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# The Development, Implementation, and Testing of an Interactive Sexual Health Web-Based Application Intervention to Reduce Sexual Risk Behaviors Among College Students

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THE DEVELOPMENT, IMPLEMENTATION, AND TESTING OF AN INTERACTIVE  
SEXUAL HEALTH WEB-BASED APPLICATION INTERVENTION TO REDUCE  
SEXUAL RISK BEHAVIORS AMONG COLLEGE STUDENTS

by

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Submitted in Partial Fulfillment of the Requirements

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The Norman J. Arnold School of Public Health

University of South Carolina

2014

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## DEDICATION

I dedicate this research to my loving parents. I would like to thank my parents Charles and Veronique Jackson and Phlonda and Kevin Jones for always imparting the importance of education in my life. Daddy, when I was seven years old I told you that I wanted to be a doctor and over the past 20 years, you, Mommy, and Nique have made countless sacrifices to make that dream come true. I cannot begin to fully understand the extent of your sacrifices, but because of each of you I was able to fulfill my lifelong dream and for that I am eternally grateful. Daddy, thank you for being the very best father and always believing in me. Mommy, I love you more than life and your support has been instrumental in my success. Nique, because of you I have two mothers, which has been the very best gift. Your advice and wisdom over the years have helped me grow tremendously. Mr. Kevin, you came into my life later, but the amount of love, support, and encouragement you always show, it feels like you've been there since the beginning. I love each of you more than you know. I also dedicate this research to my Granny, Sandra Gilliam. Granny, you are my biggest cheerleader. You have always believed in me and have supported me every step of the way. Granny, you are my main squeeze! Finally, I dedicate this research to my research participants. Each of you trusted me enough to share your stories with me through interviews, focus groups, and participating in my intervention. Without you, this research would not be possible.

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## ABSTRACT

College life is often regarded as a time for exploration and growth. One major area of exploration and growth for college students is sex and sexuality. Growth and exploration involves not only learning how to master these life situations, but also experiencing some negative consequences. Negative consequences for college students engaging in sexual risk-taking behaviors often lead to a high prevalence of sexually transmitted infections (STIs), unintended pregnancies, emotional distress, and large healthcare costs. Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of risky sexual behavior for this population, it is critical to identify factors related to decreased sexual risk behavior among college students that will decrease the incidence of STIs and HIV/AIDS. Although educational programs targeting the sexual health of young adults have been in use for quite some time, little is known about the effectiveness of newer modes of sex education. Given that more research needs to be conducted to begin to evaluate the effectiveness of new media targeting sexual health, the goal of this study was to determine the efficacy and feasibility of an interactive sexual health web-based application intervention designed specifically to decrease sexual risk behaviors among college students (*Sex 101*). Data were collected from May 2013 through February 2014 from college students (ages 18-20) at a large public university. Focus groups were conducted with 27 students. Survey data (pre- and post-test) were collected from 118 students, who participated in *Sex 101*. Qualitative analyses indicated that college students were receptive and wanting of sexual education

via web-based delivery. Quantitative results suggest no reduction in sexual risk behaviors or intention to reduce sexual risk from pre-to post-test. However, positive attitudes, positive subjective norms, and high self-efficacy predicted placement in the consistent category for use of a condom, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol. Furthermore, college students showed an increase in knowledge and attitudes for contraceptive use respectively ( $p=.000$ ,  $p=.05$ ). When designing interventions for young college students, researchers should consider incorporating theory based concepts, as well as using innovative delivery methods. Findings suggest that web-based interventions designed to decrease sexual risk behaviors among college students have the potential to be feasible and effective at reducing sexual risk behaviors in the population.



## TABLE OF CONTENTS

DEDICATION .....	iii
ACKNOWLEDGEMENTS.....	iv
ABSTRACT .....	vi
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xii
LIST OF ABBREVIATIONS.....	xiii
CHAPTER 1 INTRODUCTION.....	1
1.1 STATEMENT OF THE PROBLEM.....	2
1.2 OVERVIEW OF THE STUDY .....	4
CHAPTER 2 BACKGROUND AND SIGNIFICANCE .....	8
2.1 PREVALENCE OF RISKY SEXUAL BEHAVIOR AMONG COLLEGE STUDENTS .....	8
2.2 CONSEQUENCES OF RISKY SEXUAL BEHAVIOR .....	15
2.3 RACIAL AND ETHNIC SEXUAL HEALTH DISPARITIES .....	18
2.4 EDUCATIONAL CONTENT OF SEXUAL HEALTH INTERVENTIONS.....	21
2.5 EVIDENCE-BASED INTERVENTIONS.....	25
2.6 MODES OF DELIVERY OF SEXUAL HEALTH INTERVENTIONS .....	26
2.7 RECOMMENDATIONS FOR EFFECTIVE INTERVENTIONS .....	34
2.8 SUMMARY .....	36
2.9 STUDY SIGNIFICANCE .....	38

CHAPTER 3 RESEARCH DESIGN AND METHODS .....	40
3.1 OVERVIEW OF RESEARCH DESIGN .....	40
3.2 STUDY SETTING.....	41
3.3 CONCEPTUAL FRAMEWORK.....	42
3.4 PHASE I: FORMATIVE RESEARCH.....	43
3.5 OVERVIEW .....	43
3.6 SAMPLING .....	44
3.7 DATA COLLECTION.....	45
3.8 DATA MANAGEMENT .....	46
3.9 DATA ANALYSIS.....	46
3.10 WEB-BASED APPLICATION INTERVENTION DEVELOPMENT.....	47
3.11 PHASE II: IMPLEMENTATION AND EVALUATION .....	49
3.12 OVERVIEW.....	49
3.13 SAMPLING .....	49
3.14 DATA COLLECTION .....	51
3.15 DATA MANAGEMENT .....	52
3.16 SURVEY DEVELOPMENT .....	52
3.17 DATA ANALYSIS.....	57
3.18 DISSEMINATION PLAN .....	62
3.19 SUMMARY .....	62
CHAPTER 4 RESULTS.....	65
4.1 SEX 101: THE DEVELOPMENT OF AN INTERACTIVE SEXUAL HEALTH WEB-BASED APPLICATION INTERVENTION TO REDUCE SEXUAL BEHAVIORS AMONG COLLEGE .....	66

4.2 CAN TECHNOLOGY DECREASE SEXUAL RISK BEHAVIORS AMONG YOUNG PEOPLE? THE RESULTS OF A PILOT STUDY EXAMINING THE EFFECTIVENESS OF AN INTERACTIVE SEXUAL HEALTH WEB-BASED APPLICATION INTERVENTION TO REDUCE SEXUAL RISK BEHAVIORS AMONG COLLEGE STUDENTS .....	89
CHAPTER 5 DISCUSSION.....	122
5.1 SUMMARY OF FINDINGS .....	122
5.2 CONCEPTUAL FRAMEWORK .....	128
5.3 SYNTHESIS OF QUALITATIVE AND QUANTITATIVE FINDINGS .....	128
5.4 STUDY LIMITATIONS .....	130
5.5 STUDY STRENGTHS AND CONTRIBUTIONS TO THE SCIENTIFIC LITERATURE .....	131
5.6 CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH.....	133
REFERENCES .....	135
APPENDIX A- INVITATION LETTER.....	148
APPENDIX B- FOCUS GROUP GUIDE.....	150
APPENDIX C- WEB-BASED APPLICATION INTERVENTION STORYBOARD .....	153
APPENDIX D- ELIGIBILITY FORM .....	179
APPENDIX E- IRB APPROVAL LETTER 1 .....	180
APPENDIX F- IRB APPROVAL LETTER 2 .....	181
APPENDIX G- SEX 101 INTERVENTION SURVEY .....	182

## LIST OF TABLES

Table 3.1 Data Analysis Plan.....	60
Table 4.1 Demographic Characteristics of Study Participants .....	75
Table 4.2 Demographic Characteristics of Sample.....	102
Table 4.3 Sexual History Characteristics of Sample .....	103
Table 4.4 Knowledge Item Comparison from Pre-Test and Post-Test.....	104
Table 4.5 Pre-Test and Post-Test Comparisons of Key Psychosocial Variables.....	106
Table 4.6 Pre-Test and Post-Test Frequency Comparisons of Intentions to Reduce Sexual Risk and Actual Risk Reduction .....	107
Table 4.7 Binomial Logistic Regression: Knowledge, Attitudes, Subjective Norms, and Self-Efficacy Predicting Sexual Risk Taking .....	112

## LIST OF FIGURES

Figure 3.1 Conceptual Framework .....	42
Figure 4.1 Theoretical Framework .....	79
Figure 4.2 Types of Sex .....	82
Figure 4.3 Condom Attitudes.....	83
Figure 4.4 Types of Sex .....	96
Figure 4.5 Condom Attitudes.....	96

## LIST OF ABBREVIATIONS

CDC .....	Centers for Disease Control and Prevention
EBI .....	Evidence-based Intervention
HIV .....	Human Immunodeficiency Virus
AIDS .....	Acquired Immunodeficiency Syndrome
STI.....	Sexually Transmitted Infection
TRA.....	Theory of Reasoned Action
TTM .....	Trans-Theoretical Model of Behavior Change

## CHAPTER 1

### INTRODUCTION

College life is often regarded as a time for exploration and growth. One major area of exploration and growth for college students is sex and sexuality. Growth and exploration involves not only learning how to master these life situations, but often times it involves some negative consequences. Negative consequences for college students and sex are often sexual risk taking behaviors that lead to a high prevalence of sexually transmitted infections (STIs), unintended pregnancies, emotional distress, and large healthcare costs (Cooper, 2002, Lewis et al., 2010, Umphrey & Sherblom, 2007, Centers for Disease Control and Prevention (CDC), 2011, O'Sullivan et al., 2006, Weinstock et al., 2004, Henshaw, 1998, Lewis et al., 2009). United States (US) incidence rates for STIs are especially high among adolescents and young adults, with approximately 48% of all new STIs occurring among 15- to 24-year-olds (Weinstock et al., 2004). Approximately, 900,000 teenagers become pregnant in the US every year. The majority of these pregnancies occurs among 18-19 year olds, and most are unintended (Klein, 2005). Psychological consequences are often identified as stigma associated with an STI or HIV infection or difficulty coping with a positive STI or HIV diagnosis (Barth et al., 2002). Paul and colleagues (2000) found that both males and females who had ever hooked up had lower self-esteem than those who had not. The cost of STIs to the US healthcare system is estimated to be as much as \$16 billion annually (CDC, 2011). The poor sexual health outcomes described above are created from various sexual risk behaviors

and it is essential to identify ways in which sexual risk behaviors can be reduced among the college population.

### **Statement of the Problem**

College students represent an important population for studying and understanding factors that influence sexual risk. College life has many opportunities for self-governance and independence, and provides an important new context in which young people learn to manage their sexual relationships and their sexuality (Cooper, 2002). Like most learning processes, learning to manage one's sexuality provides opportunities for mastery and growth, but also poses risk of emotional trauma and costly physical health consequences such as unplanned pregnancy, STIs, and HIV/AIDS (Cooper, 2002).

Research indicates that 86% of college students are sexually active, but only 35% report consistent condom use during sexual intercourse (Lewis et al., 2010). Nearly 3 million young adults (15-24) (1 out of 5) are infected with an STI annually, giving them the highest STI rate among every sexually active group (Umphrey & Sherblom, 2007). Young adults are particularly at risk for STIs for a number of reasons, including their likelihood of having multiple sexual partners, their tendency to sometimes select sexual partners at high risk and lack of perceived risk for contracting an STI (O'Sullivan et al., 2006, Weinstock et al., 2004, Henshaw, 1998). Students are often aware of the dangers of contracting an STI such as HIV, yet most college students view HIV infection as an improbable health concern (Lewis et al., 2009). Given the level of newly found independence, sexual exploration, and lack of perceived risk of contracting an STI among



college aged individuals, risky sexual behaviors need to be identified and examined among this group.

Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of risky sexual behavior for this population, it is critical to identify factors related to decreased sexual risk behavior among college students that will decrease the incidence of STIs and HIV/AIDS. Although educational programs targeting the sexual health of young adults have been in use for quite some time, little is known about the effectiveness of newer modes of sex education and communication on increasing safer sex practices among college students. Interactive computer based programs, health information packages, mass media, and new media all show an increase in sexual health knowledge in varying degrees. More research needs to be done to show the impact of these newer modes of education and communication in terms of their effect on outcomes such as safer sex intentions, self-efficacy, and sexual behavior.

Sexual health interventions often involve traditional face-to-face programs that are very didactic and involve an instructor or health educator relaying sexual health information to a group of people. As shown earlier sexual health promotion is a major public health problem and there is huge potential for health promotion using technology such as the Internet. Interactive computer-based interventions (ICBIs) are programs that provide information and also decision support, behavior change support, and/or emotional support for health issues (Bailey et al., 2010). ICBIs offer potential advantages over face-to-face interventions in that access can be anonymous, repeated, and at convenient times for the user (Bailey et al., 2010). ICBIs have the potential to provide types of health promotion/treatment which may be difficult or embarrassing to access

face-to-face (for example sex therapy) and dissemination can be fast and relatively cheap online (Bailey et al., 2010). The Internet is a particularly appropriate route for the delivery of sexual health promotion to young people, since they are already confident and frequent users of Internet technology (Kanuga & Rosenfeld, 2004).

The emerging body of research on new media suggests promise for intervention programs targeting sexual health among youth and the possibility that these media are already influencing teens' sexual attitudes and behavior, both positively and negatively. But the clearest messages are that (1) adolescents are strongly involved with new media, (2) the platforms and content involved are quickly evolving, and (3) there is almost no evidence regarding the impact of most of these media (Collins et al., 2011). Given that more research needs to be conducted to begin to evaluate the effectiveness of new media targeting sexual health and in an effort to create more innovative modes of delivery for sexual health education to young people, the goal of this study was to determine the efficacy and feasibility of a interactive sexual health web-based application intervention designed to decrease sexual risk behaviors among college students.

### **Overview of Study**

To address the specific aims outlined below, the study utilized a mixed methods research design in two distinct phases: Phase I (Qualitative) and Phase II (Quantitative). Results from Phase I subsequently informed the development of Phase II. Applying a mixed methods approach assisted in fully understanding how web-based application interventions can be used to reduce sexual risk behaviors among college students. The study addressed the following specific aims:

## **Phase I: Formative Research (Qualitative Arm)**

**Specific Aim 1:** To identify the preferred content, format, and delivery structure of an interactive sexual health web-based application intervention targeting condom use, contraception use, interpersonal relationships (partner concurrency and communication with partner), and alcohol use.

**Research Question (RQ)1:** What is the preferred content, format, and delivery structure identified by college students for inclusion in the interactive web-based application intervention?

**RQ2:** How can web-based applications be used to promote safer sex practices in college students?

**Specific Aim 2:** To develop an interactive sexual health web-based application intervention based on findings from the formative research.

## **Phase II: Implementation and Evaluation (Quantitative Arm)**

**Specific Aim 3:** To pilot test and evaluate an interactive sexual health web-based application intervention with college students at the University of South Carolina.

**RQ3:** Does the interactive sexual health web-based application intervention increase knowledge, attitudes, subjective norms, and self-efficacy for the identified measures of sexually healthy behaviors (condom use, contraceptive use, interpersonal relationships, and alcohol use)? (Hereafter sexually healthy behaviors and sexual risk behaviors refer to the measures noted above).

Hypothesis 1: Participants will show an increase in sexual health knowledge for sexually healthy behaviors from pre-test to post-test.

Hypothesis 2: Participants will show an increase in positive attitudes for sexually healthy behaviors from pre-test to post-test.

Hypothesis 3: Participants will show an increase in motivation to comply with sexually healthy norms from pre-test to post-test.

Hypothesis 4: Participants will show greater self-efficacy for sexually healthy behaviors from pre-test to post-test.

**RQ4:** Does the interactive sexual health web-based application intervention increase intentions to reduce sexual risk behaviors?

Hypothesis 5: Participants will show increased intention to reduce sexual risk behaviors from pre-test to post-test.

**RQ5:** Does the interactive sexual health web-based application intervention reduce sexual risk behaviors?

Hypothesis 6: Participants will show a reduction in sexual risk behaviors from pre-test to post-test.

**RQ6:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors?

Hypothesis 7: There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors.

**RQ7:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors?

Hypothesis 8: There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors.

The format of this dissertation includes a review of the literature (Chapter 2), a discussion of the research methodology and theoretical basis (Chapter 3), research results in the form of two manuscripts (Chapter 4), and discussion and recommendations for future research (Chapter 5). In chapter 4, the manuscripts are formatted in accordance with the journal specifications to which they will be submitted.

## CHAPTER 2

### BACKGROUND AND SIGNIFICANCE

#### **Prevalence of Risky Sexual Behavior among College Students**

##### **Overview**

The most notable sexual risk behaviors are lack of condom use, number of lifetime partners, including partner concurrency, and engaging in sexual activity under the influence of drugs or alcohol (Brown & Vanable et al., 2008; ACHA, 2008; Lewis et al., 2009; Certain et al., 2009; Gullette & Lyons et al., 2005). Unprotected sexual activity is often defined as lack of condom use. Among individuals who choose to be sexually active, condom use is the only reliable method of STI and HIV prevention. However, rates of condom use among young adults, including college students, are low. A report from a national study involving a little over 4,600 undergraduate college students from 136 institutions indicated that among those students reporting participation in sexual intercourse, consistent use of a condom was only 27.9%.

Not only is condom use an important sexual risk behavior to examine, number of lifetime partners, partner type (e.g. casual, or committed), and partner concurrency are important indicators of sexual risk behavior among college students that need to be measured. College students may engage in partner concurrency, which can be defined as having multiple sexual relationships with steady and non-steady partners in a short period of time. In a study by Certain and colleagues (2009) college students understood that in

general they needed to use condoms if they had multiple or concurrent sexual partners, but they did not always use condoms in these situations, which increases risk of STI and HIV transmission. Another reason that college students are at high risk for acquiring an STI or HIV is alcohol and/or substance use combined with sexual activity. Alcohol and substance use likely mediate STI and HIV transmission risk among college students (Gullette & Lyons, 2005). Over 30% of college students report drinking alcohol before sex (Brown & Venable, 2007) and about 15% of students who drank alcohol also had unprotected sex (ACHA, 2008).

### **Lack of Condom Use**

Unprotected sexual activity is often defined as lack of condom use. Among individuals who choose to be sexually active, condom use is the only reliable method of STI and HIV prevention. However, rates of condom use among young adults, including college students, are low. For instance, research has shown that 4.5%, 27.9%, and 52.8% of sexually active students used condoms during their most recent oral, vaginal, and anal intercourse experiences, respectively (ACHA, 2008). A report from the National College Health Risk Behavior Survey (NCHRBBS), published in the Morbidity and Mortality Weekly Report by the CDC (1997) reported the results of a study that examined sexual behavior and condom use among college students. The study involved 4,609 undergraduate college students from 136 institutions across the US. Results included the following: 86.1% of the students in the study reported having sexual intercourse and 34.5% of the students indicated participation in sexual intercourse with six or more partners during their lifetime. Only 29.6% of the students reporting participation in intercourse also reported use of a condom at the most recent time they had participated in

sexual intercourse. Among those students reporting participation in sexual intercourse, consistent use of a condom was only 27.9%.

DeLorío et al. (2000) conducted a study to understand the correlates of safer sex communication among college students. The purpose of the study was to examine factors that are thought to promote communication about safer sex and HIV among college students in the US and to determine the extent to which communication about safer sex is important in the use of condoms. For the sample of 1,349 participants, the mean age was 20.6 years. Sixty-three percent of the sample was female and 37% male; 50.5% White, 42.3% African American, and 7.2% Other. Over 50% of respondents reported frequent condom use, with 28% noting that they used a condom every time and 30.6% reporting condom use almost every time they had sex. Only 9.6% indicated that they never used a condom (DeLorío et al., 2000). These results are consistent with other national studies indicating that less than 30% of college students report consistent condom use, the only reliable method of STI/HIV and unintended pregnancy prevention.

Holland and French (2012) examined condom negotiation strategy use and effectiveness among college students and once again found that condom use was low. The study included 262 sexually experienced heterosexual undergraduate students recruited from a university in southern California. Data for the study was gathered as part of a large Web-based survey in the spring of 2004. The majority of the sample were female (60.7%; n=159), and 39.3% were male (n= 103). The sample was racially and ethnically diverse, with 44.7% Asian Pacific Islander (n= 117), 26.3% White (n= 69), 22.9% Hispanic (n= 60), and 6.1% African American (n= 16). The ages of participants ranged from 18–32 (with only three participants 24 or older) with a mean age of 19.5.



Just over half of the sample reported being in a monogamous relationship (52.3%; n= 137), 27.1% reported being in a casual relationship (n= 71), and 20.6% reported no current relationship (n= 54). A condom use composite score was created by averaging participants' scores on two items that assessed how often they used condoms. The first item asked, "How often do you or your partner use condoms when you engage in sexual intercourse?" The second item asked, "In the past 6 months, how often have you or your partner used condoms when you engage in sexual intercourse?" Responses on both items were scored on a six-point scale ranging from 1 (never) to 6 (every time). The correlation between the two items was (r. .91). They found that men reported more condom use than women overall, but results indicated that using condom influence strategies (such as withholding sex, direct request, risk information, etc.) were especially vital for increasing condom use for women. There were no differences reported in condom use for race or ethnicity and relationship type (Holland & French, 2012). This study shows that overall condom use is low among the college population, but strategies can be employed to increase condom use that have the potential to reduce the risk of STIs and HIV.

### **Lifetime Partners, Partner Type and Partner Concurrency**

Not only is condom use an important sexual risk behavior to examine, number of lifetime partners, partner type (e.g. casual, or committed), and partner concurrency are important indicators of sexual risk behavior among college students that need to be measured as well. Males typically report more lifetime partners compared to females (Lewis et al., 2009). Many students feel that using condoms is not necessary with a primary partner, but they are more inclined to use a condom with a casual partner, especially among women (Lewis et al., 2009). College students may also engage in

partner concurrency, which can be defined as having multiple sexual relationships with steady and non-steady partners in a short period of time. In a study by Certain and colleagues (2009) college students understood that in general they needed to use condoms if they had multiple or concurrent sexual partners, but they did not always use condoms in these situations, which increases risk of STI and HIV transmission. In a broader sense, outside the college population, sexual networks and patterns of partner mixing play a critical role in the spread of STIs throughout the population (Adimora et al., 2002; Morris et al., 2010).

One pattern that can accelerate the transmission of STIs is concurrent sexual partnerships. Concurrency can be as short as a single episode of sex with a secondary partner during an ongoing relationship with a primary partner, or it can go on for years, if one person has regular sexual contact with two or more people. Both forms involve “going back to” a previous partner, and starting a new partnership before the previous one has ended (Morris et al., 2010). Compared with sequential monogamy, concurrent relationships permit more rapid spread of an STI through a population because an individual who becomes infected by one partner already has other partners to infect. In addition, an individual’s partners who entered the concurrent partnership earlier are put at risk for infections from that individual’s subsequent partners (Adimora et al., 2002; Morris et al., 2010). Morris and colleagues conducted a comparison of data from three studies of sexual behavior carried out in the early 1990s in Uganda, Thailand and the US to assess the international variations in historical sexual partnership concurrency and HIV prevalence (2010). They found that about 20% of Black and Hispanic men reported concurrencies in the past year. About half as many US White men (11%) and even fewer

men of other races (8.6%) did so. The annual cumulative prevalence of concurrency among US women was 9.7% for Black women, 7.7% for Hispanic women, 5.2% for White women, and 0% for all other races (Morris et al., 2010). The same type of partnering prevalence in the general population can also happen in the college population and these concurrent relationships have been shown to be a major player in the high rates of STIs and HIV transmission.

### **Alcohol Use and Sexual Risk Taking**

Another reason that college students are at high risk for acquiring an STI or HIV is alcohol and/or substance use combined with sexual activity. Many college students are binge drinkers, with binge drinking defined as 5 or more drinks on one occasion for men and 4 or more drinks on one occasion for women. The most recent Harvard College Alcohol Study (CAS) reported that 43% of college students reported binge drinking in the past 30 days (Hingson et al., 2005). The 2006 Executive Summary of the American College Health Association found that 21.8% of students reported binge drinking in the past 2 weeks (ACHA, 2007). The Harvard CAS also found that 8% of college students reported that they had had unprotected sex due to drinking, and 2% were victims of alcohol-related sexual assault (Hingson et al., 2005; Hingson et al., 2002). A separate survey found that the influence of alcohol consumption on the decision to have sex was a common reason for sexual regret (Oswalt, 2005). An additional study found that 30% of college students report drinking alcohol before sex (Brown & Venable, 2007) and risky sexual behaviors are also related to more days of drinking and binge drinking days (Lewis et al., 2009).

Given the frequency of sexual activity and binge drinking on college campuses, Certain and colleagues (2009) conducted an in depth study on condom use in heavy drinking or binge drinking college students. A total of 12,900 people were initially screened for inclusion in the study and 4,512 people (36%) screened positive for heavy drinking. Of these, 1,888 (40%) did not wish to be included in the study. An additional 534 did not return to complete the interview. A total of 2,090 (45.2%) participants completed the face-to-face interview, of whom 1,715 (82%) had sexual intercourse (not including oral sex) during the 6 months prior to completing the survey. The researchers found that approximately 1 in 3 participants (36%) reported they always used condoms during sex, 20% that they usually used condoms, 9% that they used condoms half the time, and 35% reported that they used condoms seldom. For men, 43% reported that they always used condoms, compared to 31% of women. The mean number of sexual partners in the past 6 months was 1.70 for men and 1.55 for women. Of the participants, 84 students (5%) reported an STI in the last 6 months. In examining alcohol use, the majority of students fell into the high maximum consumption category (n= 1,060, 62%). Male students who drank heavily were less likely to always use condoms. Participants with more sexual partners used condoms less when drinking. Overall, the researchers found that many students do not use condoms consistently, especially those who drink heavily or have multiple sexual partners (Certain et al., 2009). These findings show the importance of researchers and clinicians at campus health centers to encourage all students to use condoms every time they have intercourse.

The prevalence of risky sexual behavior among college students shows that college students may engage in lack of condom use, have multiple sex partners, engage in partner

concurrency, and use alcohol or illegal substances before sexual activity, which can lead to negative consequences. Those negative consequences include both physical and psychological health consequences for college students.

## **Consequences of Risky Sexual Behavior**

### **Physical Consequences**

Individuals who engage in risky sexual behavior are at risk for a number of negative physical and psychological consequences. Physical consequences are often identified as STIs, HIV, and unintended pregnancies (Henshaw, 1998; CDC, 2011; Weinstock et al., 2004). It is important to make a distinction between treatable and curable STIs. Treatable STIs include genital herpes, HPV (genital warts), and HIV/AIDS. These STIs are not curable and are lifelong chronic diseases that can be treated and managed with medication or other tertiary health interventions. Human papillomavirus (HPV) is the most common treatable STI in the US, with an estimated 6.2 million new infections diagnosed annually (Liddon et al., 2010; Gerend & Barley, 2009). Although most infections of HPV resolve spontaneously without any medical intervention, HPV is a serious STI that many sexually active individuals will contract at some point in their lifetime. Curable STIs include: chlamydia, gonorrhea, syphilis, and trichomoniasis. These STIs can be cured and are important to identify at earlier stages of infection. It is important to note that late stage syphilis is no longer curable and has severe consequences. Chlamydia and gonorrhea are the most common curable STIs. Chlamydia is the most frequently reported bacterial STI. An estimated 2.8 million infections occur annually in the US (CDC, 2012). Gonorrhea is a very common infectious disease. CDC

estimates that more than 700,000 persons in the US get new gonorrheal infections each year (2012).

United States incidence rates for STIs are especially high among adolescents and young adults, with approximately 48% of all new STIs occurring among 15- to 24-year-olds (Weinstock et al., 2004). In 2006, the number of HIV and AIDS cases that occurred among persons aged 15 to 24 years accounted for approximately 14% of all HIV and AIDS cases diagnosed during that year (CDC, 2007). Findings from a recent national survey indicate that among sexually active college students, 3.3% of women and 1.1% of men reported having genital warts (HPV), 1.2% of women and 0.6% of men reported having genital herpes, and 0.2% of women and 0.4% of men reported having HIV in the past academic year (ACHA, 2008). Unintended pregnancies are also a major negative physical health consequence of risky sexual behavior. Approximately, 900,000 teenagers become pregnant in the US every year. The majority of these pregnancies occur among 18-19 year olds, and most are unintended (Klein, 2005). Eighteen to nineteen year olds are also the ages of newly admitted college students, so unintended pregnancies are not only a major issue for teens, but for young adults. Not only are physical consequences important to examine, so are psychological consequences.

### **Psychological Consequences**

Psychological consequences are often identified as stigma associated with an STI or HIV infection or difficulty coping with a positive STI or HIV diagnosis (Barth et al., 2002). Barth and colleagues (2002) conducted a qualitative study to examine the factors that influence college students' decisions to seek testing for STIs. While the study did not

directly examine psychological consequences of risky sexual behaviors, the results revealed some psychological consequences of positive STI or HIV diagnoses among college students. Sixty-six students (18-22 years old) participated in the study and the researchers found that negative personal emotions and social stigma were common barriers to STI and HIV testing. Those barriers to STI and HIV testing directly translate to some of the psychological consequences for risky sexual behavior. Participants expressed shame, guilt, and fear with possibly having an STI. One participant said, “Guilty because you think it’s your fault” (Barth et al., 2002, p. 155). Not only did participants express negative personal emotions, they also expressed concern regarding social stigma surrounding the idea of STIs and not feeling comfortable being known to have an STI. Many participants cited embarrassment with getting tested and embarrassment and fear with testing positive for an STI or HIV.

Not only do psychological consequences come from STI or HIV infections, psychological consequences can also come from engaging in sexual activity with a random partner (Fielder & Carey, 2010). Having sex with a random partner is also defined as “hooking up”. Hooking up is defined as a, “catch all term used by adolescents and young adults to describe a sexual interaction between two partners who expect no romantic commitment” (Fielder & Carey, 2010, p. 1105). Hookups are believed to be very common on college campuses, with estimates ranging as high as 81% of students reporting at least one hookup experience (Lambert et al., 2003; Paul & Hayes, 2002; Paul et al., 2000). In a cross-sectional study of college students, Grello and colleagues (2006) found that women who had engaged in casual sex reported more distress than virgins or women who had engaged in sex with only romantic partner. Engaging in hookups may

also affect other mental health outcomes, such as an individual's self-esteem. Paul and colleagues (2000) found that both males and females who had ever hooked up had lower self-esteem than those who had not.

These consequences of risky sexual behavior continue to show the need for more social support and acceptance surrounding STI and HIV testing, as well as more social support for people living with incurable STIs or HIV/AIDS. Furthermore the mental health issues that may result from 'hooking up' need to be addressed and given proper attention in sexual education programs and initiatives. Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of risky sexual behavior for this population, it is critical to identify factors related to decreased sexual risk behavior among college students that will decrease the incidence of STIs and HIV/AIDS.

## **Racial and Ethnic Sexual Health Disparities**

### **General US Population**

One of the two overarching goals outlined in Healthy People 2020 and Healthy Campus 2020 is to eliminate health disparities among different segments of the US population (ACHA, 2010; DHHS, 2010). Sexual health disparities, in particular, remain a critical public health problem, as rates of HIV/AIDS are disproportionately higher among African Americans compared to Whites. For example, in 2009, African Americans represented 14% of the US population, but accounted for almost half (44%) of all new HIV infections (CDC, 2012b). In terms of race/ethnicity and gender/sex, the highest rate of new HIV infections in 2009 was among African American males (70% of the new



HIV infections among all African Americans). The estimated rate of new HIV infection for African American men was more than six and a half times as high as that of White men, and two and a half times as high as that of Latino men or African American women (CDC, 2012b). African Americans in the US also tend to be disparately affected by other STIs. According to the most recent surveillance data, almost half of all new chlamydia cases in 2007 occurred among African Americans; this group's chlamydia rate was approximately 8 times higher than the rate for Whites (CDC, 2011).

### **College Population**

Although national surveillance data are clear on disparities among adults in the general population, little is known about the sexual health differences among college students specifically. Recent campus- and county-level studies, however, provide clues that HIV and other sexual health problems are pressing among young people and, particularly, among African American college students. For instance, James and colleagues revealed that among students attending 10 colleges in Alabama, Georgia, and Mississippi, the chlamydia prevalence for African Americans was 11% compared with 1% for Whites (2008). Buhi and colleagues (2010) utilized secondary data from 44,165 non-married undergraduates (aged 18–24;  $M=20.1$ ) responding to the Spring 2007 American College Health Association–National College Health Assessment (ACHA-NCHA). The ACHA-NCHA is a survey that assesses a range of college students' perceptions and health issues, including alcohol, tobacco, and other drug use, sexual health, weight, and nutrition. With regards to sexual behavior the survey assesses, condom use, number of sexual partners, STI/HIV testing, contraceptive use, and unintended pregnancy.

From this national sample of college students, a smaller percentage of African American students (61.9%) reported ever engaging in oral, vaginal or anal sex, compared with White students (72.5%), and a smaller percentage of African American women (58.1%), compared with White women (71.7%), reported ever having oral sex. A greater percentage of White women (21.1%) reported ever engaging in anal sex compared with African American women (17.4%). Compared with White students, a greater percentage of African American students reported condom use for all three sexual behaviors (oral, vaginal, and anal sex). Almost 9% of all students with any sexual experience reported having 4 or more sex partners within the last school year. Compared with White students (8.3%), a greater percentage of African American students (11.8%) reported having 4 or more sex partners. Furthermore almost twice as many African American men reported having 4 or more sex partners than did White men (19% compared with 11%, respectively). Almost twice as many African American students (42.6%) reported HIV testing, compared with White students (23.6%). African American men and women, compared with White men and women, were more likely to report using no method of contraception. Although very few students in the sample reported having an STI in the last school year (3.9%), a greater percentage of African American students reported having an STI in the last school year as compared to Whites. The most frequently reported STIs were genital warts (2.4%), chlamydia (0.8%), and genital herpes (0.7%) (Buhi et al., 2010).

This data from Buhi and colleagues (2010) indicates that Whites reported more experience in oral and anal sex, were less likely to use condoms for oral, vaginal, and anal sex, and less likely to have been tested for HIV compared with African Americans.

However, African Americans reported more sex partners, lower use of hormonal contraceptives, and higher rates of adverse sexual health outcomes, such as STIs and unintended pregnancy (Buhi et al., 2010). These statistics highlight the need to increase access to hormonal contraceptives and early STI screening/treatment among African Americans, improve HIV testing among Whites, and increase condom use promotion for all students. One way to address the aforementioned recommendations is through targeted and guided sexual health interventions designed for a college-aged population. The most notable interventions are educational interventions.

### **Educational Content of Sexual Health Interventions**

#### **Abstinence-only Education Programs**

Formal school-based sex education programs aimed at reducing risks of teenage pregnancy and STI acquisition generally promote one of two types of messages regarding sexual activity: (1) abstinence-only messages, or (2) comprehensive sex education messages. Abstinence-only messages teach that sex should be delayed until marriage, and discussion of birth control methods is typically limited to statements about ineffectiveness (Kohler et al., 2008). Comprehensive programs include abstinence messages, but also provide information on birth control methods to prevent pregnancy and condoms to prevent STIs and HIV/AIDS (Kohler et al., 2008).

The federal government began supporting abstinence-only promotion programs in 1981 through the Adolescent Family Life Act (AFLA), and since 1996 there have been major expansions in federal support for abstinence-only education programs (Santelli, 2006). In 1996 Congress introduced Section 510(b) of Title V of the Social Security Act,

allocating federal dollars for state initiatives promoting abstinence-only programming and establishing criteria for defining abstinence education. To receive federal Title V funding, a sex education program must have as its exclusive purpose:

Teaching the social, psychological, and health gains to be realized by abstaining from sexual activity; teaches abstinence from sexual activity outside marriage as the expected standard for all school age children; teaches that abstinence from sexual activity is the only certain way to avoid out-of-wedlock pregnancy, sexually transmitted diseases, and other associated health problems; teaches that a mutually faithful monogamous relationship in the context of marriage is the expected standard of human sexual activity; teaches that sexual activity outside of the context of marriage is likely to have harmful psychological and physical effects; teaches that bearing children out-of-wedlock is likely to have harmful consequences for the child, the child's parents, and society; teaches young people how to reject sexual advances and how alcohol and drug use increases vulnerability to sexual advances; and teaches the importance of attaining self-sufficiency before engaging in sexual activity. (Santelli, 2006, p.842)

Although several avenues of federal funding for formal sex education programs are available, all require adherence to abstinence-only messages as defined above by Title V. There are many different groups across the US advocating for abstinence-only sex education in schools. They include Concerned Women for America, the Eagle Forum, the Family Research Council, Focus on the Family, the Heritage Foundation, the Medical Institute for Sexual Health (MISH), the National Coalition for Abstinence Education, and STOP Planned Parenthood International.

These and other proponents of abstinence-only education argue primarily that sex before marriage is inappropriate or immoral and that abstinence is the only method, which is 100% effective in preventing pregnancy and STIs (Collins et al., 2002). In addition, many abstinence- only advocates are deeply concerned that information about sex, contraception, STIs, and HIV can encourage early sexual activity among young people (National Abstinence Education Association, 2012). Abstinence-only proponents point to studies concluding that the abstinence-only education message has played a central role in the decline of adolescent sexual activity, and related negative health outcomes, over the last decade such as declines in adolescent pregnancy, birth, and abortion rates. Another group, Focus on the Family, posits what they believe is a dangerous inconsistency in health curricula:

From tobacco, alcohol and drug use, to fighting, gun use and drunk driving, the prevailing message is ‘don’t do it’ – avoid or eliminate the risk, but when it comes to sex and all the potential dangers that accompany it, the message is, use condoms to reduce your risk of unwanted pregnancies and sexually transmitted diseases (Focus on the Family, 2008). Abstinence-only education has many supporters that believe that all healthy sexual activity takes place within the covenant of marriage and no sex outside of marriage is safe sex, however comprehensive sex education supporters believe that an abstinence-only message is unrealistic and comprehensive knowledge about sex, including an abstinence message will lead to the best outcomes for teens and young adults. This position is also supported by scientific research (Boonstra, 2009; Eisenberg et al., 2008; Kohler et al., 2008; Collins et al., 2002).

## **Comprehensive Sex Education Programs**

Comprehensive programs include abstinence messages, but also provide information on birth control methods to prevent pregnancy and condoms to prevent STIs. According to the results of a 2005–2006 nationally representative survey of US adults, published in the Archives of Pediatrics and Adolescent Medicine, there is far greater support for comprehensive sex education than for the abstinence-only approaches, regardless of respondents' political leanings and frequency of attendance at religious services. Overall, 82% of those polled supported a comprehensive approach, and 68% favored instruction on how to use a condom; only 36% supported abstinence-only education (Boonstra, 2009). Mounting evidence demonstrates the effectiveness of comprehensive sexuality education and the ineffectiveness of abstinence-only education programs (Eisenberg et al., 2008; Kohler et al., 2008). An assessment of the impact of formal sex education programs on teen sexual health using nationally representative data found that abstinence-only programs had no significant effect in delaying the initiation of sexual activity or in reducing the risk for teen pregnancy and STIs. In contrast, comprehensive sex education programs were significantly associated with reduced risk of teen pregnancy, whether compared with no sex education or with abstinence-only sex education, and were marginally associated with decreased likelihood of a teen becoming sexually active compared with no sex education (Kohler et al., 2008).

Furthermore, newly released evidence from a rigorous review of federally funded abstinence-only programs, sponsored by the Department of Health and Human Services (DHHS), found that although abstinence-only programs may lead to improvements in several psychosocial variables (e.g., intentions to remain abstinent, social norms

supportive of abstinence, and perceived consequences of premarital sex) youth in the programs were no more likely than controls to abstain from sex, and among those who were sexually active, they had similar numbers of sexual partners and the same mean age of sexual debut (Eisenberg et al., 2008). The weight of the evidence from peer-reviewed scientific journals clearly shows that some comprehensive sex education programs can reduce behavior that puts young people at risk of HIV, STIs, and unintended pregnancy, and that these programs do not promote earlier onset of sexual activity or an increased number of sexual partners among adolescents. By contrast, little if any credible research exists to substantiate the claims that abstinence-only programming leads to positive behavior change among youth (Collins et al., 2002). Given this, comprehensive sex education programs have to be utilized and the gold standard of comprehensive sex education interventions is evidence-based interventions (EBIs).

### **Evidence-Based Interventions (EBIs)**

EBIs are treatments that have been proven effective (to some degree) through outcome evaluations. As such, EBIs are treatments that are likely to be effective in changing target behavior if implemented with integrity. The EBI movement has an extensive history across Medicine, Clinical and Counseling Psychology, and Public Health. The CDC compiles a list of EBIs every year. With regards to sexual health, CDC classifies EBIs for HIV behavioral interventions. The EBIs listed in the *Compendium* have been identified by HIV/AIDS Prevention Research Synthesis (PRS) through a series of efficacy reviews and are classified as either best-evidence or good evidence (CDC, 2012c). These interventions represent the strongest HIV behavioral interventions in the scientific literature to date that have been rigorously evaluated and

have demonstrated evidence of efficacy. The *Compendium* includes individual, group, and community level behavioral interventions for high-risk populations. Currently the *Compendium* includes 74 best and good evidence programs (CDC, 2012c).

For example, Becoming a Responsible Teen (BART) is a group-level, education and behavior skills training intervention designed to reduce risky sexual behaviors and improve safer skills among African American adolescents (St. Lawrence et al., 1995). The sessions were designed to help participants clarify their own values and teach technical, social, and cognitive skills. Through discussions, games, videos, presentations, demonstrations, role-plays, and practice, adolescents learn problem solving, decision-making, communication, condom negotiation, behavioral self-management, and condom use skills. In addition, the intervention encourages participants to share the information they learn with their friends and family and to provide support for their peers to reduce risky sex behaviors (St. Lawrence et al., 1995). This is just an example of an EBI verified by the CDC for replication. Others are relevant to the current work as well, including the, The Cognitive-Behavioral STD/HIV Risk-Reduction Program (Boyer et al., 1997) and Female Condom Skills Training (Choi et al., 2008). Given this data, current and past comprehensive sex education programs will be reviewed.

### **Modes of Delivery of Sexual Health Interventions**

#### **Traditional Face-to-Face Interventions**

When educating about sexual health, traditional face-to-face interventions have been used widely (Kirby, 2002). The face-to-face interventions found to be most effective used a combination of educational, psychosocial, and behavioral components, delivered



via a range of activities including lecturers, audio-visual aids, role-plays, and games (Kirby, 2002; Pedlow & Carey, 2004; Pooblan et al., 2009). Evidence on the optimum duration of face-to-face interventions is inconsistent across all outcomes. In a systematic review of literature, Pooblan and colleagues found that sustained interventions that included multiple booster sessions (Kim et al., 1997; Robin et al., 2004) were more effective than single sessions either of short or longer duration (Kalichman, Carey and Johnson, 1996; Pedlow & Carey, 2004). In the review by Darbes (2006) it was also highlighted that multiple short sessions over long periods of time were more effective than long sessions over short periods of time (e.g. seven sessions of 90 minutes is better than three sessions of 3.5 hours, although the total number of hours is the same). Others say that duration per se is not important, but duration of at least three hours may be effective if combined with the appropriate format of the intervention (Applegate, 1998). In the past and more recently interactive computer-based interventions have also been widely used.

### **Interactive Computer-based Interventions**

Sexual health promotion is a major public health challenge. There is huge potential for health promotion using technology such as the Internet. Interactive computer-based interventions (ICBIs) are programs that provide information and also decision support, behavior change support, and/or emotional support for health issues (Bailey et al., 2010). Interactive programs require contributions from users to produce tailored material and feedback that is personally relevant. ICBIs have been effective in promoting behavior change among people with chronic diseases such as diabetes or heart disease, leading to improved knowledge, social support, health behaviors, and clinical

outcomes (Murray et al., 2005; Wantland et al., 2004). A systematic review of ICBI for health promotion showed improved health behaviors for nutrition, tobacco use, substance use, safer sexual behavior, and binge/purge behaviors (Portnoy et al., 2008). ICBI offer potential advantages over face-to-face interventions in that access can be anonymous, repeated, and at convenient times for the user (Bailey et al., 2010). Interventions can offer individualized feedback, and can promote active learning through interactive elements (Bailey et al., 2010). ICBI have the potential to provide types of health promotion/treatment which may be difficult or embarrassing to access face-to-face (for example sex therapy) and dissemination can be fast and relatively cheap online (Bailey et al., 2010). The Internet is a particularly appropriate route for the delivery of sexual health promotion to young people, since they are already confident and frequent users of Internet technology (Kanuga & Rosenfeld, 2004).

Bailey and colleagues (2010) searched more than thirty databases for randomized controlled trials on ICBI targeting sexual health to produce a comprehensive review. The search generated 11,363 citations. From these, the researchers identified 143 citations for possible inclusion. Of the possible 143 citations, 15 studies described in 17 papers met the criteria for inclusion. The studies assessed various outcomes. Cognitive outcomes included: sexual health knowledge, self-efficacy (ability to effectively use a condom), intentions (condom use, STI/HIV testing, etc.), and attitudes (values and beliefs towards sexual activity and perceived susceptibility to pregnancy, STI or HIV). Behavioral outcomes included: condom use, condom carrying, and STI/HIV testing. Biological outcomes included assessing self-reported STI diagnosis. None of the 15 studies reviewed assessed economic or adverse outcomes (Bailey et al., 2010). Furthermore the

researchers found that ICBI have statistically significant effects as follows: a moderate effect on sexual health knowledge; a small effect on self-efficacy; a small effect on safer-sex intentions; and also an effect on sexual behavior. ICBI show promising effects on the mediators of change in sexual behavior (knowledge, self-efficacy, and intention), and also an effect on safer-sex behaviors. This review also shows that ICBI improve sexual health knowledge (Bailey et al., 2010). The diversity of studies included in the review shows that ICBI are feasible for a variety of people in different settings. Not only are ICBI utilized to educate youth and young adults about sex, more traditional modes of communication are also used, such as print media.

### **Print Media**

Health information packages are print media that provide education and information on sexual health including information on STIs, condoms, and sexuality. Health information packages are normally pamphlets, brochures, or fact sheets (McKenzie et al., 2005). Health information packages are often used as stand-alone educational materials, but are also used in conjunction with face-to-face sex education or other modes of sexual health prevention. Organizations that promote comprehensive sexual health often produce and print health information packages. Printed health information packages are valuable resources for educating students, clients, patients, and the general public (McKenzie et al., 2005). For example, Planned Parenthood on the state and national level regularly publishes educational information on a variety of sexual health topics (Planned Parenthood Federation of American, Inc., 2013). Traditional modes of educating young people about sex have been shown to be effective, but more creative and far reaching methods are also being used such as mass media campaigns.

## Mass Media Campaigns

The amount of time and attention that young people give to mass media and popular culture provides an ideal opportunity for using these modes to communicate with young adults about sexual health. In fact, in one recent study, teens ranked media as the primary source of sex information (Kaiser Family Foundation, 2004 found in Horner et al., 2008). Many types of media influence sexuality, including television, movies, newspapers, magazines, popular music, and, most recently, the Internet and social media sites such as Facebook and Twitter (Collins et al., 2011). While teens and college students may be presented with inaccurate or even harmful information through the media, media that incorporates public health messages about condom use and other safe-sex practices can be beneficial in decreasing risky sexual behavior and ultimately the prevalence of STIs.

While the media have been used effectively to promote sexual responsibility in other countries for decades, few such opportunities have been seized in the US. Considerable experience with mass media HIV-prevention campaigns has been gained from the developing world. These interventions suggest that safer sexual behavior can be encouraged by media messages that promote favorable norms and behavior in entire communities. Furthermore, successful interventions have employed sufficiently intense schedules of television or radio to reach the youth audience (Romer et al., 2009). In South Africa, for instance, the LoveLife program found that mass media in combination with a face-to-face intervention was associated with decreased risk of HIV infection, decreased number of partners, and increased use of condoms (LoveLife, 2004). Furthermore, a radio and television HIV prevention campaign in Ghana directed at those aged 15 to 30 years

was successful in decreasing sexual initiation among the youngest cohort. More generally, the media campaign increased awareness of AIDS and condom use among the sexually active (McCombie et al., 2002). Another study in Ghana examining the effect of a mass media campaign, directed at those aged 15 to 24 years, found that the campaign increased personal risk perceptions and self-efficacy for condom use and lowered the perceived difficulties of obtaining a condom, (Agha, 2003). More recently, a mass media campaign in Kenya was successful in increasing the utilization of HIV testing among those aged 15 to 39 years, (Marum et al., 2008). The studies cited above show the effectiveness of using mass media campaigns to promote sexual behavior change in the young adult population.

Although media interventions designed to influence adolescent sexual behavior have been attempted in the US, evaluations have only recently been able to isolate the effects of the media from other intervention components (Romer et al., 2009). A multimedia campaign directed to youth aged 14–18 years in Sacramento, California, was associated with a 4.3% population-based increase in condom use with steady partners (Kennedy et al., 2000). An intensive television campaign directed to youth aged 14–18 years in Portland, Oregon, was associated with a 10% increase in condom use for new partners (Polen, 1995). This finding was consistent with the emphasis in the campaign messages on new partners. Finally, in Lexington, Kentucky, a television campaign aimed at young adults who were above average in the sensation-seeking trait resulted in greater condom use and condom use self-efficacy and intentions (Zimmerman et al., 2007).

It has been found that motivational media campaigns using clear, simple messages, multiple media channels, and positive images can increase awareness about the risks of

being sexually active and teach people how to take preventive measures (Kirby et al., 1999). In all health communication programs, the involvement of members of the target audience as educators, coordinators, and program developers is considered key to success (AIDS Alert, 2000). Previous work shows that, to be successful, media-based campaigns for sexual health should: 1. Conduct formative research to define campaign goals, select target audiences, identify media channels, and refine the campaign strategy; 2. Tailor messages so they speak to the audience members' "world view," and use credible sources and appropriate and understandable language; 3. Ensure exposure by working with media gatekeepers and using cost-effective approaches (e.g. radio, billboards) as well as entertainment and news; 4. Frame the issues in terms important to policy-makers, thus taking advantage of the agenda-setting function of mass communication; 5. Combine media and community strategies to leverage program activity in the community; 6. Apply behavior change models—begin by increasing awareness and move on to increase knowledge and change beliefs, teach new skills, and sustain behavior change; 7. Evaluate, with attention to complex media effects, not only behavior change, but also collecting data on other indicators, preferably using a control group (Keller & Brown, 2002). The recommendations provided above should be employed when developing media-based campaigns for sexual health. Media campaigns are able to reach a broad audience, but lack the ability to make interventions individualized and possibly more meaningful. In contrast, new media has the potential to reach many while still allowing for individualized attention.

## **New Media**

New media interventions involve the use of computers, the Internet, cell phones, and video games to try to improve sexual health or reduce risky sexual behavior (Collins et al., 2011). Given their reach and the level of youth involvement, digital media have tremendous capacity to reduce sexual risk-taking. Other advantages of cell phone and Internet interventions include the ability to reach populations isolated by rural location, lack of transportation, or stigma. Perhaps the greatest advantage in terms of potential program efficacy is that digital interfaces allow individualized and interactive intervention. In the past, video or print materials were largely limited to use in didactic programs, but cell phone and Internet-based interventions make it possible to create multiple pathways through such materials in response to participants' individual inputs. For example, this could be achieved by exposing males and females to different information based on their gender. Increasing evidence suggests that tailored interventions are more effective in changing behavior and that discussion leads to greater change than didactic intervention. Digital formats can also lend themselves to simplified evaluation and automatically or very easily obtaining data from participants (Collins et al., 2011).

Noar and colleagues (2010) have discussed some additional advantages, including the inherent scalability of the intervention (i.e., interventionists can move from dissemination to a small population to an extremely large one with relatively little change in approach) and the fact that there is no need to maintain a facility for group or individual sessions. It is also possible to eliminate or greatly reduce the training of facilitators and ensure fidelity through the use of standardized materials. While there are

many benefits to using digital formats of media, there may be some negative consequences. It is possible that youth pay less attention to material when it is presented online or on a cell phone, since there is sometimes no teacher or group facilitator present to keep them on task. Users might also skip through the material or miss entire modules of a program, likely reducing effectiveness (Collins et al., 2011). In spite of their popularity with youth and their great potential to harness social influence processes among interconnected peers, Collins and colleagues (2011) encountered only one evaluation of an online intervention involving social networking sites and it had minimal effects.

The emerging body of research on new media suggests promise for intervention programs targeting sexual health among youth and the possibility that these media are already influencing teens' sexual attitudes and behavior, both positively and negatively. But the clearest messages are that (1) adolescents are strongly involved with new media, (2) the platforms and content involved are quickly evolving, and (3) there is almost no evidence regarding the impact of most of these media (Collins et al., 2011). More research needs to be conducted to begin to evaluate the effectiveness of new media targeting sexual health.

### **Recommendations for Effective Interventions**

The most common recommendation for effective interventions throughout the literature is ensuring that process and impact evaluation is assessed. Computer-based interventions need to adhere to good design and presentation, while maintaining consistent delivery (Bailey et al., 2010). Researchers have good control over the contents



and presentation of computer-based interventions, but the user has control over the use they make of a computer-based intervention, including the frequency and amount of use. Each user can construct their own unique experience of any given intervention (Bailey et al., 2010). This may make it hard to determine whether an intervention works. It may be that the intervention can work if used in the way planned by the developer, but that most users use it in a way that renders it ineffective, or vice-versa. This highlights the importance of process evaluations to gather users' viewpoints and to assess how interventions are used (Bailey et al., 2010). Not only is process and impact evaluation important, qualitative groundwork is also important.

Qualitative groundwork is essential in helping to understand the realities and complexities of sexual behavior (Marston & King, 2006) and to understand which behavior change theory is most applicable (Noar et al., 2007). For example, knowing the main reasons for risky behavior in a particular population (e.g. inaccurate knowledge, impulsive behavior, power imbalance) helps to suggest which factors an intervention should target. Interventions which may be unsuccessful from a public health perspective, but may be successful by other criteria: for example, while an intensive school-based intervention did not have an impact upon age at first intercourse, condom use, or contraception; it did increase knowledge, and reduce regret of first sex (Wight et al., 2001). It is therefore important that interventionists' criteria for success take into account broader definitions of sexual health, and also that the aims of an intervention match participants' priorities.

Sexual health interventions based in new media or incorporating new media components should be developed and tested. The broad reach and high interest level of

these media among youth suggest great potential for these approaches. It will be important for these interventions to be informed by sound theory; existing or newly developed. Avoiding the pitfalls that many mass media interventions encounter by assuming that any accurate, broadly distributed message will be effective will be the key to success in this area (Collins et al., 2011).

In summary, effective interventions need to provide accurate and appropriate sexual health information, be grounded in qualitative formative work, and most importantly assess the effectiveness, efficacy, and feasibility through utilizing process and impact evaluation techniques. This dissertation research addresses two major recommendations from the literature surrounding sexual health education targeting college students. Firstly, past research has shown that qualitative groundwork is essential in helping to understand the realities and complexities of sexuality and this research employs formative research that utilizes qualitative research methods to gain college students' input and expertise about sexuality and sexual health to successfully design and implement a targeted sexual health web-based application intervention. Lastly and maybe most importantly to our knowledge, this research is the first of its kind to empirically develop, implement, and evaluate an interactive sexual health web-based application intervention developed specifically for college students.

### **Summary**

In summary, college life is often regarded as a time for exploration and growth. One major area of exploration and growth for college students is sex and sexuality. Growth and exploration involves not only learning how to master these life situations, but often times it involves some negative consequences. Negative consequences for college

students that are engaging in sexual activity are often sexual risk taking behaviors that lead to a high prevalence of STIs, unintended pregnancies, emotional distress, and large healthcare costs (Cooper, 2002, Lewis et al., 2010, Umphrey & Sherblom, 2007, CDC, 2011, O'Sullivan et al., 2006, Weinstock et al., 2004, Henshaw, 1998, Lewis et al., 2009). The poor sexual health outcomes described above are created from various sexual risk behaviors. The most notable sexual risk behaviors are lack of condom use, number of lifetime partners, including partner concurrency, and engaging in sexual activity under the influence of drugs or alcohol (Brown & Venable et al., 2008; ACHA, 2008; Lewis et al., 2009; Certain et al., 2009; Gullette & Lyons et al., 2005).

Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of risky sexual behavior for this population, it is critical to identify factors related to decreased sexual risk behavior among college students that will decrease the incidence of STIs and HIV/AIDS. One way to address the risky sexual behavior among young adults is through targeted and guided sexual health interventions designed for a college-aged population. There are various methods for reducing sexual risk among college students, but the most effective and most notable methods are education interventions targeting sexual health (Boyer et al., 1997; Boyer et al., 2008; Collins et al., 2002; Horner et al., 2008; Kohler et al., 2008; O'Sullivan et al., 2006). Formal school-based sex education programs aimed at reducing risks of teenage pregnancy and STI acquisition generally promote one of two types of messages regarding sexual activity: (1) abstinence-only messages or (2) comprehensive sex education messages. An assessment of the impact of formal sex education programs on teen sexual health using nationally representative data found that abstinence-only programs had no

significant effect in delaying the initiation of sexual activity or in reducing the risk for teen pregnancy and STIs. In contrast comprehensive sex education programs were significantly associated with reduced risk of teen pregnancy (Kohler et al., 2008). Given this, comprehensive sex education programs have to be utilized and the gold standard of comprehensive sex education interventions are evidenced-based interventions or EBIs.

There are various modes of delivery for EBIs targeting sexual health and they include: print media, mass media campaigns, and new media, including interactive computer-based programs. Given their reach and the level of youth involvement, new media has tremendous capacity to reduce sexual risk-taking and great potential to allow for an individualized and interactive intervention. The emerging body of research on new media suggests promise for intervention programs targeting sexual health among youth and the possibility that these media are already influencing teens' sexual attitudes and behavior, both positively and negatively. More research needs to be conducted to begin to evaluate the effectiveness of new media targeting sexual health, hence the impetus for developing a web-based application intervention for reducing sexual risk behaviors among college students.

### **Study Significance**

While young adults suffer a major burden of STIs and other consequences from risky sexual behavior, there is research that shows the promise of using sexual health education to promote safer sex practices and lessen the burden of STIs and HIV. Interactive computer-based programs, web-based application interventions, and other new media all show promise for increasing sexual health knowledge, but lack the

evidence and data on the impact of changing safer sex practices. More research needs to be done to understand the true effectiveness of education and communication programs targeting sexual health. The development, implementation, and evaluation of an interactive sexual health web-based application intervention is the first step to begin to understand how new media can be used effectively to target sexual risk behaviors among young adults.

To our knowledge this research is the first of its kind to empirically develop, implement, and evaluate an interactive sexual health web-based application intervention developed specifically for college students. In addition this work bridges the gap between technology and health in an effort to educate young people about sexual health and reduce sexual risk behaviors that lead to negative consequences. Furthermore, the knowledge gained from this study can be used to strengthen existing prevention programs, particularly programs used at colleges and universities. Ultimately, this research can help to influence health programs and campaigns to decrease the incidence and prevalence of STIs/HIV and unintended pregnancies among young adults.

## CHAPTER 3

### RESEARCH DESIGN AND METHODS

This chapter will describe the overall study design as well as the design for each phase of the research. It will outline the target population, study subjects, and the sampling technique, as well as the setting in which the data collection took place. The variables used will be defined and all data collection procedures will be explained. Finally the procedures used to protect human subjects (invitation letter, confidentiality, data protection, etc.) will also be outlined.

#### **Overview of Research Design**

The specific aims were accomplished by the development, implementation, and evaluation of an interactive sexual health web-based application intervention. The research occurred in two phases. Phase I consisted of formative research to develop and pilot test the intervention. The formative research included focus groups with college students to gain knowledge about the content, format, and delivery structure of the intervention. Phase II was a single arm feasibility and efficacy quasi-experimental trial. A pre-test and post-test were administered to measure the efficacy of the intervention. The pre-test occurred immediately before the intervention and the post-test occurred 3 months following the intervention. All participants received the interactive sexual health web-based application program; topics included (condom use, contraceptive use, interpersonal relationships, and alcohol use). To be eligible to participate students had to be enrolled at

the University of South Carolina (USC) as an undergraduate student and be sexually experienced.

### **Study Setting**

All research project procedures took place at USC. USC's Columbia campus is the flagship campus. The campus is a large public university with the total enrollment in the fall of 2012 sitting at just over 31,000 students. In the fall of 2012, the enrollment of undergraduates was just over 18,000 (70.6% White, 13.7% African American, 2.9% Asian, 1.9% Hispanic, and 10.9% Unknown and 46% male and 54% female (University of South Carolina, 2012).

### **Conceptual Framework**

A unique conceptual framework (see Figure 3.1) was developed using constructs and concepts from the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and The Trans-Theoretical Model of Behavior Change (Prochaska & DiClemente, 1984). The TRA, first introduced in 1967, describes the relationship between beliefs (behavioral and normative), attitudes, intentions, and behavior. The TRA asserts that the most important determinant of behavior is a person's behavioral intention. The direct determinants of an individual's behavioral intention are their attitude toward performing the behavior and their subjective norm associated with the behavior. The TRA assumes a causal chain that links behavioral beliefs and normative beliefs to behavioral intention and behavior via attitude and subjective norms (Glanz et al., 2002). Based on the TRA, the conceptual framework for this research study hypothesizes a causal link between knowledge,

attitudes, subjective norms, and self-efficacy with regards to behavioral intention and behavior change.

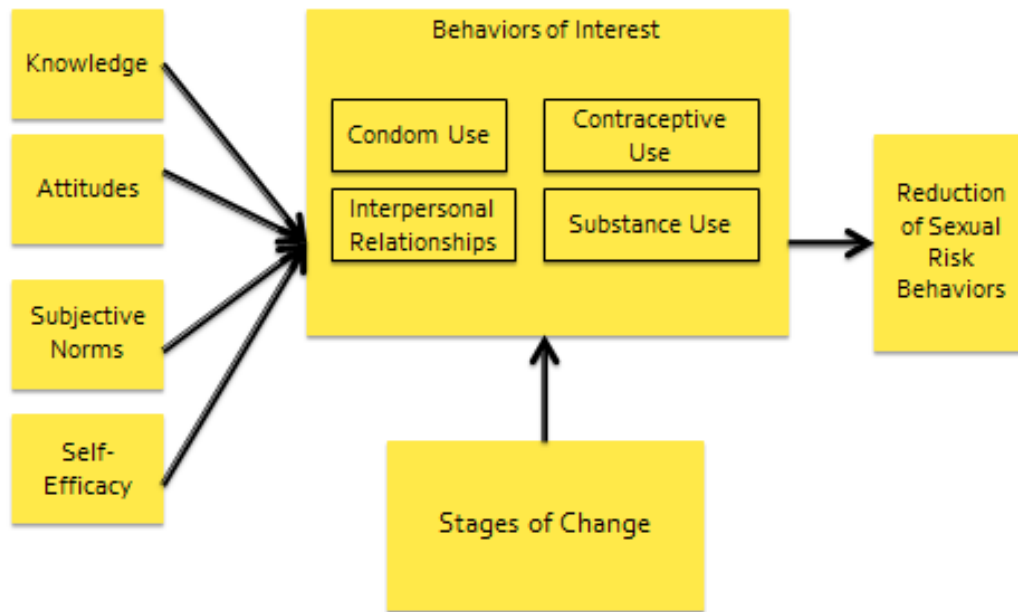


Figure 3.1 Conceptual Framework

The TRA is especially suited for this research project because research has shown that sexual risk behaviors are often influenced by a complex number of factors. Those factors include knowledge about sexual health, attitudes about sexual risk, subjective norms regarding sexual behavior, and self-efficacy with regard to sexually healthy behaviors (Glanz et al., 2002). The strongest predictor of behavior change is intention to change behavior. Not only does intention to change behavior relate to actual behavior change, intentions to change behavior exist on a continuum. This continuum will be measured using the Trans-Theoretical Model (TTM) of Behavior Change.



According to the TTM, change implies a phenomenon occurring over time. The TTM views change as a process involving progress through a series of six stages. The stages include pre-contemplation, contemplation, preparation, action, maintenance, and termination. Initially the TTM was used widely in studies of smoking, and it quickly expanded to being used in a broad range of health behaviors including alcohol and substance use, sexual risk behaviors, physical activity, and cancer screening (Glanz, 2002). People will move through the stages of change in a cyclical fashion. A person can be at action and revert back to preparation or even contemplation. In the conceptual framework outlined for this research, the stages of change can lead to intentions to change behavior, which then will lead to actual behavior change. Sexual risk behaviors involve complex decision-making, and while an individual may not be using a condom, they may be thinking about using a condom, which is one step closer to actually beginning to use a condom and engaging in sexually healthy behaviors. When developing and testing the feasibility and efficacy of a sexual health intervention, it is important to measure and analyze incremental levels of intention to change behavior. This research proposed, driven by the conceptual framework described above, utilized an interactive sexual health web-based application intervention to increase intention to reduce sexual risk behaviors, as well as reduce sexual risk behaviors.

### **Phase I: Formative Research (Qualitative Arm)**

#### **Overview**

Phase I utilized a qualitative research design employing focus groups with undergraduate college students to gain knowledge about the content, format, and delivery

structure of the interactive web-based application intervention targeting sexual health. Phase I also included the development of the interactive sexual health web-based application intervention. At the beginning of the intervention participants are provided with general information about types of sexual activity and sexually transmitted infections. Participants are then provided with information about condom use, contraception, interpersonal relationships (talking about sex, partner concurrency), and how alcohol influences sexual decision-making.

## **Sampling**

### **Sample Size Calculation and Sample**

The target sample size was 30 students. The sample size was decided based on the scope of the study, nature of the topic, study design, and future quantitative sample (LeCompte & Preissle, 1993). The actual sample size was a convenience sample of 27 undergraduate college students.

### **Participant Recruitment**

Participants were recruited using reactive recruitment. Examples of reactive recruitment included flyers distributed and posted in high traffic, readily visible areas where eligible participants were likely to see them, such as the student union, residence halls, fitness center, and classrooms. The principal investigator also recruited participants by visiting college classes and providing a brief overview of the study and allowing eligible participants to sign up for participation on site. All interested participants contacted the principal investigator to be enrolled in the study.

Participants had to be enrolled at USC and be between the ages of 18 and 20 (average age of 1<sup>st</sup> year college students). All participants needed to be sexually experienced. For this research project, sexually experienced was defined as having some past experience with oral, vaginal or anal sex. Participants were excluded from the research project if they did not meet all inclusion criteria.

## **Data Collection**

### **Procedure**

Twenty-seven participants participated in focus groups and one in-depth interview. All focus groups and interviews were conducted at a location mutually agreed upon that provided both privacy and comfort for both the participant and interviewer. All participants were given an invitation letter (Appendix A) that outlined all study details prior to participating in the focus group meeting and were given a \$10 cash incentive for their participation. Focus groups and the one in-depth interview were conducted with all eligible participants. One in-depth interview was conducted outside of the focus groups because a participant arrived to a canceled focus group discussion, but was given the opportunity to still participate individually. All protocols and procedures were reviewed and approved by the principal investigator's university Institutional Review Board. All focus groups and interviews were conducted in May 2013. Focus groups were audio-recorded and ranged from 35-45 minutes in length.

### **Focus Group Guide**

The focus groups and interview were designed to understand what content, format, and delivery structure elements college students prefer in the use of a web-based

application intervention. The focus groups and interview were also used to understand generally how web-based applications could be used to promote safer sex practices in college students. Examples of focus groups questions that were included in the focus group guide were: 1. What topics should be included in a sexual health program for college students?; 2. What are some sexual health topics that college students need to know more about?; 3. What is the best format for a sexual health program? A more detailed list of questions can be viewed in the focus group guide (See Appendix B).

### **Data Management**

Qualitative data were managed by the PI using Microsoft Word and Microsoft Excel. Audio files were converted into a Mac Flip Player file and saved to a Dropbox folder (only password accessible by the PI) and transcribed by the PI. Transcripts were compared with the original voice recordings for completeness and accuracy. Additionally, any identifiers (i.e. names, addresses, etc.) found in the transcripts were removed.

### **Data Analysis**

The two central research questions in the qualitative phase are: (1) What is the preferred content, format, and delivery structure identified by college students for inclusion in the interactive web-based application intervention?; and (2) How can mobile applications be used to promote safer sex practices in college students?

### **Procedure**

To address Research Question 1 and 2 within Phase I, focus groups were digitally recorded, transcribed and analyzed by the PI utilizing Microsoft Word and Microsoft

Excel. Transcripts were coded using both directed and conventional content analysis methods (Hsieh & Shannon, 2005). In the directed portion of the process, a coding scheme was structured according to the categories and subcategories of the focus group guide. The PI delineated a process for first identifying the major categories of discussion (“trees”), then marking the subcategories and probes (“branches”) within each category. The PI used Microsoft Word and Microsoft Excel to help mark and sort segments of dialogue pertaining to particular sections and subsections of the focus groups. Using the principles of the constant comparative method (Glaser & Strauss, 1967), discussions of a particular question or topic within a particular node were read and sorted along dimensions of similarity. Unlike highly structured coding used in content analysis that employs categories established at the outset and tested across coders for reliability prior to engagement with the material, the constant comparison method allowed for provisional categories to be assigned and modified as new perspectives emerged. This was important to ensure that all information provided by the undergraduate college students participating in the focus groups and in-depth interview were captured.

### **Web-Based Application Intervention Development**

The focus groups utilized in Phase I of the research helped to develop the content and structure of the web-based application. Web-based application development not only involved finalizing the educational content, but it also involved the basics of application development from a technology standpoint. Prior to conducting the research the PI and research team proposed a mobile application intervention, but after consultation with the focus group participants and the dissertation committee a web-based application seemed

the most appropriate. Web-based applications are not native apps (specific to one mobile platform such as Android or Apple), but can be accessed from any computer, mobile phone, or tablet with access to the Internet.

The web-based application utilized a one-gamer system, where one participant logged into the application and was tracked from pre-test through the intervention and at post-test by the use of a unique study identification number. The one-gamer system does not allow participants to interact with other users of the web-based application; it only allows interaction with the application. This aspect allowed the PI and the research team to control what content was received. The web-based application consisted of three main components: a pre-test, the intervention, and a post-test. The intervention's main components involved four separate modules that target the specific aims of the research. The modules included: condom use, contraception use, interpersonal relations (partner concurrency and partner communication), and alcohol use. Each of the four modules provided general factual information, quizzes to test knowledge, as well as short videos (1-2 minutes) that were developed to help participants understand attitudes and subjective norms surrounding the various sexually health behaviors (i.e., condom use, contraceptive use, etc.). The program on average took about 40 minutes to 1 hour to complete. Three months following the intervention participants completed a post-test survey to evaluate the effectiveness of the intervention. Participants had the ability to complete the entire program at one time, or move through the program at their own pace. The pre-test, intervention, and post-test were created for a web-based format using Formstack.com; an online form builder that enables users to create surveys, contact forms, and simple applications. The online link to the education program (*SEX 101*) is:

<https://www.formstack.com/forms/?1567164-0owzMAyedm>. The storyboard that was developed to create the web-based program is included in Appendix C.

## **Phase II: Implementation and Evaluation (Quantitative Arm)**

### **Overview**

Phase II is a single arm feasibility and efficacy quasi-experimental trial that utilized an interactive sexual health web-based application intervention to reduce sexual risk behaviors among college students. Five sexual risk behaviors (lack of condom use, lack of contraceptive use, partner concurrency, negative communication with partner, and alcohol use) were measured and analyzed in relation to knowledge, attitudes, subjective norms, and self-efficacy. Phase II included a pre-test and post-test. The pre-test occurred immediately before the intervention, and the post-test occurred 3 months following the intervention (to account for changes in behavioral intentions and actual behavior).

### **Sampling**

#### **Sample Size Calculation and Sample**

This study was a pilot study, which utilized a convenience sample of undergraduate college students. As a result, our research team focused on feasibility of the research design (Van Teijlingen, 2001). Results of an a priori power analysis revealed that a sample size of  $N=128$  per group would achieve 80% power at a 0.05 significance level in order to detect differences in sexual risk behaviors from pre- to post-test. Target numbers for pre-test were set to 154 participant to account for a possible 20% attrition at post-test. Target numbers for post-test were set to 128 to achieve the minimum participants needed to reach the desired power level outlined above. Sample size

calculations were conducted using Power Analysis and Sample Size software (NCSS, 2010).

### **Participant Recruitment**

A non-probability sample of 568 undergraduate college students attending USC were recruited for inclusion in the study. Inclusion criteria for the study included: 1) ages 18-20, 2) attending USC, and 3) sexually experienced. Exclusion criteria included: 1) not meeting the above 3 inclusion criteria. To maintain participant privacy and confidentiality, persons under the age of 18 were excluded as they were not permitted to consent themselves into the study without notifying a parent or legal guardian. Among the 568 recruited participants, 186 students did not meet eligibility criteria (were not sexually experienced or not between the ages of 18-20) resulting in a final eligible sample of 372 participants. Of those 372 participants, 236 completed the pre-test and of those 236 participants, 118 completed the post-test.

Participants were recruited using reactive recruitment. Examples of reactive recruitment included flyers distributed and posted in high traffic, readily visible areas where eligible participants were likely to see them, such as the student union, residence halls, fitness center, and classrooms. The principal investigator also recruited participants by visiting college classes and providing a brief overview of the study and allowing eligible participants to sign up for participation on site. All interested participants contacted the principal investigator to be enrolled in the study.



## Data Collection

### Procedure

Pre-test data were collected from September- October 2013 and post-test data were collected from December 2013- February 2014. Prior to deciding to participate in the intervention including the pre-and post-test survey all participants were given a brief overview of the study by the PI. Each participant then completed an eligibility form (See Appendix D) and provided an email address. Every eligible participant was then emailed an information letter about participating in the web-based application intervention and provided with a unique study identification number, a personal web link to the pre-test and web-based application intervention, as well as unique login information. The study was approved by the USC Institutional Review Board (See Appendix E and Appendix F for IRB approval letters). Participants were informed that participation in the study was completely voluntary and that they could withdraw at any time without consequence. Each participant was asked to complete the pre-test and then proceed to the web-based application intervention using the web link and login information. Completing the pre-test and intervention took no more than 40 minutes to complete. Participants had the ability to complete the pre-test and intervention all at once or over a one week period.

At the end of the intervention participants were asked to provide a follow-up email address so that they could be contacted three months following their participation to complete a post-test survey. Three months after each participants' participation in the intervention, they were sent a subsequent email requesting that they complete the post-test survey They were once again provided with their unique study identification number and given a personal web link to the post-test survey. All participants that completed a post-test survey were entered into a raffle to receive a \$50.00 Amazon.com gift card. Ten

gift cards in total were distributed. All study procedures outside of participant recruitment were conducted web-based through the Internet.

### **Data Management**

To protect the privacy of study participants, each participant was assigned a unique study identification number. Completed pre- and post-test surveys and the data obtained from the intervention were all stored on Formstack.com servers. Formstack.com is a password protected online form builder that enables users to create surveys, contact forms, and simple applications. No hard copies of pre- and post-test surveys were used. All data were stored on Formstack.com servers. Following data collection, all data were downloaded to Microsoft Excel and stored on password-protected spreadsheets on a password-protected computer. The PI was responsible for preparing the data for analysis and all oversight of data entry and data quality control. The PI performed all quantitative data management, analysis, and related tasks. Data were digitally downloaded into Microsoft Excel and manually cleaned by the PI into Statistical Package for Social Sciences SPSS v 20.0 (IBM 2011) to be analyzed. Data were saved on password-protected spreadsheets on a password-protected computer, with a password only known by the PI.

### **Survey Development**

The survey instrument was designed by the PI and dissertation committee using existing scales, adaptations of items from previous studies, and the development of new survey items based on a comprehensive literature review. First, the PI searched the literature to identify validated scales and commonly used items in the sexual risk behavior literature. Second, the collection of items (including those existing, developed,

and adapted) was reviewed by the dissertation committee. The final survey instrument consisted of 88 items. Below is a description of the survey scales.

**Demographic Characteristics:** Seven demographic items were included at the beginning of the survey. Data such as age, gender, race, sexual orientation, and year in school were obtained.

**Sexual health knowledge:** Thirteen items were used to assess participants' knowledge for each of the identified measures of sexual risk behaviors. The PI and the research team developed all items for the knowledge measure. All response items were true or false. An example of an item for each sexual risk behavior is listed: condom use-“Using condoms helps to prevent against the transmission of HIV and STIs”, and contraceptive use-“Birth control pills are 99% effective if taken as directed.” Cronbach's alpha data is not available for the knowledge measure because it is not expected that correct responses on knowledge items will be correlated with one another.

**Attitudes:** Twenty-one items were used to assess participants' attitudes for each of the identified measures of sexual risk behaviors. Based on the conceptual framework, attitude is an overall evaluation of a particular behavior. The PI and the research team developed some items for the attitude measure and included some existing items from reliable and valid scales depending on the sexual risk behavior. Boyer et al (2008) reported Cronbach's alpha as 0.81, 0.63, and 0.74 respectively for attitudes with regards to condom use, contraceptive use, and alcohol use. A Likert scale was used for all responses (1-Strongly disagree to 5-Strongly agree). An example of the item for condom use behavior is, “Using condoms with my sex partner(s) is a good way to prevent STIs and HIV.” The PI developed items for interpersonal relationships, given this no Cronbach's

alpha data is available for those items. An example of the interpersonal relationship attitude item is, “Talking with my sex partner(s) about sex is just too embarrassing.”

**Subjective norms:** Sixteen items were used to assess participants’ subjective norms for each of the identified measures of sexual risk behaviors. Based on the conceptual framework, subjective norms are defined as a person’s belief about whether most people approve or disapprove of a particular behavior and that individuals’ motivation to comply with that behavior. The PI and the research team developed all items for the subjective norms measure. Given this, no Cronbach’s alpha data is available. A Likert scale was used for all responses (1-Strongly disagree to 5-Strongly agree). An example of an item for condom use behavior is, “Most people that are important to me think that condoms are effective at preventing pregnancy.”

**Self-efficacy:** Sixteen items were used to assess participants’ self-efficacy for each of the identified measures of sexual risk behaviors. Based on the conceptual framework, self-efficacy is defined as the, “confidence that one can engage in a healthy behavior across different challenging situations” (Glanz et al., 2002). A Likert scale was used for all responses (1-Strongly disagree to 5-Strongly agree).

Condom use was measured using the Condom Use Self-Efficacy Scale (CUSES) created by Brafford and Beck (1991). The scale contains 28 items (6 items were used for this research). The internal consistency is ( $\alpha = .91$ ) and the test-retest reliability is 0.81. The scale has four subscales; mechanics (putting a condom on self or other), partner disapproval items (use of a condom with a partner’s approval), assertive (ability to

persuade a partner to use a condom), intoxicants (ability to use a condoms while under the influence) (Brafford & Beck, 1991).

Contraceptive use was measured using a self-efficacy measure for contraceptive use developed by Dempsey and colleagues (2011). The measure is based on a series of eight questions asking participants how sure they were that they would take the hormonal contraception in a variety of difficult situations (4 items were used for this research). The authors reported Cronbach's alpha for this scale as ( $\alpha = .89$ ).

Self-efficacy for alcohol use was measured using the Alcohol Safety and Health Self-efficacy Scale (ASHSES) developed by Rosenberg and colleagues (2011). The final ASHSES questionnaire instructs participants to rate how confident they were that they could use each of the 17 listed strategies to preserve their health and safety assuming they had consumed "enough alcohol to feel drunk" (3 items were used for this research). The authors reported Cronbach's alpha for this scale as ( $\alpha = .92$ ).

Self-efficacy for interpersonal relationships was measured by items developed by the PI and research team. Given this, no Cronbach's alpha data is available. An example of an item for partner communication is, "I feel confident in my ability to talk about sex with my sex partner(s)."

**Stages of change:** Five items were used to measure stages of change for each of the identified measures or sexual risk behaviors. Based on the conceptual framework, stages of changes are measured by pre-contemplation, contemplation, preparation, action, maintenance, and termination. The stages of change were used in this research to measure intentions to change sexual risk behavior for condom use, contraceptive use,

interpersonal relationships, and alcohol use. Pre-contemplation is defined as a person having no intention to take action within the next six months. Contemplation is defined as a person having intentions to take action within the next six months. Preparation is defined as a person intending to take action within the next thirty days, etc. Stages of change for each of the identified measures of sexual risk were measured by items developed by the PI and research team. Given this, no Cronbach's alpha data is available. An example of the items for condom use are, "I currently do not use condoms during sexual intercourse and I am not thinking about starting" (pre-contemplation); "I currently do not use condoms during sexual intercourse, but I am thinking about starting" (contemplation); and "I currently do not use condoms during sexual intercourse, but I am planning to start in the next month" (preparation) (adapted from Arden & Armitage, 2008). Finally to measure actual behavior change, action and maintenance from the stages of change model will be measured for each of the identified measures of sexual risk. Action is defined as a person changing overt behavior for less than six months. Maintenance is defined as a person maintaining a behavior for longer than six months. For condom use, the action item is "I currently always use condoms during sexual intercourse, but I only started doing so in the last 6 months" (action). The maintenance item is "I currently use condoms during sexual intercourse and I have done so for longer than 6 months."

**General Sexual Health Questions:** Fourteen items were used to measure participant's general sexual health prior to and following the intervention. Each item was developed by the PI and research team. Given this, no Cronbach's alpha data is available. An example of an item is, "Have you ever had oral sex?"

**Impact of intervention:** Three items were used to measure the impact of the intervention. Each item was developed by the PI and research team. Given this, no Cronbach's alpha data is available. An example of an item is, "Overall, how satisfied were you with Sex 101?" The full Sex Health 101 Intervention Survey can be viewed in Appendix G.

### **Data Analysis**

Data were digitally downloaded into Microsoft Excel, and data were analyzed using Statistical Package for Social Sciences SPSS v 20.0 (IBM 2011). Within SPSS, the data were cleaned and recoded as needed. All data recoding processes were recorded by the PI in a Microsoft Excel document. A confidence interval of 95% and a p-value of .05 determined statistical significance.

Descriptive analyses were performed where appropriate. Means and ranges were calculated for students' age, lifetime number of sex partners (including oral, vaginal and anal), and age at sexual initiation (oral, vaginal or anal). Frequencies were calculated for gender, race, ethnicity, sexual orientation, and year in school.

The quantitative phase of the study consisted of five research questions. Below are descriptions of the analyses performed for each of the five research questions:

**Research Question 1:** Does the interactive sexual health web-based application intervention increase knowledge, attitudes, subjective norms, and self-efficacy for the identified measures of sexually healthy behaviors (condom use, contraceptive use, interpersonal relationships and alcohol use)?

*Hypothesis 1:* Participants will show an increase in sexual health knowledge for sexually healthy behaviors from pre-test to post-test.

*Statistical analysis:* To analyze this research question, McNemar tests were used. The independent variable (IV) is the intervention and the dependent variable (DV) is knowledge.

*Hypothesis 2:* Participants will show an increase in positive attitudes for sexually healthy behaviors from pre-test to post-test.

*Statistical analysis:* To analyze this research question, a paired-samples *t*-Test was used. The IV is the intervention and the DV is attitudes.

*Hypothesis 3:* Participants will show an increase in motivation to comply with sexually healthy norms from pre-test to post-test.

*Statistical analysis:* To analyze this research question, a paired-samples *t*-Test was used. The IV is the intervention and the DV is subjective norms.

*Hypothesis 4:* Participants will show greater self-efficacy for sexually healthy behaviors from pre-test to post-test.

*Statistical analysis:* To analyze this research question, a paired-samples *t*-Test was used. The IV is the intervention and the DV is self-efficacy.

**Research Question 2:** Does the interactive sexual health mobile application intervention increase intentions to reduce sexual risk behaviors? **Research Question 3:** Does the interactive sexual health mobile application intervention reduce sexual risk behaviors?

*Hypothesis 5:* Participants will show increased intention to reduce sexual risk behaviors from pre-test to post-test.

*Hypothesis 6:* Participants will show a reduction in sexual risk behaviors from pre-test to post-test.



*Statistical analysis:* Research questions 2 and 3 were combined during the analysis phase. To analyze this research question, a Chi square and Wilcoxon ranked-sum test was used. The IV variable is the intervention and the DV is the reduction of sexual risk behaviors.

**Research Question 4:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors? **Research Question 5:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors?

*Hypothesis 7:* There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors.

*Statistical analysis:* To analyze this research question, binomial logistic regression analysis was used. The IVs are knowledge, attitudes, subjective norms, and self-efficacy and the DV is the intention to reduce sexual risk behaviors.

*Hypothesis 8:* There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors.

*Statistical analysis:* Research questions 4 and 5 were combined during the analysis phase. To analyze this research question, binomial logistic regression analysis was used. The IVs are knowledge, attitudes, subjective norms, and self-efficacy and the DV is sexual risk behaviors.

See Table 3.1 for data analysis plan per hypothesis.

Table 3.1 Data Analysis Plan

Hypothesis	Independent Variable	Level of Measurement	Dependent Variable	Level of Measurement	Statistical Analysis
<b>H1:</b> Participants will show an increase in sexual health knowledge for sexually healthy behaviors from pre-test to post-test.	Intervention	Dichotomous (nominal)	Knowledge	Continuous (interval)	McNemar Test
<b>H2:</b> Participants will show an increase in positive attitudes for sexually healthy behaviors from pre-test to post-test.	Intervention	Dichotomous (nominal)	Attitudes	Continuous (interval)	<i>t</i> -Test
<b>H3:</b> Participants will show an increase in motivation to comply with sexually healthy norms from pre-test to post-test.	Intervention	Dichotomous (nominal)	Subjective Norms	Continuous (interval)	<i>t</i> -Test
<b>H4:</b> Participants will show greater self-efficacy for sexually healthy behaviors from pre-test to post-test.	Intervention	Dichotomous (nominal)	Self-Efficacy	Continuous (interval)	<i>t</i> -Test
<b>H5:</b> Participants will show increased intention to reduce sexual risk behaviors from pre-test to post-test.	Intervention	Dichotomous (nominal)	Intention to Reduce Sexual Risk Behaviors Condom use Contraceptive use Interpersonal Relationships Alcohol use	Categorical	Chi square
<b>H6:</b> Participants will show a reduction in sexual risk behaviors from pre-test to post-test.	Intervention	Dichotomous (nominal)	Sexual Risk Behaviors Condom use Contraceptive use Interpersonal Relationships Alcohol use	Categorical	Chi square

**H7:** There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors.

Knowledge  
Attitudes  
Subjective Norms  
Self-Efficacy

Continuous  
(interval)

Intention to Reduce  
Sexual Risk Behaviors  
Condom use  
Contraceptive use  
Interpersonal Relationships  
Alcohol use

Categorical

Binomial Logistic  
Regression

**H8:** There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors.

Knowledge  
Attitudes  
Subjective Norms  
Self-Efficacy

Continuous  
(interval)

Sexual Risk Behaviors  
Condom use  
Contraceptive use  
Interpersonal Relationships  
Alcohol use

Categorical

Binomial Logistic  
Regression

## **Dissemination Plan**

The PI recognizes an investigator's ethical obligation to disseminate key findings to research participants, as well as other individuals and institutions involved in the research process. Results from this study will be diffused through various channels. Most importantly, the PI will present study findings to study participants that are interested by publishing a "Findings Publication" (a brief 1-2 page document outlining key findings, made available by postal mail or email). Additionally, the PI will present study findings to USC faculty, staff, and students to meet doctoral program requirements. Study findings will be presented at various local and national conferences through conference presentation and posters. Following suggestions and recommendations received through the dissertation defense, results will be subsequently disseminated to peer-reviewed journals to contribute to the sexual health education and STI/HIV literature.

The PI is additionally committed to disseminating results to the broader South Carolina community as well as other colleges and universities across the country. Efforts will be made to make key findings available to various campus and community organizations committed to educating young people about STIs/HIV and reducing sexual risk behaviors.

## **Summary**

In summary, phase I utilized a qualitative research design employing focus groups with undergraduate college students to gain knowledge about the content, format, and delivery structure of an interactive web-based application intervention targeting sexual health. Phase I also included the development of the interactive sexual health web-based application intervention. At the beginning of the intervention participants are provided with general information about types of sexual activity and sexually transmitted

infections. Participants are then provided with information about condom use, contraception, interpersonal relationships (communicating about sex, partner concurrency), and how alcohol influences sexual decision-making. Phase II is a single arm feasibility and efficacy quasi-experimental trial that utilized an interactive sexual health web-based application intervention to reduce sexual risk behaviors among college students. Five sexual risk behaviors (lack of condom use, lack of contraceptive use, partner concurrency, negative communication with partner, and alcohol use) were measured and analyzed in relation to knowledge, attitudes, subjective norms, and self-efficacy. Phase II included a pre-test and post-test. The pre-test occurred immediately before the intervention, and the post-test occurred 3 months following the intervention (to account for changes in behavioral intentions and actual behavior).

Both phases I and II were driven by a unique conceptual framework (see Figure 3.1) developed using constructs and concepts from the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and The Trans-Theoretical Model of Behavior Change (Prochaska & DiClemente, 1984). Based on the TRA, the conceptual framework for this research study sees a causal link between knowledge, attitudes, subjective norms, and self-efficacy with regards to behavioral intention and actual behavior change. TRA is especially suited for this research project because it has been shown in the literature that sexual risk behaviors are often influenced by a complex number of factors. Those factors include knowledge about sexual health, attitudes about sexual risk, subjective norms regarding sexual behavior, and self-efficacy with regard to sexually healthy behaviors.

Overall, this dissertation research was designed to develop, implement, and evaluate a web-based application intervention designed to decrease sexual risk behaviors

among college students. The next chapter will present results from this dissertation research.

## CHAPTER 4

### RESULTS

This chapter presents the results of this study in the form of two manuscripts. Manuscript I, which corresponds with Phase I of the study, was prepared for submission to American Journal of Sexuality Education. The goal of Phase I was to engage a group of young college students on what content, format, and delivery structure would be preferred in the use of a web-based application intervention designed to reduce sexual risk behaviors among college students to inform the development of the web-based application. Manuscript II, which corresponds with Phase II, was prepared for submission to the Journal of American College Health. The goal of Phase II was to evaluate the effectiveness of the web-based application intervention developed in Phase I based on results from the pre- and post-test.

#### 4.1 Manuscript 1

### Sex 101: The Development of an Interactive Sexual Health Web-based Application Intervention to Reduce Sexual Risk Behaviors among College Students<sup>1</sup>

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<sup>1</sup> Jackson DD, Ingram Annang, L, Boyer CB., Robillard A and Huhns M. To be submitted to the Journal of Sexuality Education.



## **Abstract**

Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of these behaviors on this population, it is critical to identify ways to reduce these behaviors. Although educational programs targeting the sexual health of young adults have been in use since the early 1900s, little is known about the effectiveness of newer modes of sex education and communication on increasing safer sex practices among young adults. The following paper describes the development of an interactive sexual health web-based application intervention designed to decrease sexual risk behaviors among college students.

## **Introduction**

College students represent an important population for studying and understanding factors that influence sexual risk. College life has many opportunities for self-governance and independence, and provides an important new context in which young people learn to manage their sexual relationships and their sexuality (Cooper, 2002). Like most learning processes, learning to manage one's sexuality provides opportunities for mastery and growth, but also poses risk of emotional trauma and costly physical health consequences such as unplanned pregnancy, sexually transmitted infections (STIs), and HIV/AIDS (Cooper, 2002). Research indicates that 86% of college students are sexually active, but only 35% report consistent condom use during sexual intercourse (Lewis et al., 2010). Nearly three million young adults (ages 15-24 years) are infected with an STI annually, giving them the highest STI rate among every sexually active group (Umphrey & Sherblom, 2007). Young adults are particularly at risk for STIs

for a number of reasons, including their likelihood of having multiple sexual partners, their tendency to sometimes select sexual partners at high risk and lack of perceived risk for contracting an STI (O'Sullivan et al., 2006, Weinstock et al., 2004, Henshaw, 1998). Students are often aware of the dangers of contracting an STI such as HIV, yet most college students view HIV infection as an improbable health concern (Lewis et al., 2009). Given the level of newly found independence, sexual exploration, and lack of perceived risk of contracting an STI among college aged individuals, risky sexual behaviors need to be identified and examined among this group; including sexual health interventions to reduce sexual risk behaviors.

Sexual health interventions often involve traditional face-to-face programs that are very didactic and involve an instructor or health educator relaying sexual health information to a group of people. Given the high rates of STIs in the young adult population that were indicated earlier, sexual health promotion programs are warranted and there is huge potential for sexual health promotion using technology such as the Internet. Interactive computer-based interventions (ICBIs) are programs that provide information and also decision support, behavior change support, and/or emotional support for health issues (Bailey et al., 2010). ICBIs offer potential advantages over face-to-face interventions in that access can be anonymous, repeated, and at convenient times for the user (Bailey et al., 2010). ICBIs have the potential to provide types of health promotion and treatment which may be difficult or embarrassing to access face-to-face (for example sex education) and dissemination can be fast and relatively cheap online (Bailey et al., 2010). The Internet is a particularly appropriate route for the delivery of sexual health

promotion to young people, since they are already confident and frequent users of Internet technology (Kanuga & Rosenfeld, 2004).

The emerging body of research on new media, including the Internet, suggests promise for intervention programs targeting sexual health among youth and the possibility that these media are already influencing teens' sexual attitudes and behavior. The clearest messages are that (1) adolescents are strongly involved with new media, (2) the platforms and content involved are quickly evolving, and (3) there is almost no evidence regarding the impact of most of these media (Collins et al., 2011). Given that more research needs to be conducted to begin to evaluate the effectiveness of new media targeting sexual health, and in an effort to create more innovative modes of delivery for sexual health education to young people, the following paper discusses the development of an interactive sexual health web-based application intervention designed to decrease sexual risk behaviors among college students.

### **Background**

College life is often regarded as a time for exploration and growth. One major area of exploration and growth for college students is sex and sexuality. Growth and exploration involves not only learning how to master these life situations, but often times it involves some negative consequences. Negative consequences for college students that are engaging in sexual activity are often sexual risk taking behaviors that lead to a high prevalence of STIs, unintended pregnancies, emotional distress, and large healthcare costs (Cooper, 2002, Lewis et al., 2010, Umphrey & Sherblom, 2007, CDC, 2011, O'Sullivan et al., 2006, Weinstock et al., 2004, Henshaw, 1998, Lewis et al., 2009). United States (US) incidence rates for STIs are especially high among adolescents and

young adults, with approximately 48% of all new STIs occurring among 15- to 24-year-olds (Weinstock et al., 2004). Approximately 900,000 teenagers become pregnant in the US every year. The majority of these pregnancies occur among 18-19 year olds, and most are unintended (Klein, 2005). Psychological consequences are often identified as stigma associated with an STI or HIV infection or difficulty coping with a positive STI or HIV diagnosis (Barth et al., 2002). The cost of STIs to the US healthcare system is estimated to be as much as \$16 billion annually (CDC, 2011). The poor sexual health outcomes described above are created from various sexual risk behaviors.

The most notable sexual risk behaviors are lack of condom use, number of lifetime partners, including partner concurrency, and engaging in sexual activity under the influence of drugs or alcohol (Brown & Vanable et al., 2008; ACHA, 2008; Lewis et al., 2009; Certain et al., 2009; Gullette & Lyons et al., 2005). Unprotected sexual activity is often defined as lack of condom use. Among individuals who choose to be sexually active, condom use is the only reliable method of STI and HIV prevention. However, rates of condom use among young adults, including college students, are low. For instance, research has shown that 4.5%, 27.9%, and 52.8% of sexually active students used condoms during their most recent oral, vaginal, and anal intercourse experiences, respectively (ACHA, 2008). Additionally, a report from a national study involving a little over 4,600 undergraduate college students from 136 institutions indicated that among those students reporting participation in sexual intercourse, consistent use of a condom was only 27.9%.

Not only is condom use an important sexual risk behavior to examine, number of lifetime partners, partner type (e.g. casual, or committed), and partner concurrency are

important indicators of sexual risk behavior among college students that need to be measured. College students may engage in partner concurrency, which can be defined as having multiple sexual relationships with steady and non-steady partners in a short period of time. In a study by Certain and colleagues (2009) college students understood that in general they needed to use condoms if they had multiple or concurrent sexual partners, but they did not always use condoms in these situations, which increases risk of STI and HIV transmission. Another reason that college students are at high risk for acquiring an STI or HIV is alcohol and/or substance use combined with sexual activity. Alcohol and substance use likely mediate STI and HIV transmission risk among college students (Gullette & Lyons, 2005). Over 30% of college students report drinking alcohol before sex (Brown & Vanable, 2007) and about 15% of students who drank alcohol also had unprotected sex (ACHA, 2008).

Given the high prevalence of risky sexual behavior among young adults and the highly negative consequences of risky sexual behavior for this population, it is critical to identify factors related to reduced sexual risk behavior that will decrease the incidence of STIs and HIV/AIDS. One way to address the risky sexual behavior among young adults is through tailored sexual health interventions designed for a college-aged population. There are various methods for reducing sexual risk among college students, but the most effective and most notable methods are educational interventions targeting sexual health (Boyer et al., 1997; Boyer et al., 2008; Collins et al., 2002; Horner et al., 2008; Kohler et al., 2008; O'Sullivan et al., 2006). Formal school-based sex education programs aimed at reducing risks of teenage pregnancy and STI acquisition generally promote one of two types of messages regarding sexual activity: (1) abstinence-only messages or (2)

comprehensive sex education messages.

Abstinence-only messages teach that sex should be delayed until marriage, and discussion of birth control methods is typically limited to statements about ineffectiveness (Kohler et al., 2008). Comprehensive programs include abstinence messages, but also provide information on birth control methods to prevent pregnancy and condoms to prevent STIs and HIV/AIDS (Kohler et al., 2008). An assessment of the impact of formal sex education programs on teen sexual health using nationally representative data found that abstinence-only programs had no significant effect in delaying the initiation of sexual activity or in reducing the risk for teen pregnancy and STIs. In contrast comprehensive sex education programs were significantly associated with reduced risk of teen pregnancy (Kohler et al., 2008). Given this, comprehensive sex education programs have to be utilized and the gold standard of comprehensive sex education interventions are evidenced-based interventions (EBIs).

There are various modes of delivery for EBIs targeting sexual health such as print media, mass media campaigns, and new media (including interactive computer-based programs). Given their reach and the level of youth involvement, new media has tremendous capacity to reduce sexual risk-taking and great potential to allow for an individualized and interactive intervention. The growing body of research on digital media suggests potential for intervention programs targeting sexual health among youth and the possibility that these media are already shaping young adults' sexual attitudes and behavior. Little is known about how these media are shaping young adults' sexual attitudes and behavior since the platforms used change quickly and almost no evaluation data exist on these media (Collins et al., 2011). More research should be conducted to

evaluate the effectiveness of new media targeting sexual health, hence the impetus for developing a web-based application intervention for reducing sexual risk behaviors among college students. The purpose of this paper is to describe the formative research phase used to develop an interactive sexual health web-based application intervention designed specifically for college students.

## **Methods**

### **Participants**

For inclusion into the study, participants had to be enrolled at the principal investigator's university and be between the ages of 18 and 20 (average age of 1<sup>st</sup> year college students). All participants had to be sexually experienced. For this study, sexually experienced was defined as having some past experience with oral, vaginal or anal sex. Participants were excluded from the study if they did not meet all inclusion criteria. In addition, participants had to be able to attend a focus group session lasting no more than one hour.

### **Study Procedures**

Participants were recruited using reactive recruitment. Examples of reactive recruitment included flyers distributed and posted in high traffic, readily visible areas where eligible participants were likely to see them, such as the student union, residence halls, fitness center, and classrooms. The principal investigator also recruited participants by visiting college classes and providing a brief overview of the study and allowing eligible participants to sign up for participation on site. All participants were given an invitation letter that outlined all study details prior to participating in the focus group meeting and were given a \$10 cash incentive for their participation. Focus groups and the

one in-depth interview were conducted with all eligible participants. One in-depth interview was conducted outside of the focus groups because a participant arrived to a canceled focus group discussion, but was given the opportunity to still participate individually. All protocols and procedures were reviewed and approved by the principal investigator's university Institutional Review Board. All focus groups and interviews were conducted in May 2013.

### **Measures**

The focus groups and interview were designed to understand what content, format, and delivery structure college students prefer in the use of a web-based application intervention. The focus groups and interview were also used to understand generally how web-based applications could be used to promote safer sex practices in college students. Examples of focus groups questions that were included in the focus group guide were: (1) What topics should be included in a sexual health program for college students?; (2) What are some sexual health topics that college students need to know more about? and; (3) What is the best format for a sexual health program? See Appendix B for the focus group guide. Demographic data (age, sex, and school classification) were also collected from each study participant.

### **Data Analysis**

For each focus group meeting and the in-depth interview all responses were transcribed and examined for common themes using a coding system (Strauss & Corbin, 1998). Audio recordings were reviewed to provide context and/or clarity to participant responses when needed. The initial coding system was developed by identifying key words and phrases from participant responses. The keywords and phrases were then analyzed and grouped based upon common themes and provided meaning based on the



categories used to guide the focus group questions (i.e., sexual health program topics; format for sexual health programs; mobile applications use in sexual health programs). Additional categories were identified during data analysis as they emerged in the data. Demographic data were tallied for all participants and percentages were calculated. Results from the focus groups, in-depth interview, and demographics are provided below.

## Results

Seven focus groups and one in-depth interview were conducted yielding a total of 27 participants. The average age of participants was 19.4 years. The majority of the participants were female (63%), male (37%). Each participant except for three participants met the inclusion criteria. Three participants were 21 years of age and fell outside of the inclusion criteria, but were allowed to participate given that they only fell slightly outside the age requirement. See Table 4.1 for full participant demographics. Focus group findings are grouped into three categories: (1) sexual health program topics, (2) format for sexual health programs and, (3) mobile applications use in sexual health programs.

Table 4.1 Demographic Characteristics of Study Participants

Characteristic	Females (n=17)		Males (n=10)	
	n	%	n	%
Race				
White	12	70.5	8	80.0
African American	4	23.5	2	20.0
Other	1	6.0	0	0.0
Level in School				
Freshman	6	35.0	2	20.0
Sophomore	7	41.0	4	40.0
Junior	2	12.0	4	40.0
Senior	2	12.0	0	0.0

## Sexual Health Program Topics

When asked, “What topics should be included in a sexual health program for college students?” participants mentioned the influence of alcohol, STIs, contraception, condoms, pregnancy, communicating about sex, sexual assault, and overall how to be safe. Specifically, two female participants said, “Definitely STDs, considering Richland County has the highest rate per capita,” and “generally stay away from people saying don’t have sex and teach people how to have safe sex.” When asked if condom use was important to discuss, both male and female participants said, “For sure!” Furthermore, one female participant stated, “I don’t mind carrying one [condom], but I just don’t want to buy them. I would feel weird if people saw me, like judgment.” Another female participant stated, “How to use it correctly, how to make sure it stays effective.” An additional female mentioned the importance of birth control, but also knowing that doesn’t protect against STIs. Specifically she said, “...but yeah, what about STDs, birth control doesn’t protect against that.” Male participants shared similar important topics to discuss and specifically mentioned the following: “Definitely STDs, maybe symptoms or something like that” also “factual information, little stats and stuff, like statistics can pop up in the app.” Participants also thought it would be helpful to have information on places to learn more about sexual health such as Planned Parenthood or the Student Health Center.

Overall, participants emphasized wanting factual information about condoms, STIs, and places to visit for further information. Both males and females wanted information about contraception such as cost, effectiveness, and side effects. In addition, participants agreed that partner communication and how alcohol and drugs influence

sexual decision-making would be important to discuss. One female participant mentioned, “it [mobile app] should have tips on how to talk about sex, especially if your partner doesn’t want to use condoms.” One male participant mentioned, “general stuff, like using condoms, make sure your partner is healthy.” When asked if substance use should be included participants overall said, “YES!” but also mentioned that alcohol is the most important. Other drugs mentioned were: “college drugs....Xanax, Molly, Cocaine.” When asked if any additional information needs to be included in a mobile application designed to reduce sexual risk behaviors among college students, participants mentioned, making sure the information is trustworthy and credible. Specifically both male and female participants said, “it should be backed by a credible source” (male participant) and “it should look nice, that way people take it seriously” (female participant).

### **Format for Sexual Health Program**

When asked, “What is the best format for a sexual health program?” participants mentioned mobile apps almost exclusively, but one female participant mentioned pamphlets and flyers. The discussion of mobile applications dominated the conversation given the purpose of the focus groups was to understand how mobile applications can be used for sex education for college students. Generally, participants mentioned the mobile application being interactive, including tabs where participants can navigate through various screens, the length being no more than one hour, a question and answer portion, graphics, and gender-specific sections. Specifically one female participant said, “I think a mobile app is pretty cool actually” and “it’s way more private.” Another male participant said, “I think apps are legit” and “maybe have it be interactive.” An additional male

participant said, “Maybe like quizzes, a game, I’m not sure, but something interactive.” Participants were split when asked if the program should be group or individual. Some participants really enjoyed the private aspect of the program, while others felt like it would be less awkward to have more people involved in a group discussion about sex. Specifically male and female participants said, “I totally want something individual” (male participant) and “well individual is cool, but I think I feel less awkward if I had other people going through the program. I’m totally the person that wants to ask a question in class, but I just wait for another person to ask and then I just wait for the answer” (female participant). In addition some participants felt strongly about the look of the intervention. Most notably one female participant said, “It should be blue, the color of peace and serenity... I mean Facebook and Twitter are blue, something has to be said for that.” Overall, participants thought it was most important to keep the education program short (less than one hour), interactive, and relatable.

### **Mobile Applications’ Use in Sexual Health Programs**

Not only was it important for us to understand what topics and format a sexual health program for college students should include and follow, we also wanted to understand if college students thought mobile applications were a feasible tool to educate college students about sexual health. Generally, all participants agreed that mobile applications could be used to promote safer sex practices in college students. Specifically, one male participant said, “I think a mobile application is a great idea!” and “yeah sure.” The most detailed response came from a male participant. He said, “Totally, I like the idea of a mobile application because it’s better than getting a pamphlet or something” and “since it’s on a phone, it would be super accessible, it’s on a phone.” Overall, participants

were advocates of using a mobile application for sexual health.

Given that students had a positive response for mobile application development, the results discussed above were used in conjunction with a theoretical framework developed by the research team to create the sex education program, *Sex 101: Not your normal sex education program!*

### Theoretical Framework

*Sex 101* is a theoretically based, multicomponent intervention. The theoretical framework that guided the development of *Sex 101* was created using constructs and concepts from the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) and The Trans-Theoretical Model of Behavior Change (TTM) (Prochaska & DiClemente, 1984). The TRA, first introduced in 1967, is concerned with the relationship between attitudes, intentions, and behavior. The TRA assumes a causal chain that links behavioral beliefs and normative beliefs to behavioral intention and behavior, via attitude and subjective norms (Glanz et al., 2002).

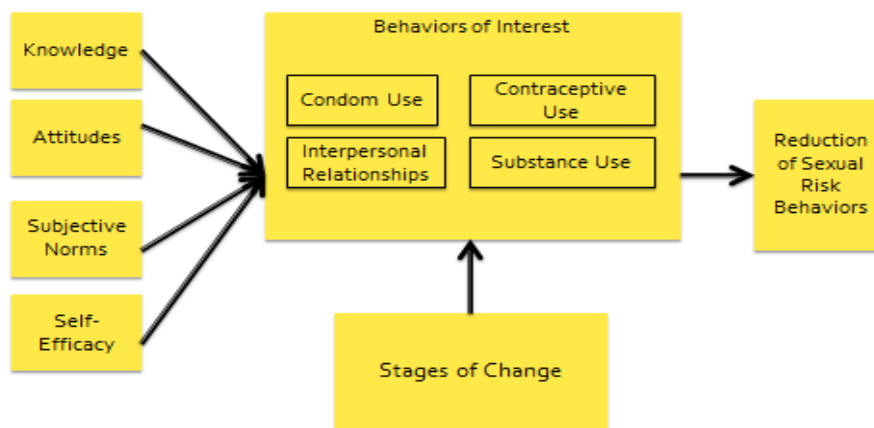


Figure 4.1 Theoretical Framework

Based on the TRA, the theoretical framework for this study sees a causal link between knowledge, attitudes, subjective norms, and self-efficacy with regards to behavioral intention and behavior change. The strongest predictor of behavior change is intention to change behavior. Not only does intention to change behavior relate to actual behavior change, intentions to change behavior exist on a continuum. This continuum will be measured using the TTM. The TTM views change as a process involving progress through a series of six stages. The stages include pre-contemplation, contemplation, preparation, action, maintenance, and termination. These stages are measured in the *Sex 101* intervention and the overall theoretical framework was instrumental in the development of *Sex 101*.

Not only was it important for the web-based intervention to be developed based on sound theory, the expertise of the target population (18-20 year old college students) was also instrumental in the development of the intervention program. Further details are provided below.

### **From Focus Groups to the Pilot Program**

Based on the focus groups conducted with the target population, many suggestions were provided for the content and format of the intervention. With regards to content, participants mentioned wanting to include information on condom use, contraceptive use, substance use, partner communication, and sexual assault. With regards to format, participants mentioned wanting the intervention to be interactive, short, have a blue interface, the ability to complete the program overtime, and to include photos, videos, and quizzes. How these suggestions were integrated into the development

of *Sex 101* are described below. *Sex 101: Not your normal sex education program!* is a web-based sexual health education intervention designed to reduce sexual risk behaviors among college students, ages 18-20. The program covers four major topics; condom use, contraceptive use, interpersonal relationships, and alcohol use. These topics were deemed the most important to cover given the background on risky sexual behaviors among young adults shown in the literature which included lack of condom use, unintended pregnancies, partner concurrency, and alcohol and substance use in conjunction with sexual activity. Furthermore as shown above, college students agreed that condom use, contraceptive use, communication with a partner and alcohol use were important topics in relation to sexual activity. Additionally, participants mentioned that substance use, and sexual assault would be important to discuss, but these topics were not included in the program given the scope of the program and the time constraints imposed with trying to keep the program one hour or less.

With regards to the format of the program, many participants noted having the program be interactive, not to last too long, the color to be blue, as well as having the ability to complete the program at a personal pace. Given this, participants had the ability to complete the intervention program all at once or over a one-week period. Furthermore, given the suggestion about the color from various participants, the interface of the application was made the color blue. As shown above participants mentioned including photos, videos, and quizzes. Given this suggestion, each of the four modules (condom use, contraception use, interpersonal relationships, and how alcohol influences sexual decision-making) provides general factual information, quizzes to test knowledge, as well as short videos (1-2 minutes) that help participants understand attitudes and subjective

norms surrounding the various sexually health behaviors (i.e., condom use, contraceptive use, etc.). In total, including the pre-test survey that measures knowledge, attitudes, subjective norms, and self-efficacy (derived from the theoretical framework), the program takes about 40 minutes to 1 hour to complete. Three months following the intervention, participants complete a post-test survey to evaluate the effectiveness of the intervention and this post-test takes no more than 15 minutes to complete. Both the data from the focus groups and the theoretical framework informed the development of *Sex 101*. Below are two screen shots from the web-based application intervention. Figure 4.2 shows an introduction screen, where different types of sex are discussed. Figure 4.3 shows some of the attitudes that young people may have about condoms.

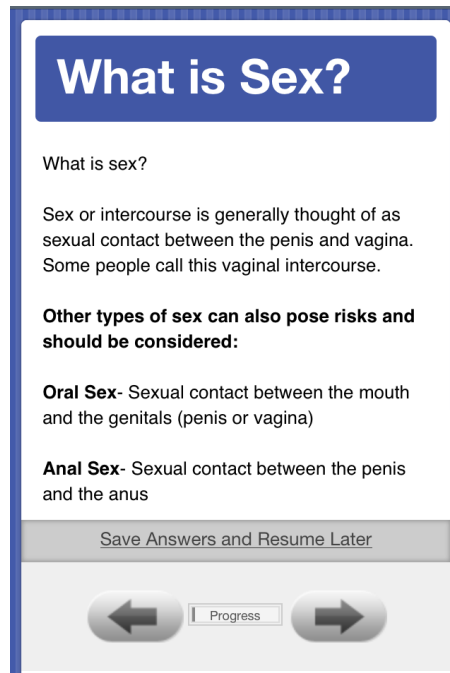


Figure 4.2 Types of Sex



## Condom Attitudes

We know that condoms protect against pregnancy and STIs including HIV, but sometimes people have negative thoughts or beliefs about condoms.

What are some negative thoughts that you or your friends have had about condoms?

Below are some common negative thoughts that we've heard:

- **Condoms spoil the mood.**
- **Condoms don't feel good.**
- **If I suggest using a condom, my partner is going to think I have an STI or that I think he/she has an STI.**

Let's tackle some of these negative attitudes about condoms!

Figure 4.3 Condom Attitudes

### Conclusion

*Sex 101: Not your normal sex education program!* is a culturally relevant sexual health education program designed for young college students. Many sexual health intervention programs utilize a didactic framework that includes one-way classroom instruction, but *Sex 101* utilizes an interactive web-based model that allows for an individualized intervention for each participant. While young adults suffer a major burden of STIs and other consequences from risky sexual behavior, there is research that shows the promise of using sexual health education to promote safer sex practices and lessen the burden of STIs and HIV. Interactive computer-based programs, web-based application interventions, and other new media all show promise for increasing sexual health knowledge, but lack the evidence and data on the impact of changing safer sex

practices. More research needs to be done to understand the true effectiveness of education and communication programs targeting sexual health. The development and evaluation of *Sex 101* is the first step to begin to understand how new media can be used effectively to target sexual risk behaviors among young adults.

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## 4.2 Manuscript 2

Can Technology Decrease Sexual Risk Behaviors Among Young People? The Results of a Pilot Study Examining the Effectiveness of an Interactive Sexual Health Web-based Application Intervention to Reduce Sexual Risk Behaviors among College Students<sup>2</sup>

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<sup>2</sup> Jackson DD, Ingram Annang, L, Boyer CB., Robillard A and Huhns M. To be submitted to the Journal of American College Health.

## Abstract

**Objective:** This pilot study tested the efficacy of a brief, novel, theory-driven, web-based application intervention designed to decrease sexual risk behaviors among young college students.

**Participants:** One hundred eighteen college students ( $n=97$ , 82.2% female;  $n=20$ , 16.9% male,  $n=1$ , 0.9% other) completed the pre-test, the intervention, and the post-test from September 2013 through January 2014.

**Methods:** The intervention was tested using a pre- and post-test design with the follow-up assessment occurring three months following the intervention completion.

**Results:** Ninety-six percent of participants showed an increase in contraceptive use knowledge from pre- to post-test. Attitudes about contraceptive use also improved ( $p=.000$ ). Participants did not show a statistically significant change in intention to reduce sexual risk behaviors or actual risk reduction. Positive subjective norms for condom use, partner communication, partner concurrency, and alcohol use predicted placement in the consistent category for use of a condom, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol. High self-efficacy for contraceptive use, and positive attitudes for partner communication and alcohol use predicted placement into the consistent category for use of contraception, partner communication, and not engaging in sexual activity under the influence of alcohol.

**Conclusions:** This pilot study supports the use of a web-based application intervention to educate young people about safer sex practices and its potential to help reduce sexual risk behaviors.



**Keywords:** technology, intervention, sexual behavior, college students

College students represent an important population for studying and understanding factors that influence sexual risk. College life has many opportunities for self-governance and independence, and provides an important new context in which young people learn to manage their sexual relationships and their sexuality.<sup>1</sup> Like most learning processes, learning to manage one's sexuality provides opportunities for mastery and growth, but also poses risks of emotional trauma and costly physical health consequences such as unplanned pregnancy, and sexually transmitted infections (STIs) including HIV/AIDS.<sup>1</sup>

Approximately 900,000 teenagers become pregnant in the United States (US) every year. The majority of these pregnancies occur among 18-19 year olds, and most are unintended.<sup>2</sup> Nearly 3 million young adults (1 out of 5) are infected with an STI annually, giving them the highest STI rate among every sexually active group.<sup>3</sup> The cost of STIs to the US healthcare system is estimated to be as much as \$16 billion annually.<sup>4</sup> Young adults are particularly at risk for STIs for a number of reasons, including their likelihood of having multiple sexual partners, their tendency to sometimes select sexual partners at high risk, and lack of perceived risk for contracting an STI.<sup>5</sup> Students are often aware of the dangers of contracting an STI such as HIV, yet most college students view HIV infection as an improbable health concern.<sup>6</sup> These poor sexual health outcomes are the result of various sexual risk behaviors.

The most notable sexual risk behaviors are lack of condom use, number of lifetime partners, including partner concurrency, and engaging in sexual activity under the influence of drugs or alcohol.<sup>6, 7, 8, 9, 10</sup> Among individuals who choose to be sexually

active, condom use is the only reliable method of STI and HIV prevention. However, rates of condom use among young adults, including college students, are low. For instance, research has shown that 4.5%, 27.9%, and 52.8% of sexually active students used condoms during their most recent oral, vaginal, and anal intercourse experiences, respectively.<sup>8</sup> Not only is condom use an important sexual risk behavior to examine, number of lifetime partners and partner concurrency are important indicators of sexual risk behaviors. In a study by Certain and colleagues<sup>9</sup> college students understood that in general they needed to use condoms if they had multiple or concurrent sexual partners, but they did not always use condoms in these situations, which increases risk of STI and HIV transmission. Another reason that college students are at high risk for acquiring an STI or HIV is alcohol and/or substance use combined with sexual activity. Over 30% of college students report drinking alcohol before sex<sup>7</sup> and about 15% of students who drank alcohol also had unprotected sex.<sup>8</sup>

Given the level of newly found independence, sexual exploration, and lack of perceived risk of contracting an STI among college aged individuals, risky sexual behaviors need to be identified and examined among this population. Additionally, novel, creative, targeted, and guided sexual health interventions need to be developed and tested that are designed specifically for the college population. Sexual health interventions often involve traditional face-to-face programs that are very didactic and involve an instructor or health educator relaying sexual health information to a group of people, but more interactive modes of transmission may be beneficial for youth and young adults. The Internet is a particularly appropriate route for the delivery of sexual health promotion to young people, since they are already confident and frequent users of Internet

technology.<sup>11</sup> The emerging body of research on new media, including the Internet, suggests promise for intervention programs targeting sexual health among youth and the possibility that these media are already influencing teens' sexual attitudes and behavior. The clearest messages are that (1) youth are strongly involved with new media, (2) the platforms and content involved are quickly evolving, and (3) there is almost no evidence regarding the impact of most of these media.<sup>12</sup>

To address the need outlined above, the aim of the current study was to evaluate the efficacy and acceptability of a web-based application intervention designed to decrease sexual risk behaviors (lack of condom use, lack of birth control use, lack of communication with sexual partners, engaging in concurrent sexual activity with multiple sex partners, and engaging in sexual activity under the influence of alcohol) among college students. It was hypothesized that an increase in knowledge, attitudes, subjective norms, and self-efficacy for the identified measures of sexually healthy behaviors would be found post intervention compared with baseline and that the intervention would increase intentions to reduce sexual behaviors as well as reduce actual sexual risk behaviors. Finally, we sought to understand the relationship between knowledge, attitudes, subjective norms, self-efficacy and sexual risk taking.

## **METHODS**

### **Study Sample**

This study utilized a convenience sample of undergraduate college students. A non-probability sample of 568 undergraduate college students attending the principal investigator's institution were recruited for the study. Inclusion criteria for the study included: 1) ages 18-20, 2) attending USC, and 3) sexually experienced (having some

past or present experience with oral, vaginal or anal sex). Exclusion criteria included: 1) not meeting the above 3 inclusion criteria. To maintain participant privacy and confidentiality, persons under the age of 18 were excluded as they were not permitted to consent themselves into the study without notifying a parent or legal guardian. Among the 568 recruited participants, 186 students did not meet eligibility criteria resulting in a final eligible sample of 372 participants. Of those 372 participants, 236 completed the pre-test and of those 236 participants, 118 completed the post-test.

Participants were recruited using reactive recruitment. Examples of reactive recruitment included flyers distributed and posted in high traffic, readily visible areas, where eligible participants were likely to see them, such as the student union, residence halls, fitness center, and classrooms. The principal investigator also recruited participants by visiting college classes and providing a brief overview of the study and allowing eligible participants to sign up for participation on site. All interested participants contacted the principal investigator to be enrolled in the study. The study was approved by the university's institutional review board.

### **Intervention and Procedure**

This study was a quasi-experiment utilizing a pretest-posttest design. Pre-test data were collected from September- October 2013 and post-test data were collected from December 2013- February 2014. Prior to deciding to participate in the study, all participants were given a brief overview of the study by the PI. Each participant then completed an eligibility form (participants indicated their age and experience with sexual activity to determine eligibility) and provided an email address. Every eligible participant was then emailed an information letter about participating in the web-based application

intervention and provided with a unique study identification number, a personal web link to the pre-test and web-based application intervention, as well as unique login information. Participants were informed that participation in the study was completely voluntary and that they could withdraw at any time without consequence. Each participant was asked to complete the pre-test and then proceed to the web-based application intervention using the web link and login information. The pre-test and intervention took an average of 40 minutes to complete. Participants had the ability to complete the pre-test and intervention over a 1-week period. The pre-test assessed demographic and background information, as well as sexual history.

The intervention program was developed based on constructs and concepts from the Theory of Reasoned Action (TRA)<sup>13</sup> and the Trans-Theoretical Model of Behavior Change (TTM)<sup>14</sup> as well as the results of formative qualitative work which gathered expertise from the target population (18-20 year old college students) to understand what should be included in a sexual health program of this nature. A full description of the intervention is provided in Manuscript 1 of this dissertation document. The program covered four major topics: condom use, contraceptive use, interpersonal relationships, and alcohol use. Each of the four modules provided general factual information, quizzes to test knowledge, as well as brief videos (1-2 minutes) to try to change attitudes about each healthy sexual behavior (i.e., condom use, contraceptive use, etc.) to a more positive one. Below are two screen shots from the web-based application intervention. Figure 4.4 shows an introduction screen, where different types of sex are discussed. Figure 4.5 shows some of the attitudes that young people may have about condoms.

## What is Sex?

What is sex?

Sex or intercourse is generally thought of as sexual contact between the penis and vagina. Some people call this vaginal intercourse.

**Other types of sex can also pose risks and should be considered:**

**Oral Sex-** Sexual contact between the mouth and the genitals (penis or vagina)

**Anal Sex-** Sexual contact between the penis and the anus

[Save Answers and Resume Later](#)

← Progress →

Figure 4.4 Types of Sex

## Condom Attitudes

We know that condoms protect against pregnancy and STIs including HIV, but sometimes people have negative thoughts or beliefs about condoms.

What are some negative thoughts that you or your friends have had about condoms?

Below are some common negative thoughts that we've heard:

- **Condoms spoil the mood.**
- **Condoms don't feel good.**
- **If I suggest using a condom, my partner is going to think I have an STI or that I think he/she has an STI.**

Let's tackle some of these negative attitudes about condoms!

Figure 4.5 Condom Attitudes

At the end of the intervention participants were asked to provide a follow-up email address so that they could be contacted three months following their participation to complete a post-test survey. Three months after each participant's participation in the intervention, they were sent a subsequent email requesting that they complete the post-test survey. They were once again provided with their unique study identification number and given a personal web link to the post-test survey. All participants that completed a post-test survey were entered into a raffle to receive a \$50.00 Amazon.com gift card. Ten gift cards in total were distributed.

## Measures

### Sexual Health Knowledge

The pre- and post-test surveys were identical. Thirteen items were used to assess participants' knowledge for each of the identified measures of sexual risk behaviors. The PI and the research team developed all items for the knowledge measure. All response items were true or false. An example of an item for each sexual risk behavior is listed: condom use-“Using condoms helps to prevent against the transmission of HIV and STIs”, and contraceptive use-“Birth control pills are 99% effective if taken as directed.”

### Attitudes

Twenty-one items were used to assess participants' attitudes for each of the identified measures of sexual risk behaviors. Attitude is defined as an overall evaluation of a particular behavior. The PI and the research team developed some items for the attitude measure and included some existing items from reliable and valid scales. Boyer et al<sup>15</sup> reported Cronbach's alpha as 0.81, 0.63, and 0.74 for attitudes with regards to condom use, contraceptive use, and alcohol use, respectively. A Likert scale was used for all responses 1 (*strongly disagree*) to 5 (*strongly agree*). An example of the item for condom use behavior is, “Using condoms with my sex partner(s) is a good way to prevent STIs and HIV.”

### Subjective Norms

Sixteen items were used to assess participants' subjective norms for each of the identified measures of sexual risk behaviors. Subjective norms are defined as a person's belief about whether most people approve or disapprove of a particular behavior and that

individual's motivation to comply with that behavior. The PI and the research team developed all items for the subjective norms measure. A Likert scale was used for all responses 1 (*strongly disagree*) to 5 (*strongly agree*). An example of an item to assess subjective norms for condom use is, "My partner(s) think that it is important to use condoms to prevent STIs and HIV."

### **Self-efficacy**

Sixteen items were used to assess participants' self-efficacy for each of the identified measures of sexual risk behaviors. Self-efficacy is defined as the, "confidence that one can engage in a healthy behavior across different challenging situations." A Likert scale was used for all responses 1 (*strongly disagree*) to 5 (*strongly agree*).

Condom use was measured using the Condom Use Self-Efficacy Scale (CUSES) created by Brafford and Beck.<sup>16</sup> The scale contains 28 items (6 items were used for this study). The internal consistency is ( $\alpha = 0.91$ ) and the test-retest reliability is  $\alpha = 0.81$ . A sample item is, "I feel confident in my ability to put a condom on myself or my partner."

Contraceptive use was measured using a self-efficacy measure for contraceptive use developed by Dempsey and colleagues.<sup>17</sup> The measure is based on a series of eight questions asking participants how sure they were that they would take the hormonal contraception in a variety of difficult situations (4 items were used for this research). The authors reported Cronbach's alpha for this scale as ( $\alpha = 0.89$ ). A sample item is, "I am confident that I can abstain from having sex (not have sex) if a birth control method is not used or available." Self-efficacy for alcohol use was measured using the Alcohol Safety and Health Self-efficacy Scale (ASHSES) developed by Rosenberg and colleagues.<sup>18</sup>



Three out of 17 items were used for this research and authors reported Cronbach's alpha for this scale as ( $\alpha = 0.92$ ).

### **Stages of Change**

Five items were used to measure stages of change for each of the identified measures of sexual risk behaviors. Based on the conceptual framework, stages of changes are measured by pre-contemplation (not thinking about changing a problem behavior), contemplation (thinking about changing a problem behavior), preparation (getting ready to change a problem behavior), action (changing a problem behavior), and maintenance (maintaining the positive behavior change). The stages of change were used in this research to measure intentions to change sexual risk behavior for condom use, contraceptive use, communication with partner, concurrent sexual relationships, and alcohol use as well as actual behavior changes.

### **General Sexual Health Questions**

Fourteen items were used to measure participants' general sexual health prior to and following the intervention. Each item was developed by the PI and research team. An example of an item is, "Have you ever had oral sex?"

### **Impact of intervention**

Three items were used to measure the impact of the intervention. An example of an item is, "Overall, how satisfied were you with Sex 101?" The full assessment is provided in appendix G.

## Data Analysis

Data were analyzed using Statistical Packages for Social Sciences SPSS v 20.0.<sup>19</sup> A 95% confidence interval and a p-value of 0.05 were used to determine statistical significance for all analyses. Descriptive analyses were conducted on all demographic characteristics. The hypotheses were that (1) participants will show an increase in sexual health knowledge for sexually healthy behaviors from pre-test to post-test, (2) participants will show an increase in positive attitudes for sexually healthy behaviors from pre-test to post-test, (3) participants will show an increase in motivation to comply with sexually healthy norms from pre-test to post-test, (4) participants will show greater self-efficacy for sexually healthy behaviors from pre-test to post-test, (5) participants will show increased intention to reduce sexual risk behaviors from pre-test to post-test, (6) participants will show a reduction in sexual risk behaviors from pre-test to post-test, (7) there will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors, and (8) there will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors. Given these hypotheses, McNemar tests were conducted for all knowledge items, and paired sample t-tests were conducted to analyze a change in attitudes, subjective norms and self-efficacy for each sexually healthy behavior. Chi square and Wilcoxon signed-rank test were used to analyze a shift in intention to reduce sexual risk behavior and actual risk reduction behavior from pre- to post-test. Finally, to assess the relationship between knowledge, attitudes, subjective norms, self-efficacy and sexual risk taking, binomial logistic regressions were conducted. All items that assessed agreement with risky sexual behavior (i.e. condoms decrease the feeling during sex) were reversed coded. To ensure sufficient cell sizes for all statistical

analyses, the stages of change outcome was collapsed from five distinct stages for each sexual risk outcome (condom use, contraceptive use, partner communication, partner concurrency, and alcohol use) to two dichotomous categories (no/inconsistent safe sex practices and consistent use of safe sex practices). None or inconsistent safe sex practices included the pre-contemplation, contemplation, and preparation stages. Consistent use of safe sex practices included the action and maintenance stages. These dichotomous categories allowed comparisons for those participants who are not utilizing consistent safe sex practices compared to those participants who are consistently using safe sex practices.

## **RESULTS**

### **Socio-demographic Characteristics**

A total of 236 participants completed the pre test and the intervention. Of those 236 participants, a total of 118 participants completed the post-test. The results presented are based on the 118 participants who completed all aspects of the intervention program, including the pre-test, the intervention, and the post-test. Independent sample t-tests were conducted on key demographic and outcome variables to compare those participants who only completed the pre-test with those participants who completed both the pre-test and post-test, the samples were no different and we are therefore confident in conducting the analyses with the final sample of 118 participants. Participants' ages ranged from 18-20 years, with a mean age of 19 years ( $SD=.75$ ). The majority of the sample was female (82.2%), White (78.8%), non-Hispanic/Latino (94.9%), straight (91.5%), and sophomore classification (50%) (Table 4.2).

Table 4.2 Demographic Characteristics of Sample (N = 118)

<b>Characteristic</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b>Range</b>	<b>n</b>	<b>%</b>
Age (years)	19.09	.75	18-20	--	--
<b>Gender</b>					
Female	--	--	--	97	82.2
Male	--	--	--	20	16.9
Other	--	--	--	1	0.9
<b>Race</b>					
White	--	--	--	93	78.8
Black/African American	--	--	--	17	14.4
Other	--	--	--	8	6.8
<b>Ethnicity</b>					
Not Hispanic/Latino	--	--	--	112	94.9
Hispanic/Latino	--	--	--	6	5.1
<b>Sexual Orientation</b>					
Straight	--	--	--	108	91.5
Bisexual	--	--	--	4	3.4
Gay	--	--	--	4	3.4
Other	--	--	--	2	1.7
<b>Student Classification</b>					
Freshman	--	--	--	26	22.0
Sophomore	--	--	--	59	50.0
Junior	--	--	--	31	26.3
Senior	--	--	--	2	1.7

The pre-test assessment also assessed sexual history. The majority of the sample had vaginal sex (97.5%). Age at first vaginal sex ranged from 13 to 20 years of age, with the majority of participants starting vaginal sex at 16 years of age (25.4%). Number of vaginal sex partners ranged from 1-15 with the majority of participants having 1 vaginal sex partner (35.6%). Followed by vaginal sex, many participants had experience with oral sex (92.4%). Age at first oral sex ranged from 13 to 20 years of age, with the majority of participants starting oral sex at 16 years of age (24.8%). Number of oral sex partners ranged from 1-15 with the majority of participants having 2 oral sex partners (22%). A small percentage of participants engaged in anal sex (19.5%), with the majority of

participants starting anal sex at age 18 (43.5%). The number of anal sex partners ranged from 1-3 partners with the majority of anal sex engagers, having 1 anal sex partner (82.6%). A small percentage of participants reported being told by a doctor or a nurse that they had an STI (7.6%) and 1 (0.8%) participant reported an unintended pregnancy (Table 4.3).

Table 4.3 Sexual History Characteristics of Sample (N=118)

<b>Characteristic</b>	<b>M</b>	<b>SD</b>	<b>Range</b>	<b>n</b>	<b>%</b>
Ever had vaginal sex					
Yes	--	--	--	115	97.5
No	--	--	--	3	2.5
Ever had oral sex					
Yes	--	--	--	109	92.4
No	--	--	--	9	7.6
Ever had anal sex					
Yes	--	--	--	23	19.5
No	--	--	--	95	80.5
Ever had an STI					
Yes	--	--	--	9	7.6
No	--	--	--	109	92.4
Ever had an intended pregnancy					
Yes	--	--	--	1	0.8
No	--	--	--	117	99.2
Age at First Sex					
Vaginal	16.7	1.45	13-20	--	--
Oral	16.2	1.48	13-20	--	--
Anal	17.8	1.41	14-20	--	--
Number of Sex Partners					
Vaginal	3.4	2.91	1-15	--	--
Oral	3.4	2.90	1-15	--	--
Anal	1.2	.51	1-3	--	--

### Knowledge

Results revealed that there were few significant increases in knowledge about condoms, contraceptives, interpersonal relationships, and alcohol use from pre- to post-

test. Two items did however show significant increases from pre- to post-test. At pre-test 88.1% of participants (n=104) correctly identified that birth control pills are 99% effective if taken as directed, and at post-test that percentage increased to 96.6% (n=114, p=.013). Additionally, at pre-test only 28% of participants (n=33) correctly identified that alcohol decreases sexual arousal and at post-test that percentage increased to 42.4% (n=50, p=.007). While few items resulted in significant changes from pre- to post-test, the participants in this sample showed a high level of knowledge about condoms, contraception, interpersonal relationships, and alcohol use at pre-test, prior to the intervention. (Table 4.4).

Table 4.4 Knowledge Item Comparison from Pre-Test and Post-Test

Item	% of participants who answered item correctly	
	Pre-Test	Post-Test
<b>Condom Use Knowledge</b>		
1. Male condoms should be used during each sexual act to aid in the prevention of STIs and HIV. <sup>a</sup>	93.2	98.3
2. A condom blocks the transfer of bodily fluids, to decrease the risk of getting STIs and HIV. <sup>a</sup>	97.5	97.5
3. Using water-based lubricants can damage condoms. <sup>b</sup>	57.6	54.2
4. STIs are infections and viruses that are caused from having unprotected sex. <sup>a</sup>	97.5	94.9
<b>Contraceptive Use Knowledge</b>		
5. Birth control pills offer some protection against STIs. <sup>b</sup>	91.5	91.5
6. Birth control pills are 99% effective if taken as directed. <sup>a</sup>	88.1	96.6*
7. The “morning after” pill is a type of hormonal birth control that can be used as an emergency method of pregnancy prevention. <sup>a</sup>	99.2	97.5

<sup>a</sup> Indicates correct response as TRUE

<sup>b</sup> Indicates correct response is FALSE

\* p < .05

8. "Pulling out" or withdrawal of the penis before a man "cums" or ejaculates effectively prevents pregnancy. <sup>b</sup>	87.3	88.1
<b>Interpersonal Relationships</b>		
9. Having overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended) increases your risk of contracting STIs and HIV. <sup>a</sup>	86.4	91.5
<b>Alcohol Use</b>		
10. Alcohol is a depressant that affects every part of your body. <sup>a</sup>	97.5	98.3
11. Small amounts of alcohol make you feel a sense of excitement. However, as the BAL (blood alcohol level) rises the depressive effects take over. <sup>a</sup>	96.6	96.6
12. Alcohol use often promotes risky sexual behaviors that can lead to STIs including HIV infection, and unintended pregnancies. <sup>a</sup>	99.2	99.2
13. Alcohol increases sexual arousal. <sup>b</sup>	28.0	42.4*

### Attitudes, Subjective Norms, and Self-Efficacy

Results revealed that there were few significant increases in attitudes, subjective norms, or self-efficacy with regards to condom use, contraceptive use, interpersonal relationships, and alcohol use. The only significant change from pre- to post-test was attitudes towards condoms use. The results revealed that participants had a significant increase from pre- to post-test in positive attitudes toward contraceptive use ( $p = .000$ ). While no other results were shown to be significant, positive attitudes and subjective norms for condom use, and positive subjective norms for alcohol use approached statistical significance from pre- to post-test (Table 4.5).

<sup>a</sup> Indicates correct response as TRUE

<sup>b</sup> Indicates correct response is FALSE

\*  $p < .05$

Table 4.5 Pre-Test and Post-Test Comparisons of Psychosocial Variables

Scale	Pre-Test		Post-Test		<i>p</i> -value (2-tailed)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>Attitudes</b>					
Condom Use	3.72	0.38	3.74	0.41	.0535
Contraceptive Use	3.94	0.52	4.13	0.49	.000*
Interpersonal Relationships	4.51	0.45	4.52	0.50	.700
Alcohol Use	2.71	0.77	2.79	0.84	.230
<b>Subjective Norms</b>					
Condom Use	3.87	0.85	4.00	0.61	.052
Contraceptive Use	4.07	0.69	4.14	0.80	.264
Interpersonal Relationships	4.22	0.63	4.25	0.70	.643
Alcohol Use	3.65	0.62	3.53	0.67	.053
<b>Self-Efficacy</b>					
Condom Use	4.27	0.64	4.35	0.61	.124
Contraceptive Use	4.16	0.59	4.25	0.69	.150
Interpersonal Relationships	4.45	0.55	4.37	0.59	.151
Alcohol Use	4.27	0.60	4.22	0.74	.335

### Intentions to Reduce Sexual Risk Behavior and Reduction of Sexual Risk Behaviors

Results revealed that there were no significant changes in intention to reduce sexual risk behaviors or actual reduction in sexual risk behaviors from pre- to post-test for condom use, contraceptive use, communicating about sex with a partner, partner concurrency, or alcohol use. Although no changes in intention to reduce sexual risk behaviors or actual reduction in sexual risk behaviors from pre- to post-test proved to be significant, the results showed that the majority of participants exhibited low sexual risk

\*  $p < .05$



at both pre- and post-test and a slight increase in intention to reduce sexual risk behaviors from pre- to post-test, particularly for condom use (60.1% at pre and 61.6% at post always using condoms for at least 6 months) and contraceptive use (79.6% at pre and 82.2% at post always using birth control for at least 6 months). The table below outlines each stage by sexual risk (Table 4.6).

Table 4.6 Pre-Test and Post-Test Frequency Comparisons of Intentions to Reduce Sexual Risk

Stages of Change	No/Inconsistent Use		Consistent Use		<i>p</i> value (2-tailed)
	Pre-Test	Post-Test	Pre-Test	Post-Test	
Condom Use	47	45	71	72	.835
Contraceptive Use	24	21	94	97	.467
Partner Communication	13	13	105	105	1.000
Partner Concurrency	4	5	114	113	.739
Alcohol Use	55	55	63	63	1.000

### Relationship between Knowledge, Attitudes, Subjective Norms, Self-Efficacy and Sexual Risk Behaviors

#### Condom Use

A logistic regression analysis was conducted with the outcome variable condom use, where 0 = no/inconsistent condom use during sexual intercourse (stages: pre-contemplation, contemplation, and preparation) and 1 = consistent condom use during sexual intercourse (stages: action and maintenance). There were 47 participants in the no/inconsistent condom use category and 71 participants in the consistent condom use

category. The predictor variables were condom use knowledge, attitudes, subjective norms, and self-efficacy.

The logistic regression results showed that the model chi-square was significant,  $\chi^2(4) = 62.94, p < 0.001$ . The non-significance of the Hosmer and Lemeshow chi-square test confirmed that the model was a good fit to the data,  $\chi^2(8) = 8.44, p = .392$ . Results from the classification table showed that 82.2% of the condom use categories were predicted correctly based on the model. The Nagelkerke  $R^2$  for this model was .56, a large effect size.<sup>20</sup> When examining the significance of individual predictors, only condom use subjective norms predicted placement into the consistent condom use category (action and maintenance), Wald  $\chi^2(1) = 28.53, p < .001$ . As subjective norms for condom use increased by one unit, participants were 12.42 times more likely to be placed in the consistent condom use category (action and maintenance stages).

### **Contraceptive Use**

A logistic regression analysis was conducted with the outcome variable birth control use, where 0 = no/inconsistent contraceptive use (stages: pre-contemplation, contemplation, and preparation) and 1 = consistent contraceptive use (stages: action and maintenance). There were 24 participants in the no/inconsistent contraceptive use category and 94 participants in the consistent contraceptive use category. The predictor variables were contraceptive knowledge, attitudes, subjective norms, and self-efficacy.

The logistic regression results showed that the model chi-square was significant,  $\chi^2(4) = 38.38, p < 0.001$ . The non-significance of the Hosmer and Lemeshow chi-square test confirmed that the model was a good fit to the data,  $\chi^2(8) = 7.25, p = .510$ . Results

from the classification table showed that 84.7% of the contraceptive use categories were predicted correctly based on the model. The Nagelkerke  $R^2$  for this model was .44, a large effect size.<sup>20</sup> When examining the significance of individual predictors, only contraceptive use self-efficacy significantly predicted placement into the consistent contraceptive use category (action and maintenance), Wald  $\chi^2(1) = 6.11, p = .013$ . As self-efficacy for contraceptive use increased by one unit, participants were 4.37 times more likely to be placed in the consistent contraceptive use category (action and maintenance stages).

### **Partner Communication**

A logistic regression analysis was conducted with the outcome variable partner communication, where 0 = no/inconsistent communication with partner(s) about sex (stages: pre-contemplation, contemplation, and preparation) and 1 = consistent communication with partner(s) about sex (stages: action and maintenance). There were 13 participants in the no/inconsistent communication category and 105 participants in the consistent communication category. The predictor variables were relationship knowledge, attitudes, subjective norms, and self-efficacy.

The logistic regression results showed that the model chi-square was significant,  $\chi^2(4) = 49.23, p < 0.001$ . The non-significance of the Hosmer and Lemeshow chi-square test confirmed that the model was a good fit to the data,  $\chi^2(8) = 0.47, p = .999$ . Results from the classification table showed that 94.9% of the communication categories were predicted correctly based on the model. The Nagelkerke  $R^2$  for this model was .68, a large effect size.<sup>20</sup> When examining the significance of individual predictors, three predictors significantly predicted placement into the consistent communication category

(stages: action and maintenance). Relationship attitudes significantly predicted placement into the consistent communication category Wald  $\chi^2 (1) = 5.78, p = .016$ . As relationship attitudes increased by one unit, participants were 22.14 times more likely to be placed into the consistent communication category. Relationship subjective norms significantly predicted placement into the consistent communication category, Wald  $\chi^2 (1) = 12.80, p < .001$ . As relationship subjective norms increased by one unit, participants were 206.84 times more likely to be placed in the consistent communication category. Finally, relationship self-efficacy significantly predicted placement into the no/inconsistent communication category, Wald  $\chi^2 (1) = -2.87, p = .041$ . As relationship self-efficacy decreased by one unit, participants were 6% more likely to be placed in the no/inconsistent communication category (pre-contemplation, contemplation, and preparation stages).

### **Partner Concurrency**

A logistic regression analysis was conducted with the outcome variable partner concurrency, where 0 = partner concurrency (stages: pre-contemplation, contemplation, preparation) and 1 = no partner concurrency (stages: action and maintenance). There were 4 participants in the engaging in partner concurrency category and 114 participants in the non-engagement of partner concurrency category. The predictor variables were relationship knowledge, attitudes, subjective norms, and self-efficacy.

The logistic regression results showed that the model chi-square was not significant,  $\chi^2(4) = 9.09, p = 0.059$ . However, the non-significance of the Hosmer and Lemeshow chi-square test indicated that the model was a good fit to the data,  $\chi^2(8) = 6.17, p = .628$ . Furthermore, results from the classification table showed that 96.6.% of

the partner concurrency categories were predicted correctly based on the model. The Nagelkerke  $R^2$  for this model was .29, which indicated a medium effect size.<sup>20</sup> When examining the significance of individual predictors, relationship subjective norms significantly predicted placement into the no partner concurrency category, Wald  $\chi^2(1) = 4.01, p = .045$ . As subjective norms increased by one unit, participants were 14.08 times more likely to be placed in the no partner concurrency category (action and maintenance stages).

### **Alcohol Use**

A logistic regression was conducted with the outcome variable of sexual activity under the influence of alcohol, where 0 = engage in sex while under the influence of alcohol (stages: pre-contemplation, contemplation, preparation) and 1 = do not engage in sex while under the influence of alcohol (stages: action and maintenance). There were 55 participants in the engage in sex while under the influence of alcohol category and 63 participants in the do not engage in sex while under the influence of alcohol. The predictor variables were alcohol use knowledge, attitudes, subjective norms, and self-efficacy.

The logistic regression results showed that the model chi-square was significant,  $\chi^2(4) = 40.95, p < 0.001$ . The non-significance of the Hosmer and Lemeshow chi-square test confirmed that the model was a good fit to the data,  $\chi^2(8) = 8.37, p = .399$ . Results from the classification table showed that 71.2% of the sexual activity under the influence of alcohol categories were predicted correctly based on the model. The Nagelkerke  $R^2$  for this model was .39, a medium effect size.<sup>20</sup> When examining the significance of individual predictors, two emerged as significant predictors of placement into the do not

engage in sexual activity under the influence of alcohol category. Attitudes about alcohol use significantly predicted placement into the do not engage in sexual activity under the influence of alcohol, Wald  $\chi^2 (1) = 13.48, p < .001$ . As attitudes about alcohol use increased by one unit, participants were 4.5 times more likely to be placed into the do not engage in sexual activity under the influence of alcohol category. Subjective norms about alcohol use significantly predicted placement into the do not engage in sexual activity under the influence of alcohol category, Wald  $\chi^2 (1) = 7.27, p = .007$ . As subjective norms about alcohol use increased by one unit, participants were 3.48 times more likely to be placed in the do not engage in sexual activity under the influence of alcohol category.

Table 4.7 Binomial Logistic Regression: Knowledge, Attitudes, Subjective Norms, and Self-Efficacy Predicting Sexual Risk Taking

Predictors	<i>B</i>	<i>SE</i>	<i>Wald</i> $\chi^2$	<i>Df</i>	<i>p</i>	<i>Odds</i> <i>Ratio</i>	<i>95% CI</i>
<b>Condom Use</b>							
Knowledge	-0.17	0.43	0.17	1	.684	0.84	0.36-1.94
Attitudes	-0.32	0.80	0.16	1	.690	0.73	0.15-3.49
Subjective Norms	2.52	0.47	28.53	1	<.001*	12.42	4.93-31.30
Self-Efficacy	-0.51	0.42	1.46	1	.227	0.60	0.26-1.38
<b>Contraceptive Use</b>							
Knowledge	0.20	0.50	0.16	1	.691	1.22	0.46-3.27
Attitudes	1.14	0.62	3.40	1	.065	3.12	0.93-10.49
Subjective Norms	1.01	0.54	3.52	1	.060	2.75	0.96-7.88
Self-Efficacy	1.48	0.60	6.11	1	.013*	4.37	1.36-14.08
<b>Partner Communication</b>							
Knowledge	-1.96	1.61	1.48	1	.224	0.14	0.01-3.32
Attitudes	3.10	1.29	5.78	1	.016*	22.14	1.77-276.80
Subjective Norms	5.33	1.49	12.80	1	<.001*	206.84	11.14-3839.09
Self-Efficacy	-2.87	1.40	4.19	1	.041*	0.06	0.00-0.89

\*  $p < .05$

<b>Partner Concurrency</b>							
Knowledge	-19.36	7598.44	0.00	1	.998	0.00	0.00-0.00
Attitudes	1.46	1.24	1.38	1	.240	4.29	0.38-48.73
Subjective Norms	2.65	1.32	4.01	1	.045*	14.08	1.06-187.11
Self-Efficacy	-5.44	2.84	3.67	1	.055	0.00	0.00-1.13
<b>Alcohol Use</b>							
Knowledge	- 0.02	0.44	0.00	1	.959	0.98	0.41-2.33
Attitudes	1.50	0.41	13.48	1	<.001*	4.50	2.02-10.05
Subjective Norms	1.25	0.46	7.27	1	.007*	3.48	1.41-8.61
Self-Efficacy	-0.45	0.41	1.22	1	.270	0.64	0.29-1.42

**COMMENT**

This pilot study suggests that a brief, novel, theory-driven, web-based application intervention designed to decrease sexual risk behaviors among young college students may be effective in increasing knowledge and attitudes about contraceptive use. As hypothesized, participants showed an increase in sexual health knowledge from pre- to post-test indicating that brief web-based interventions show potential for shifting knowledge. We also hypothesized that attitudes, subjective norms, and self-efficacy for all the sexually healthy behaviors (condom use, contraceptive use, partner communication, non-partner concurrency, and no sexual activity under the influence of alcohol) would increase from pre-to post, and while only attitudes toward contraceptive use significantly shifted in a positive direction from pre- to post-test; this finding is not surprising. Past research with the college population has shown that attitudes, subjective norms, and self-efficacy greatly influence sexual decision making, but it is often difficult to change these constructs in an effort to change behavior.<sup>21, 22, 23, 24, 25</sup>

Given that we understand based on theory that knowledge, attitudes, subjective norms, and self-efficacy influence sexual decision making<sup>13</sup>, we hypothesized that there

\* p < .05

would be a positive association between those constructs and the intention to reduce sexual risk behaviors as well as risk reduction. We found that positive subjective norms for condom use, partner communication, partner concurrency, and alcohol use predicted placement into the consistent category for use of a condom, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol. This finding is consistent with previous research findings indicating that college students are greatly influenced by their peers and feel an overwhelming need to conform to the perceived norms of their peers.<sup>24, 25, 26</sup> Additionally, this finding shows that college students in this sample may have a high need to comply with behaviors that their sex partner(s) approve of or engage in, particularly with those behaviors that involve consulting with a sex partner(s) before engagement (i.e., condom use, partner communication).

Furthermore, self-efficacy also predicted placement in the consistent contraceptive use category, which is consistent with previous research findings where researchers have found that higher/increased self-efficacy for contraceptive use contributes to higher rates of use.<sup>17, 27</sup> Additionally, low self-efficacy for partner communication, predicted placement into the no/inconsistent category for partner communication, suggesting that the less confidence a participant has about communicating with their partner(s) about sex, the less they will actually communicate about sex with a sex partner(s). Positive attitudes for partner communication and positive attitudes about alcohol use predicted placement into the consistent communication category and the do not engage in sexual activity under the influence of alcohol category



respectively showing that the way a participant feels about a particular behavior may greatly influence their motivation to comply with it.

Given that positive attitudes, subjective norms, and self-efficacy predicted consistent use of healthy sexual practices, future interventions targeting the sexual health of young adults and college students should include information about attitudes, subjective norms, and self-efficacy. Self-efficacy may be particularly important for sexual risk reduction behaviors like condom use, contraceptive use, and partner communication that involve skill and confidence building. While it is disappointing that there was not substantial or significant behavior change as hypothesized, it is not surprising given that other researchers have found difficulty in changing behavior, particularly sexual behavior.<sup>1, 6, 13, 14, 15, 17, 28, 29</sup> Additionally, compared to existing literature<sup>2, 3, 4, 5</sup> our sample engaged in less risky sexual behavior, exhibited fewer negative sexual health consequences, were highly knowledgeable about safe sex practices, had positive attitudes and subjective norms, and high self-efficacy suggesting the possibility of regression toward the mean and limited variability in the change scores. Additionally, with such low sexual risk indicators in our sample, increasing safe sex practices based on the intervention showed to be very difficult.

Furthermore, this study included a small program evaluation component that suggests very good acceptability of the program. Almost all participants were very satisfied or satisfied (93.9%) with the intervention program, felt that the length of the program was “just about right” (92.2%) and would recommend the program to others (81.9%). This type of low-intensity, brief intervention is exactly what the US Preventative Services Task Force has recommended be developed and disseminated to

high-risk populations.<sup>30</sup> Moreover, the self-guided, individual, private, web-based nature of this program means that it can be used in low-resource settings, for various sensitive health topics and with additional populations that may engage with newer modes of technology such as cell phone and tablets on a regular basis.

### **Limitations and Conclusion**

While this study has a number of strengths, several limitations should be considered when interpreting study results. Study limitations include the lack of a control group, the use of a small convenience sample, and large attrition rate. While the study utilized a pretest-posttest design to observe intervention effects, without the use of control group, we cannot be completely sure that changes in our dependent variables were caused by the intervention. It is possible that simply time or something other than the intervention could have resulted in the changes from pre- to post-test. Additionally, the small convenience sample does not allow the results to be generalizable. Specifically, the results may not be generalizable to other groups of sexually active young people at other colleges or universities and cannot be generalized to other age groups of sexually active people. The large attrition rate (50%) may also reduce the reliability of the results retrieved from the data. While statistical analyses proved no differences between those individuals that dropped out and those individuals that completed the full education program, attrition led to a lower sample size and less generalizability.

Moreover, this pilot study was based on self-report data and participants could have provided socially desirable responses. Finally, there were limitations with the length of time between the pre- and post-test measurement. Future studies should incorporate a longer longitudinal design and repeated measures in order to assess more long-term

effects of sexual health interventions on increasing intentions to reduce sexual behaviors and actual risk reduction. Despite these limitations, this pilot study supports the need for a larger trial, including larger numbers of young college students to better understand if web-based application interventions are successful in reducing sexual risk behaviors among college students. Other researchers also support further research to explore innovative methods accessible via mobile phones and the effects of minimal-contact modes of delivery such as Internet-based interventions.<sup>31</sup> Given this and the lack of efficacious web-based interventions available for college students, the findings from this pilot study provide a starting point for a new approach to foster protective behaviors for sexually active college students. Furthermore, past research shows that a duration of at least three hours may be most effective for sexual health interventions<sup>32</sup> and given that *Sex 101* was only one hour and was effective with various outcome measures, it shows promise for using more brief interventions as well as the potential for web-based interventions to be combined with more traditional modes of sexual health delivery such as face-face classroom style interventions.

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## **CONFLICT OF INTEREST DISCLOSURE**

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the

legal requirements of the United States and received approval from the University of South Carolina Institutional Review Board.

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## CHAPTER 5

### DISCUSSION

This chapter summarizes the overall findings from this entire research project, organized by specific aim and corresponding research questions and hypotheses. Next, qualitative and quantitative findings are merged, synthesized, and discussed in the context of related literature. Finally, this section concludes with study limitations, strengths, and implications for future research.

#### **Summary of Findings**

**Specific Aim # 1.** To identify the preferred content, format, and delivery structure of an interactive sexual health web-based application intervention targeting condom use, contraception use, interpersonal relationships (partner concurrency and partner communication), and alcohol use.

**RQ1:** What is the preferred content, format, and delivery structure identified by college students for inclusion in the interactive web-based application intervention?

Focus groups and one in-depth interview were used to identify the preferred content, format and delivery structure for inclusion in the web-based application intervention. Findings showed that participants wanted factual information about condoms, STIs, and places to visit for further information. Generally, participants mentioned wanting the web-based application to be interactive, including tabs



where participants could navigate through various screens, the length being no more than one hour, a question and answer portion, graphics, and gender-specific sections.

**RQ2:** How can web-based applications be used to promote safer sex practices in college students?

All participants agreed that mobile applications could be used to promote safer sex practices in college students and were advocates for using a mobile application for sexual health. Web-based applications were used to make the intervention more accessible to a wide range of students.

**Specific Aim # 2.** To develop an interactive sexual health web-based application intervention based on findings from the formative research.

*Sex 101: Not your normal sex education program!* is a web-based sexual health education intervention developed to reduce sexual risk behaviors among college students, ages 18-20 at the University of South Carolina based on a unique conceptual framework (Fishbein & Ajzen, 1975; Prochaska & DiClemente, 1984; Glanz, 2002) and from input from college students (focus groups and interview). The content included four major topics: condom use, contraceptive use, interpersonal relationships, and alcohol use. Many participants noted having the program to be interactive, not to last too long, the color to be blue, as well as having the ability to complete the program at a personal pace. Given this, participants had the ability to complete the intervention program all at once or over a 1-week period. Furthermore, given the suggestion about the color from various participants, the interface of the application was made the color blue. Finally, based on the conceptual framework and the feedback from college students each of the four

modules (condom use, contraception use, interpersonal relationships, and how alcohol influences sexual decision-making) provided general factual information, quizzes to test knowledge, as well as short videos (1-2 minutes) that attempt to shift attitudes and subjective norms surrounding the various sexually healthy behaviors to positive ones.

**Specific Aim # 3.** To pilot test and evaluate an interactive sexual health web-based application intervention with college students at the University of South Carolina.

**RQ3:** Does the interactive sexual health web-based application intervention increase knowledge, attitudes, subjective norms, and self-efficacy for the identified measures of sexually healthy behaviors (condom use, contraceptive use, interpersonal relationships, and alcohol use)?

**Hypothesis 1:** Participants will show an increase in sexual health knowledge for sexually healthy behaviors from pre-test to post-test.

McNemar tests were employed to determine if increases in knowledge from pre- to post-test were significant. As hypothesized, participants showed an increase in sexual health knowledge from pre- to post-test indicating that brief web-based interventions show potential for shifting knowledge.

**Hypothesis 2:** Participants will show an increase in positive attitudes for sexually healthy behaviors from pre-test to post-test.

**Hypothesis 3:** Participants will show an increase in motivation to comply with sexually healthy norms from pre-test to post-test.

**Hypothesis 4:** Participants will show greater self-efficacy for sexually healthy behaviors from pre-test to post-test.

Paired sample t-tests were conducted to determine if any significant shifts in attitudes, subjective norms, or self-efficacy for the identified measures of sexually healthy behaviors were evident from pre- to post-test. Results revealed that there were few significant increases in attitudes, subjective norms, or self-efficacy with regards to condom use, contraceptive use, interpersonal relationships, and alcohol use. While only attitudes toward contraceptive use significantly shifted in a positive direction from pre- to post-test, this finding is not surprising. Past research with the college population has shown that attitudes, subjective norms, and self-efficacy greatly influence sexual decision making, but it is often difficult to change these constructs in an effort to change behavior (Dittus & Jaccard, 2000; Maguen & Armistead, 2006; Martens et al., 2006; Scholly et al., 2006; Page et al., 2000).

**RQ4:** Does the interactive sexual health web-based application intervention increase intentions to reduce sexual risk behaviors? **RQ5:** Does the interactive sexual health web-based application intervention reduce sexual risk behaviors? Research questions 4 and 5 were combined during the analysis phase.

**Hypothesis 5:** Participants will show increased intention to reduce sexual risk behaviors from pre-test to post-test.

**Hypothesis 6:** Participants will show a reduction in sexual risk behaviors from pre-test to post-test.

Wilcoxon ranked-sum tests and chi square tests were used to see if the intervention (*Sex 101*) increased intentions to reduce sexual risk behaviors or reduced actual sexual risk behaviors. Results revealed that there were no significant changes in intention to reduce sexual risk behaviors or actual reduction in sexual risk behaviors from

pre- to post-test for condom use, contraceptive use, communicating about sex with a partner, partner concurrency, or alcohol use. While it is disappointing that there was not substantial or significant behavior change as hypothesized, it is not surprising given that other researchers have found difficulty in changing behavior, particularly sexual behavior change (Cooper, 2002; Lewis et al., 2009; Fishbein & Ajzen, 1975; Prochaska & DiClemente, 1984; Boyer et al., 2008; Arden & Armitage, 2008; Lewis et al., 2010). Additionally, compared to existing data (Cooper, 2002; Klein, 2005; Umphrey & Sherblom, 2007; CDC, 2011; O'Sullivan et al., 2006) our sample engaged in less risky sexual behavior, exhibited fewer negative sexual health consequences, were highly knowledgeable about safe sex practices, had positive attitudes and subjective norms, and high self-efficacy suggesting the possibility of regression toward the mean and limited variability in the change scores, meaning more difficulty to increase safe sex practices based on the intervention.

**RQ6:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors? **RQ7:** Is there an association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors? Research questions 6 and 7 were combined during the analysis phase.

**Hypothesis 7:** There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and intention to reduce sexual risk behaviors.

**Hypothesis 8:** There will be a positive association between knowledge, attitudes, subjective norms, self-efficacy and the reduction of sexual risk behaviors.

Binominal logistic regression analyses were conducted to determine if there was an association between knowledge, attitudes, subjective norms, self-efficacy and sexual risk taking. A binominal logistic regression was conducted for condom use, contraceptive use, partner concurrency, partner communication, and alcohol use. We found that positive subjective norms for condom use, partner communication, partner concurrency, and alcohol use predicted placement in the consistent category for use of a condom, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol. This finding is consistent with previous research findings indicating that college students are greatly influenced by their peers and feel an overwhelming need to conform to the perceived norms of their peers (Scholly et al., 2006; Page et al., 2000; Paul & Hayes, 2000). Additionally this finding shows that college students in this sample may have a high need to comply with behaviors that their sex partner(s) approve of or engage in, particularly with those behaviors that involve consulting with a sex partner(s) before engagement (i.e., condom use, partner communication).

Furthermore, self-efficacy also predicted placement in the consistent contraceptive use category, which is consistent with previous research findings; self-efficacy for contraceptive use contributes to higher rates of use (Dempsey et al., 2011; Alford, 2003). Additionally, low self-efficacy for partner communication, predicted placement into the no/inconsistent category for partner communication, suggesting that the less confidence a participant has about communicating with their partner(s) about sex, the less they will actually communicate about sex with their partner(s). Positive attitudes for partner communication and positive attitudes about alcohol use predicted placement

into the consistent communication category and the do not engage in sexual activity under the influence of alcohol category respectively showing that the way a participant feels about a particular behavior may greatly influence their motivation to comply with it.

### **Conceptual Framework**

The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) and the Trans-Theoretical Model of Behavior Change (TTM) (Prochaska & DiClemente, 1984) were both used to guide the development of the intervention program (*Sex 101*). Based on TRA, knowledge, attitudes, subjective norms, and self-efficacy were believed to be positively associated with behavioral intention and behavior change. Based on the findings, this hypothesis was true. Positive attitudes, positive subjective norms, and high self-efficacy predicted consistent use of healthy sexual practices. This findings shows that developing intervention programs that are theoretically based have the potential to promote positive behavior change, particularly with regard to risky sexual behaviors in youth and young adults. Although the program did not change intentions to reduce sexual risk behavior or actual risk reduction, the association between attitudes, subjective norms, and self-efficacy show promise that when those constructs are targeted, behavior change is predictable and probable. Future interventions targeting the sexual health of young adults and college students should include information about attitudes, subjective norms, and self-efficacy, and other theoretically sound concepts to promote safe sex practices.

### **Synthesis of Qualitative and Quantitative Findings**

This research represents a critical step in bridging the gap between technology and health with regards to sex education for young people. It is one of the few studies to:

1) elucidate specific content, format, and delivery structure elements that can be incorporated into web-based application interventions for sexual health targeting college students; 2) develop a web-based application designed to decrease sexual risk behaviors among college students; and 3) empirically test the effectiveness of that web-based application. One of the most profound findings from Phase I of this study was that the majority of college students believed that a mobile/web-based education intervention targeting sexual health would be valuable for college students and that they would utilize the resource. All of the participants who participated in the focus groups and interview said that they would utilize the web-based intervention and preferred a mobile/web-based intervention compared to more traditional modes of delivery (i.e., classroom instruction, pamphlets, etc.). Participants talked about the importance of technology with regards to education and in their larger lives without prompting, which is congruent with literature that suggests that young people are confident and frequent users of Internet technology (Bailey et al., 2010; Kanuga & Rosenfeld, 2004; Collins et al., 2011).

These qualitative findings were further validated in Phase II of the study, when almost all of the participants were very satisfied or satisfied (93.9%) with the intervention program and would recommend the program to others (81.9%). Moreover, the findings from Phase II showed that knowledge about sexual health increased from pre- to post-test, that attitudes about contraceptive use shifted in a positive direction at post-test, and positive attitudes, positive subjective norms, and high self-efficacy predicted consistent use of healthy sexual practices (condom use, contraceptive use, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol). These findings indicate that web-based application interventions

designed to reduce sexual risk among college students are potentially feasible and effective in reducing sexual risk behaviors.

### **Study Limitations**

While this study has a number of strengths, several limitations should be considered when interpreting study results. The use of a non-random sample introduced a degree of selection bias and limits the study's generalizability. Phase I included a modest sample size (Focus Groups: N=26; Interview: N=1) and all participants were recruited from one major state university. Phase I participants were also mostly female, so their perspectives on what should be included in a web-based application intervention to reduce sexual risk behaviors among college students may differ from males. Future studies should use more robust sample sizes, and explore the types of sexual health information males may want to see included in a web-based application intervention designed to reduce sexual risk behaviors among college students.

Phase II posed limitations to the research as well. Phase II limitations included the lack of a control group, the use of a small convenience sample, and a large attrition rate. While the study utilized a pretest-posttest design to observe intervention effects, without the use of control group, we cannot be completely sure that changes in our dependent variables were caused by the intervention (*Sex 101*). It is possible that simply time, or something other than the intervention could have resulted in the changes from pre- to post-test. Additionally, the small convenience sample does not allow the results to be generalizable. Specifically, the results may not be generalizable to other groups of sexually active young people at other colleges or universities and cannot be generalized to other age groups of sexually active people. The large attrition rate (50%) may also



reduce the reliability of the results retrieved from the data. While statistical analyses proved no differences between those individuals that dropped out and those individuals that completed the full education program, attrition led to a lower sample size and less generalizability.

Moreover, this pilot study was based on self-report data and participants could have provided socially desirable responses. Finally, there were limitations with the length of time between the pre- and post-test measurement. Participants completed the pre-test measure immediately prior to the going through the intervention, and completed the post-test measure three months following the intervention. Most sexual health interventions utilizing a longitudinal design not only employ longer wait times (6 months, 1 year), but they also employ repeated measures and administer a post-test at multiple time points (Henderson et al., 2010; Adimora et al., 2002; Agah, 2003; Arden & Armitage, 2008; Boyer et al., 2008; Choi et al., 2008; Homer et al., 2008). Future studies should incorporate a longer longitudinal design and repeated measures in order to assess more long-term effects of sexual health interventions on increasing intentions to reduce sexual behaviors and risk reduction.

### **Study Strengths and Contributions to the Scientific Literature**

This study makes several important contributions to the scientific literature. First, this study bridges the gap between technology and health by employing a web-based application intervention to deliver sex education, which serves as a major strength. Public health strategies and theories were used to comprehensively assess the multi-level factors associated with sex education and sexual health decision-making, particularly among a

high-risk young adult population. Additionally, computer science and engineering techniques were used to develop the web-based application intervention and prior research has shown the need for newer and more interactive modes of transmitting sexual health information, particularly for youth and young adults and this intervention achieved that. Although the longitudinal design wait time was relatively short for this pilot study (3 months), this study was strengthened by the use of a longitudinal design to account for changes in sexual behavior over time. A third strength of the study was in its methodological approach. Effective interventions need to provide accurate and appropriate sexual health information, be grounded in qualitative formative work, and most importantly assess the effectiveness, efficacy, and feasibility through utilizing process and impact evaluation techniques (Martson & King, 2006; Noar et al., 2007; Collins et al., 2011). This pilot study addresses two major recommendations from the literature surrounding sex education targeting college students. First, this research employed formative research that utilized qualitative research methods to gain college students' input and expertise about sexuality and sexual health to successfully design and implement a targeted sexual health web-based application intervention. Secondly, this research was informed by sound public health theory (Fishbein & Ajzen, 1975; Prochaska & DiClemente, 1984) to better understand how certain factors may influence sexual decision-making.

Lastly, and maybe most importantly to our knowledge, this research is the first of its kind to empirically develop, implement, and evaluate an interactive sexual health web-based application intervention developed specifically for college students.

## Conclusion and Implications for Future Research

*Sex 101: Not your normal sex education program!* the web-based sexual health education intervention designed for young college students as a part of this pilot study utilizes an interactive web-based model that allows for an individualized intervention for each participant. This type of low-intensity, brief intervention is exactly what the United States Preventative Services Task Force has recommended be developed and disseminated to high-risk populations (US Preventative Service Task Force, 2008). Moreover, the self-guided, individual, private, web-based nature of this program means that it can be used in low-resource settings, for various sensitive health topics and with additional populations that may engage with newer modes of technology such as cell phones and tablets on a regular basis. The development and evaluation of *Sex 101* is the first step to begin to understand how new media can be used effectively to target sexual risk behaviors among young adults.

Furthermore, *Sex 101* may be effective in increasing knowledge and attitudes about contraceptive use. Moreover, the findings from Phase II showed that positive attitudes, positive subjective norms, and high self-efficacy predicted consistent use of healthy sexual practices (condom use, contraceptive use, partner communication, not engaging in partner concurrency, and not engaging in sexual activity under the influence of alcohol). Given that positive attitudes, positive subjective norms, and high self-efficacy predicted consistent safe sex practices, future interventions should include information that helps to shift attitudes, subjective norms, and self-efficacy in the positive/high direction when tailoring interventions for young college students. Self-efficacy may be particularly important for sexual risk reduction behaviors like condom

use, contraceptive use, and partner communication that involve skill and confidence building.

Overall, the knowledge gained from this study can be used to strengthen existing prevention programs, particularly programs used at colleges and universities. Ultimately, this research can help to influence health programs and campaigns to decrease the incidence and prevalence of STIs/HIV and unintended pregnancies among young adults.

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## APPENDIX A: INVITATION LETTER



Dear Potential Participant,

My name is Dawnyéa Jackson and I am a PhD candidate in the Health Promotion, Education, and Behavior Department at the University of South Carolina. I am completing my dissertation research in an effort to reduce sexual risk behaviors among college students. The study is titled, "The Development of an Interactive Sexual Health Web-based Application Intervention to Reduce Sexual Risk Behaviors among College Students." I am writing to invite you to participate in the study.

I am interested in better understanding how web-based applications can be used to educate college students at the University of South Carolina about sexual risk behaviors. If you decide to participate, you will be asked to take part in two surveys and an education program. One survey will take place before the education program and the other will take place 3 months following the education program. All aspects of the study program (pre-test survey, education program, and post-test survey) will be web-based, meaning that all aspects will be completed on a Smartphone, tablet, and/or computer. The study program should take about 1 hour to complete. You will have the ability to complete the program at your own pace. You will not have to complete any aspects of the study program that you feel uncomfortable with or answer any questions that you do not want to answer.

By taking part in this study you may learn about effective strategies for reducing sexual risk behaviors such as sexually transmitted infections and unintended pregnancies by learning about personal behaviors that may place you at risk. Participation is confidential, and therefore all of your personal information will be kept private. All survey and quiz data obtained from taking part in the study will be identified by a unique study identification number to maintain your privacy. All information will be stored on a password-protected computer in the Health Sciences Building on the University of South Carolina Campus. Only the research team will be able to open the computer files. All files will be erased after the completion of the study.

Taking part in the study is your decision. You do not have to participate in this study if you do not want to. Further, you may discontinue your participation in the study at any time. If you agree to participate, I will collect your name and e-mail address to provide you with the secure link and password to the survey and education program. Three months following your completion of the education program, I will contact you via e-mail to complete a web-based (SmartPhone, tablet and/or computer) follow-up survey. Following completion of the follow-up survey, as a thank you for your participation, your name will be entered in a raffle to win a **\$50 Amazon.com gift card**.

I will be happy to answer any questions you have about the study. You may contact me at 443-676-2333 or [dawnyea@gmail.com](mailto:dawnyea@gmail.com) if you have study related questions or problems. If you have any questions about your rights as a research participant, you may contact the Office of Research Compliance at the University of South Carolina at 803-777-7095. Thank you for your consideration.

With kind regards,

Dawnyéa D. Jackson, MS, PhD Candidate

Principal Investigator

Sex 101: Not your normal sex education program!

[dawnyea@gmail.com](mailto:dawnyea@gmail.com)

443-676-2333(cell)

## APPENDIX B: FOCUS GROUP GUIDE

Facilitator:

Participants:

Location:

Start Time:

End Time:

### Introduction

Good afternoon! Thank you so much for being here. We would like to invite you to participate in a study regarding your ideas and opinions about using mobile applications for sex education for college students. We will use this information to create an interactive mobile application intervention to help reduce sexual risk behaviors among college students. We will ask you to join us for a 60-minute meeting with 5-6 other participants. We will ask you questions about sex education and how mobile applications can be used to educate college students about sexual health.

### Group Facilitation Questions

1. What topics should be included in a sexual health program for college students?

### Probes

1. Is condom use important to discuss

2. Is contraceptive use important to discuss?
  3. Are partner dynamics important to discuss? (Communication w/ partner and partner concurrency)
  4. Is substance use important to discuss? (Alcohol and drugs)
2. What are some sexual health topics that college students need to know more about?
  3. What is the best format for a sexual health program?

#### Probes

1. Is group or individual learning preferred? Explain
  2. Is classroom, web-based, or mobile app preferred? Explain
  3. Should sexual health programs be interactive? Explain
  4. What is the appropriate length of time for a sexual health program designed for a mobile app?
  5. Would you prefer to complete a program all at once, or have the ability to do the program in various sittings over time?
4. How can mobile applications be used to promote safer sex practices?
  5. What mobile application platforms do you and your friends use the most?

#### Probes


1. Apple?

2. Android?
3. Blackberry?
6. How realistic are mobile applications for sex education?
7. What would make you complete a sexual health program on your Smartphone?
8. What would turn you off if it were included in a sexual health program?

#### Probes

1. Certain topics?
2. Format?
3. Length?
9. Is there anything else we should know about designing sexual health interventions for college students?

## APPENDIX C: WEB-BASED APPLICATION INTERVENTION

 <p>Not your normal sex education program!</p>	<p>Sex 101 is a web based (SmartPhone, tablet, and/or computer) application education intervention to educate college students about sexual health. Topics that will be covered are general sexual health, condom use, contraceptive use, interpersonal relationships, and alcohol use.</p> <p>This sexual health intervention is completely confidential and no information about you or the questions you answer will be shared with others.</p> <p>If you agree to participate in the mobile application education intervention you will be asked to provide your study ID number (the number you received in your enrolment email), age, year in school, gender, race, and email address.</p> <p>Your email and study ID number are required so that we can follow-up 3 months later with an additional survey.</p>	<p>Study ID Number</p> <p>Age</p> <p>Year in School</p> <p>Sex (M/F)</p> <p>Race</p> <p>Email Address</p>
<p><b>1</b> Opening Screen</p>	<p><b>2</b> SEX 101 introduction (Header for this screen; red background, white font)</p>	<p><b>3</b> Sign-in/ Create Account Screen (Header for this screen; red background, white font)</p>
<p>Can I also have this image as the app icon that appears on the home screen and the Android Market. White background.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font. Once someone creates the log-in, the app should report that information to the server and assign a study ID number. The information reported on this screen should be linked to the study ID number on the server.</p>

<p>Let's Get Started!</p>	<p>Remember, all information that you share during the completion of this mobile application will be kept private. Only the principal investigator (Dawnyéa Jackson) and the research team will have access to the data collected.</p> <p>To move through the modules at your own pace you will have the ability to save and</p> <p>Including the pre test, intervention and post-test, the module should take no more 1 hour and you will have the ability to complete the module at your own pace, but once started the module will need to be completed in one weeks time.</p>	<p>Before we talk about sex, lets complete a brief health behavior survey. The survey should take no more than 20 minutes and it will help us understand how to best tailor the app to fit your needs. One the survey is complete you will be able to go through the different modules of "Sex 101."</p>
<p><b>4</b> Loading Screen (Header for this screen; red background, white font)</p>	<p><b>5</b> SEX 101 instructions (Header for this screen; red background, white font)</p>	<p><b>6</b> Pre-Test (Header for this screen; red background, white font)</p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>



<p><b>Thank you for completing the pre-test! Let's get started with the education program.</b></p>	<p>What is sex?</p> <p>Sex or intercourse is generally thought of as sexual contact between the penis and vagina. Some people call this vaginal intercourse.</p> <p><b>Other types of sex can also pose risk and should be considered:</b></p> <p><b>Oral Sex-</b> Sexual contact between the mouth and the genitals (penis or vagina)</p> <p><b>Anal Sex-</b> Sexual contact between the penis and the anus</p>	<p>Vaginal, oral, and anal sex can all pose health risks if not protected.</p> <p>Unprotected sex can lead to the transmission of sexually transmitted infections (STIs), including HIV and unintended pregnancy.</p> <p>STIs are infections and viruses that are caused from having unprotected sex.</p> <p>The term STDs is also used, STDs are sexually transmitted diseases and they are the same as STIs.</p>
<p><b>7</b> Loading Screen (Header for this screen; red background, white font)</p>	<p><b>8</b> What is Sex? (Header for this screen; red background, white font)</p>	<p><b>9</b> Sexual Risk Factors (Header for this screen; red background, white font)</p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p><b>STI Symptoms in Women</b></p> <ul style="list-style-type: none"> <li>• Rashes</li> <li>• Sores</li> <li>• Itching</li> <li>• Pain</li> <li>• Discharge from the vagina</li> <li>• Frequent urination</li> <li>• Bleeding during or after sex</li> </ul> <p>Source: Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2013.</p>	<p><b>STI Symptoms in Men</b></p> <ul style="list-style-type: none"> <li>• Rashes</li> <li>• Blisters</li> <li>• Sores</li> <li>• Itching around the genitals</li> <li>• Discharge or drip from penis</li> <li>• Burning or pain when urinating</li> </ul> <p>Source: Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2013.</p>	<p>One major way to prevent the signs and symptoms of STIs including HIV is use of latex condoms from the beginning to the end of each sexual encounter.</p> <p>Let's discuss the basics of condoms.</p> <p><b>For more information on STIs please visit:</b>  <a href="http://www.cdc.gov/std/">http://www.cdc.gov/std/</a></p>
<p><b>10</b> Signs and Symptoms of STIs in Women (Header for this screen; red background, white font)</p>	<p><b>11</b> Signs and Symptoms in Men (Header for this screen; red background, white font)</p>	<p><b>12</b> STI Prevention (Header for this screen; red background, white font)</p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

	<p>There are two types of condoms, male condoms and female condoms. We are going to focus on male condoms.</p> <p>Latex male condoms are <u>a sheath that cover the erect penis of a man.</u></p> <p>Consistent and correct use of latex condoms reduces the risk for most STIs (chlamydia, gonorrhea, and <u>trichomoniasis</u>) that are transmitted by genital fluids</p> <p>Condoms reduce the risk for genital ulcer diseases, such as genital herpes and syphilis, but only when the infected area or site of potential exposure is protected.</p> <p>Condoms may reduce the risk of genital human papillomavirus (HPV) infection.</p> <p><b>Source:</b> Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2013.</p>	<p>Now that we know some basics facts about condoms, lets discuss the proper way to use and dispose of a male condom.</p> <ol style="list-style-type: none"> <li>1. Open the condom packet at one corner being careful not to tear the condom with your fingernails, your teeth, or by being too rough. Make sure the packet and condom appear to be in good condition, and check that the expiration date has not passed.</li> <li>2. Place the rolled condom over the tip of the hard penis, while pinching the tip of the condom enough to leave a ½ inch space for semen to collect.</li> <li>3. Roll the condom all the way down to the base of the penis, and smooth out any air bubbles.</li> <li>4. After ejaculation or <u>cuming</u> and before the penis gets soft, grip the rim of the condom and carefully withdraw. Gently pull the condom off the penis, making sure that semen doesn't spill out.</li> <li>5. Wrap the condom in a tissue and throw it away in the trash where others will not handle it.</li> </ol>
<p><b>13</b> Condom Use (Header for this screen; red background, white font)</p>	<p><b>14</b> Condom Basics (Header for this screen; red background, white font) <b>K</b></p>	<p><b>15</b> The Five Steps to Using a Condom (Header for this screen; red background, white font) <b>K</b></p>
<p>I would like for this picture to be shown and then move to the next screen. Can this photo also be used as a small caption on each condom use module screen, located left on the screen.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p style="text-align: center;"><a href="#"><u>How to Use a Condom Video</u></a></p>	<p>We've discussed the 5 steps to using a condom and watched the how to use a condom video, so now lets test your knowledge about condom use!</p> <p><b>Put the 5 steps to using a condom in order.</b></p> <p>After ejaculation or <u>cumming</u> and before the penis gets soft, grip the rim of the condom and carefully withdraw. Gently pull the condom off the penis, making sure that semen doesn't spill out. <b>(4)</b></p> <p>Place the rolled condom over the tip of the hard penis, while pinching the tip of the condom enough to leave a ½ inch space for semen to collect. <b>(2)</b></p> <p>Open the condom packet at one corner being careful not to tear the condom with your fingernails, your teeth, or by being too rough. Make sure the packet and condom appear to be in good condition, and check that the expiration date has not passed. <b>(1)</b></p> <p>Wrap the condom in a tissue and throw it away in the trash where others will not handle it. <b>(5)</b></p> <p>Roll the condom all the way down to the base of the penis, and smooth out any air bubbles. <b>(3)</b></p>	<p><b>Great work on your condom use quiz!</b></p> <p><b>Remember:</b></p> <ul style="list-style-type: none"> <li>* Keep condoms handy at all times. If you are starting to become aroused sexually, you'll be ready.</li> <li>* When you buy condoms, don't get embarrassed. If anything, be proud! It shows that you are responsible and confident.</li> <li>* Talk with your partner(s) about using a condom before having sex. We will talk about the importance of responsible communication between partners later.</li> <li>*If you feel like condoms interrupt your passion then try introducing condoms into your lovemaking. It can be really sexy if you do it together.</li> </ul>
<p><b>16</b> Condom Use Video (Header for this screen; red background, white font) <b>K</b></p>	<p><b>17</b> Condom Use Quiz (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>18</b> Condom Use Tips (Header for this screen; red background, white font) <b>SE</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font. All steps will appear on the screen at once, the participant will pick the first step (If correct, it will highlight in green and disappear, if incorrect, it will highlight in red and a pop up will read, "Please select another option.") This will continue until all 5 steps are picked correctly.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>We have provided some tips for condom use and one major tip is using lubrication!</p> <p>Lubrication or lube for short can make condoms easier to put on, more comfortable to use, and reduce breakage.</p> <p>Remember to always use water-based lube with latex condoms. Oil-based lubes breakdown latex and can cause the condom to break!</p> <p>Some lubes contain spermicide.</p> <p>Spermicide kills sperm to prevent pregnancy, but spermicides that contain nonoxynol-9 (N-9) are not recommended for STI and HIV prevention as it has been shown that spermicides with N-9 irritate vaginal and anal lining and can increase the transmission of HIV.</p> <p><b>Source:</b> Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2013.</p>	<p>Now that you're the condom expert! How often do you think college students use condoms during...?</p> <p><b>Oral Sex</b></p> <ul style="list-style-type: none"> <li>• 5%</li> <li>• 25%</li> <li>• 50%</li> <li>• 75%</li> </ul> <p><b>Vaginal Sex</b></p> <ul style="list-style-type: none"> <li>• 5%</li> <li>• 25%</li> <li>• 50%</li> <li>• 75%</li> </ul> <p><b>Anal Sex</b></p> <ul style="list-style-type: none"> <li>• 5%</li> <li>• 25%</li> <li>• 50%</li> <li>• 75%</li> </ul>	<p><b>Oral Sex</b> If you selected 5% you are correct!</p> <p><b>Vaginal Sex</b> If you selected 25% you are correct!</p> <p><b>Anal Sex</b> If you selected 50% you are correct!</p> <p>As you can see condom use is low among college students, but condom use is so important to preventing the spread of STIs including HIV and unintended pregnancies.</p>
<p><b>19</b> What's the Skinny on Lube (Header for this screen; red background, white font) <b>K</b></p>	<p><b>20</b> College Students and Condoms (Header for this screen; red background, white font) <b>SN</b></p>	<p><b>21</b> College Students and Condoms Answers (Header for this screen; red background, white font) <b>SN</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font. For the response options, only allow the selection of one answer and they must select all before being able to move on.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>We know that condoms protect against pregnancy and STIs including HIV, but sometimes people have negative thoughts or beliefs about condoms.</p> <p>What are some negative thoughts that you and your friends have had about condoms?</p> <p><b>Condoms spoil the mood.</b></p> <p><b>Condoms don't feel good.</b></p> <p><b>If I suggest using a condom, my partner is going to think I have an STI or that I think he/she has an STI.</b></p> <p>Let's tackle some of these negative attitudes about condoms!</p>	<p>Check out how Michelle has made using condoms every time she has sex a pretty cool thing and far from negative.</p> <p><a href="#">Michelle Talks Condom Use</a></p> <p>Video provide by <a href="#">bedsider.org</a></p> <p>Bedsider.org (<a href="#">Bedsider</a>) is an online birth control support network for women 18-29 operated by The National Campaign to Prevent Teen and Unplanned Pregnancy, a private non-profit organization.</p>	<p>After watching Michelle talk about condoms, think about how you can make using condoms during sex a fun and enjoyable experience.</p> <p>Next, we are going to talk about the most important aspect of condoms, actually talking to a partner about using condoms.</p>
<p><b>22</b> Condom Attitudes (Header for this screen; red background, white font) <b>A</b></p>	<p><b>23</b> Condom Attitudes (Header for this screen; red background, white font) <b>A</b></p>	<p><b>24</b> Condom Attitudes (Header for this screen; red background, white font) <b>A</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>Some people dislike using condoms or have excuses for not wanting to use condoms, but this module is going to give you tools to use that show the benefit of using condoms and allow you to maintain your limits of what you will and won't do sexually!</p> <p>Check out the rebuttals to common excuses for not using condoms and think about some ways that you would respond to someone if you wanted to use condoms and they did not.</p>	<p>Rebuttals to common excuses for not using condoms:</p> <ol style="list-style-type: none"> <li>1. You don't trust me- I do trust you, but I want to make sure we are both protected against pregnancy and STIs.</li> <li>2. But I'm on birth control- That's great, but that won't protect us from STIs, let's be safe!</li> <li>3. It doesn't feel good-It will make me feel better knowing that we are protected!</li> </ol>	<p>Hopefully this module has helped you think about condoms in a new and refreshing way!</p>
<p><b>25</b> Let's Talk About Condoms (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>26</b> Let's Talk About Condoms (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>27</b> Condom Conclusion (Header for this screen; red background, white font) <b>SE</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font. Display each negative statement about condom use, delay for 1-2 seconds and then display rebuttal; giving participants time to think about their own rebuttals.</p>	<p>White screen, black writing, Chalkboard font.</p>

	<p>We've talked about how condoms can be used to prevent pregnancy and protect against STIs, including HIV, let's now talk about birth control or contraception.</p> <p>There are a variety of contraception options out there, this sexual health education program will cover the most popular, give you the basic facts about each method, and provide you with web links that will give you more in depth information about various methods of contraception.</p>	<p>Let's address the most popular methods. Click on each method to learn more!</p> <ul style="list-style-type: none"> <li>The Pill</li> <li>The Patch</li> <li>The Shot</li> <li>The Ring</li> <li>IUD</li> <li>Emergency Contraception</li> </ul>
<p><b>28</b> Contraceptive Use (Header for this screen; red background, white font)</p>	<p><b>29</b> Contraceptive Use Introduction (Header for this screen; red background, white font) <b>T</b></p>	<p><b>30</b> Popular Methods of Contraception (Header for this screen; red background, white font) <b>T</b></p>
<p>I would like for this picture to be shown and then move to the next screen. Can this photo also be used as a small caption on screen 29. On the left side of the screen.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>I want the modules above to be on a tab screen where participants can choose where they would like to start. White screen, black writing, Chalkboard font.</p>



<p><b>Q: How effective is it?</b> A: 99% effective when taken correctly, less effective when taken incorrectly.</p> <p><b>Q: How do I use it?</b> A: A woman has to remember to take the pill at the same time everyday.</p> <p><b>Q: What are the side effects?</b> A: Some women experience nausea, and decreased sex drive.</p> <p><b>Q: How much does it cost?</b> A: \$0-\$90</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs.</p> <p><b>Q: How do I get it?</b> A: A woman needs to go to the doctor or clinic to get an initial prescription.</p> <p>* Q row (darker grey) A row (lighter grey)</p>	<p><b>Q: How effective is it?</b> A: 99% effective, when it is changed on time each week.</p> <p><b>Q: How do I use it?</b> A: A women places a patch on the butt, belly, back or arm once a week and change the patch weekly.</p> <p><b>Q: What are the side effects?</b> A: Most common side effects are irregular bleeding, sore boobs, and nausea.</p> <p><b>Q: How much does it cost?</b> A: \$0-\$50</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs.</p> <p><b>Q: How do I get it?</b> A: A woman needs to go to the doctor or clinic to get an initial prescription.</p> <p>* Q row (darker grey) A row (lighter grey)</p>	<p><b>Q: How effective is it?</b> A: 99% effective, as long as each shot is given on time.</p> <p><b>Q: How do I use it?</b> A: A woman has to get the shot at the Drs. office every 3months.</p> <p><b>Q: What are the side effects?</b> A: Most common side effects are irregular bleeding and weight gain.</p> <p><b>Q: How much does it cost?</b> A: Ranges from \$0-\$75</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs.</p> <p><b>Q: How do I get it?</b> A: A woman needs to go to the doctor or clinic every 3 months.</p> <p>* Q row (darker grey) A row (lighter grey)</p>
<p><b>31</b> The Pill (Header for this screen; red background, white font) <b>K</b></p>	<p><b>32</b> The Patch/ Ortho Evra (Header for this screen; red background, white font) <b>K</b></p>	<p><b>33</b> The Shot/Depo/Depo-Provera (Header for this screen; red background, white font) <b>K</b></p>
<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. Pill photo on right in black. Same photo from slide 1.</p>	<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. Patch photo on right in black.</p>	<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. <u>Depo</u> photo on right in black.</p>


<p><b>Q: How effective is it?</b> A: 99% effective, as long as you use it correctly.</p> <p><b>Q: How do I use it?</b> A: A woman inserts the ring, leaves it in for 3 weeks, takes the ring out, and leaves it out for 1 week. Repeat.</p> <p><b>Q: What are the side effects?</b> A: Most common side effects are irregular bleeding, sore boobs, and nausea.</p> <p><b>Q: How much does it cost?</b> A: \$0-\$50</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs.</p> <p><b>Q: How do I get it?</b> A: A woman needs to go to the doctor or clinic to get an initial prescription.</p> <p>* Q row (darker grey) A row (lighter grey)</p>	<p><b>Q: How effective is it?</b> A: 99.9% effective, one of the most effective methods.</p> <p><b>Q: How do I use it?</b> A: A woman gets the IUD inserted at the Drs. office and does nothing for years.</p> <p><b>Q: What are the side effects?</b> A: Rare, but headaches, moodiness, and spotting during the 1<sup>st</sup> 3-6 months.</p> <p><b>Q: How much does it cost?</b> A: \$0-\$850</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs?</p> <p><b>Q: How do I get it?</b> A: A woman needs to go to the doctor or clinic to have the IUD inserted.</p> <p>* Q row (darker grey) A row (lighter grey)</p>	<p><b>Q: How effective is it?</b> A: 89% effective if taken within 72 hours after unprotected sex, less effective after that, but can be used up to 120 hours after unprotected sex.</p> <p><b>Q: How do I use it?</b> A: A woman takes the pill as outlined on the package.</p> <p><b>Q: What are the side effects?</b> A: Most common side effects are headaches, upset stomach, and vomiting.</p> <p><b>Q: How much does it cost?</b> A: \$0-\$50</p> <p><b>Q: Does it prevent STIs?</b> A: No protection against STIs.</p> <p><b>Q: How do I get it?</b> Women can get EC at the Drs. office or clinic. It is also available over the counter without a prescription for men or women.</p> <p>* Q row (darker grey) A row (lighter grey)</p>
<p><b>34</b> The Ring/ Nuvaring (Header for this screen; red background, white font) <b>K</b></p>	<p><b>35</b> IUD/ Intrauterine Device (Header for this screen; red background, white font) <b>K</b></p>	<p><b>36</b> Emergency Contraception/EC/Plan B (Header for this screen; red background, white font) <b>K</b></p>
<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. Nuvaring photo on right in black.</p>	<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. IUD photo on right in black.</p>	<p>White screen, black writing, Chalkboard font. At the top left of the screen, I would like a drop down menu of all contraception options to return to. EC photo on right in black.</p>

<p><b>We have talked about some of the popular methods of birth control; some you are probably familiar with and some that you aren't. Let's play a little game to test your knowledge about the available contraceptive options.</b></p>	<p>Nancy does not like using hormonal contraception She also wants to protect herself against STIs as well as pregnancy. What method would work best for her? Choose all that apply.</p> <p>The Pill The Patch The Shot The Ring IUD Male Condom</p> <p>(I would like this in a list, that the participant can click and unclick to select their options)</p> <p>Submit Button (Bottom center, that will prompt screen 39)</p>	<p>The Pill The Patch The Shot The Ring X IUD X Male Condom</p> <p>Nancy can use any method that does not contain hormones. She can use the copper IUD that contains no hormones. Because she wants to protect against STIs, her and her partner should also use condoms.</p>
<p><b>37</b> What Method Should they Choose? (Header for this screen; red background, white font) <b>T</b></p> <p>White screen, black writing, Chalkboard font.</p>	<p><b>38</b> Natural Nancy (Header for this screen; red background, white font) <b>SE</b></p> <p>White screen, black writing, Chalkboard font.</p>	<p><b>39</b> Natural Nancy- Answers (Header for this screen; red background, white font) <b>SE</b></p> <p>White screen, black writing, Chalkboard font. The Xs indicate correct answers, maybe red for wrong answers and green for right answers.</p>

<p>Paul does not want to depend on his partner to take care of the birth control. He wants to make sure for himself that he doesn't have any babies or contract an STI. What method would work best for him? Choose all that apply.</p> <p>The Pill The Patch The Shot The Ring IUD Male Condom</p> <p>(I would like this in a list, that the participant can click and unclick to select their options)</p> <p>Submit Button (Bottom center, that will prompt screen 41)</p>	<p>The Pill The Patch The Shot The Ring IUD X Male Condom</p> <p>Paul can only use options that are male dependent because he wants to protect himself. Condoms will work to help prevent pregnancy and STIs.</p>	<p>Farrah wants a method that is really effective, but she does not want to be bothered with something that she has to take everyday. She wants to keep her birth control options personal and not discuss them with her partner. What method would work best for her? Choose all that apply.</p> <p>The Pill The Patch The Shot The Ring IUD Male Condom</p> <p>(I would like this in a list, that the participant can click and unclick to select their options)</p> <p>Submit Button (Bottom center, that will prompt screen 43)</p>
<p><b>40</b> Proactive Paul (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>41</b> Proactive Paul-Answers (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>42</b> Forgetful Farrah (Header for this screen; red background, white font) <b>SE</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font. The Xs indicate correct answers, maybe red for wrong answers and green for right answers.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>The Pill The Patch X The Shot The Ring X IUD Male Condom</p> <p>Farrah would not do well with methods that require daily or weekly routines like the pill, patch, or ring, but because she still wants a highly effective method, the shot or the IUD would probably work best for Farrah.</p>	<p><b>Wow! We have reviewed the information on various methods of contraceptives and now you are armed with the knowledge to engage in safe sexual activity without the risk of an unintended pregnancy!</b></p> <p><b>Knowledge is good, but let's also make sure you have the confidence, healthy attitude, and necessary skills to make using contraceptives a reality!</b></p>	<p>So you think birth control is complicated or just not really worth it!</p> <p>Check out how easy <u>Mandi</u> has made using the pill to protect herself when she's with a casual partner and when she is in a steady relationship.</p> <p><a href="#">Mandi Takes the Pill</a></p> <p>Video provided by <a href="#">bedsider.org</a></p> <p><a href="#">Bedsider.org</a> (<a href="#">Bedsider</a>) is an online birth control support network for women 18-29 operated by The National Campaign to Prevent Teen and Unplanned Pregnancy, a private non-profit organization.</p>
<p><b>43</b> Forgetful Farrah-Answers (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>44</b> Contraceptive Use Wrap-Up (Header for this screen; red background, white font) <b>T</b></p>	<p><b>45</b> Mandi Takes the Pill (Header for this screen; red background, white font) <b>SN</b></p>
<p>White screen, black writing, <b>Chalkboard</b> font. The Xs indicate correct answers, maybe red for wrong answers and green for right answers.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>

<p>Males, I know when it comes to birth control, you may think it's female territory, but it is important that you play a role in making decisions about birth control and preventing an unintended pregnancy. We aren't the only ones that think it's important, other males think it's important too!</p> <p>Check out Guy talking about the importance of birth control for males!</p> <p><a href="#">Guy's Guide to Birth Control</a></p> <p>Video provide by <a href="#">bedsider.org</a></p> <p><a href="#">Bedsider.org</a> (<a href="#">Bedsider</a>) is an online birth control support network for women 18-29 operated by The National Campaign to Prevent Teen and Unplanned Pregnancy, a private non-profit organization.</p>	<p><b>We have covered the most popular types of contraception available, but for more information on additional methods of contraception, or for more in depth information on the methods already described please visit the following sites:</b></p> <p><a href="#">Planned Parenthood</a></p> <p><a href="#">Bedsider</a></p> <p>Sources for contraceptive information:</p> <p>Planned Parenthood Federation of America, Inc. (PPFA), 2013.</p> <p><a href="#">Bedsider</a>, National Campaign to Prevent Teen and Unplanned Pregnancy, 2013.</p> <p>Boyer, C.B., Shafer, M., Shaffer, R.A., Brodine, S.K., Pollack, L.M., Betsinger, K., Chang, Y.J., Kraft, H.S., &amp; Schachter, J. (2005). Evaluation of a cognitive-behavioral group randomized controlled intervention trial to prevent sexually transmitted infections and unintended pregnancies in young women. <i>Preventative Medicine</i>, 40, 420-431.</p>	<p><b>We know that there many types of birth control methods that are available, but hopefully this simple and short module makes the world of birth control a little less daunting and can help you make the choice that is best for you and your partner(s).</b></p> <p><b>After this, when your goal is to prevent an unintended pregnancy, we hope that you now have accurate information, skills, and confidence to use an effective method of birth control when you are deciding to have sex in the future!</b></p>
<p><b>46</b> A Guy's Guide to Birth Control (Header for this screen; red background, white font) <b>SN</b></p>	<p><b>47</b> Contraception Methods-Conclusion (Header for this screen; red background, white font) <b>T</b></p>	<p><b>48</b> <a href="#">Contraceptive</a> Wrap-Up (Header for this screen; red background, white font) <b>T</b></p>
<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>

	<p><b>So far we have addressed what we like to call the Big Cs, condoms and contraception!</b></p> <p><b>People say it takes two to tango so you need to know more than just the Big Cs you need to know how to talk about sex with your partner(s).</b></p> <p>Sex can be difficult to talk about between sexual partners, no matter what the stage of the relationship, but talking about sex is important, so this section of the education program is going to provide <u>keys to</u> effective communication about sex and having healthy communication with your sex partner(s).</p>	<p>Tips for Talking About Sex- Be Honest</p> <p>Tips for Talking About Sex-Be Responsible</p> <p>What about Hooking Up?</p> <p>What about Partner Concurrency?</p>
<p><b>49</b> Interpersonal Relationships (Header for this screen; red background, white font)</p>	<p><b>50</b> Talking About Sex (Header for this screen; red background, white font) <b>T</b></p>	<p><b>51</b> Talking About Sex (Header for this screen; red background, white font) <b>T</b></p>
<p>I would like for this picture to be shown and then move to the next screen. Can this photo also be used as a small caption on all the interpersonal relationship screens, on the left side of the <u>screen</u>.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font. I want the modules above to be on a tab screen where participants can choose where they would like to start.</p>






<p>Be Honest:</p> <ul style="list-style-type: none"> <li>• About your past relationships</li> <li>• About the importance of being protected and safe</li> <li>• About your personal values and boundaries (what you will and won't do sexually)</li> <li>• About your emotions and feelings</li> </ul>	<p>Be Responsible:</p> <ul style="list-style-type: none"> <li>• Decide who is responsible for condoms or other contraceptives</li> <li>• Get tested for STIs before you are sexually active with a new partner(s)</li> <li>• Avoid situations that may hinder you making safe decisions, like being under the influence of drugs or alcohol</li> </ul>	<p>Let's face it, talking about sex is a little easier when it's with a steady partner, like a boyfriend or girlfriend, but talking about sex is probably non-existent with a random partner, hook up, or one night stand.</p> <p>Given that communication may be less with a casual hook up, planning and staying safe is key.</p> <p>Try to:</p> <ul style="list-style-type: none"> <li>• Carry condoms</li> <li>• Know what you will and won't do sexually</li> </ul>
<p><b>52</b> Talking About Sex-Be Honest (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>53</b> Talking About Sex-Be Responsible (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>54</b> What about Hooking Up? (Header for this screen; red background, white font) <b>SE</b></p>
<p>White screen, black writing, Chalkboard font. I would like a drop down menu of all talking about sex options to return to.</p>	<p>White screen, black writing, Chalkboard font. I would like a drop down menu of all talking about sex options to return to.</p>	<p>White screen, black writing, Chalkboard font. I would like a drop down menu of all talking about sex options to return to.</p>



<p>So we've covered hooking up, partner concurrency.</p> <p><b>Partner Concurrency! SAY WHAT?! What the heck is that?</b></p> <p>Well partner concurrency is a pretty important concept.</p> <p>It is essentially overlapping sexual relationships; starting a sexual relationship with one person before the previous sexual relationship has ended.</p> <p>This type of sexual activity can increase the chances of transmitting STIs and HIV and can make communication about sex even more important!</p> <p><b>Tip:</b> In some cases people in relationships have other sex partners that you may not be aware of- so unless you are 100% sure, it is always best to protect yourself against unknown exposure to STIs and possibly HIV by using condoms.</p>	<p>Check out how important young adults think communication is in a relationship!</p> <p><a href="#">Communication is Everything</a></p>	<p>After watching young adults talk about the importance of communication, think about how you plan to communicate with your sex partner(s) about sex and keep it real and make it fun!</p> <p>Hopefully this module has helped you think about healthy relationships and made talking about sex with your partner(s) not such a scary thing!</p>
<p><b>55</b> What about Partner Concurrency (Header for this screen; red background, white font) <b>K</b></p>	<p><b>56</b> Communication with Your Partner(s) (Header for this screen; red background, white font) <b>A/SN</b></p>	<p><b>57</b> Interpersonal Relationships Conclusion (Header for this screen; red background, white font) <b>A/SN</b></p>
<p>White screen, black writing, <b>Chalkboard</b> font. I would like a drop down menu of all talking about sex options to return to.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>

	<p>We've talked about condoms, methods of contraception and how to communicate with your sex partner(s), but there is one last thing to cover.....</p> <p><b>ALCOHOL!</b></p> <p>Many college students drink alcohol to just relax, socialize and have fun, but alcohol can affect your judgement and your decision-making, which also includes your sexual decision-making.</p> <p>To make sure you make safe and healthy decisions while drinking, we are going to discuss some alcohol basics.</p>	<p>We will cover:</p> <p>Basic Alcohol Facts</p> <p>Alcohol Myths</p> <p>Consequences of Drinking</p>
<p><b>58</b> Alcohol Use (Header for this screen; red background, white font)</p>	<p><b>59</b> Alcohol Use Introduction (Header for this screen; red background, white font) <b>T</b></p>	<p><b>60</b> Substance Use (Header for this screen; red background, white font) <b>T</b></p>
<p>Can this photo also be used as a small caption on all the substance use screens on the left side of the screen.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>*Alcohol is a depressant that affects every part of your body</p> <p>*It can damage the part of your brain that controls coordination, memory, judgement, and decision-making</p> <p>* Alcohol travels through your bloodstream and damages your brain, stomach, liver, kidneys, and muscles.</p> <p>*Each year, approximately 5,000 people under the age of 21 die as a results of drinking.</p> <p><b>Source:</b>  <a href="#">Dimeff LA, Baer JS, Kivlahan DR, Marlatt GA. Brief Intervention College Student Drinkers: A Harm Reduction Approach for Alcohol Abuse. The Addictive Behaviors Research Center, 1996, Seattle, Washington.</a>  <a href="#">Giarratano SC. Tobacco, Alcohol and Drugs: Choosing Health High School. ETR Associates, 1997, Santa Cruz, CA.</a></p>	 Liquor-40-50% alcohol content (1½ ounces)  Wine- 10-14% alcohol content (4 ounces)  Beer- 4-6% alcohol content (12 ounces) <p><b>Source:</b>  <a href="#">Dimeff LA, Baer JS, Kivlahan DR, Marlatt GA. Brief Intervention College Student Drinkers: A Harm Reduction Approach for Alcohol Abuse. The Addictive Behaviors Research Center, 1996, Seattle, Washington.</a>  <a href="#">Giarratano SC. Tobacco, Alcohol and Drugs: Choosing Health High School. ETR Associates, 1997, Santa Cruz, CA.</a></p>	<p>The blood alcohol level (BAL) is the ratio of alcohol to blood in the blood stream</p> <p>In most states, a person with a BAL of .08 is considered legally drunk</p> <p>BAL .02%-Feel some effects, judgement is impaired.</p> <p>BAL .35%- Central nervous system is compromised and there is risk of death.</p> <p><b>Source:</b>  <a href="#">Dimeff LA, Baer JS, Kivlahan DR, Marlatt GA. Brief Intervention College Student Drinkers: A Harm Reduction Approach for Alcohol Abuse. The Addictive Behaviors Research Center, 1996, Seattle, Washington.</a>  <a href="#">Giarratano SC. Tobacco, Alcohol and Drugs: Choosing Health High School. ETR Associates, 1997, Santa Cruz, CA.</a></p>
<p><b>61</b> Basic Alcohol Facts (Header for this screen; red background, white font) <b>K</b></p>	<p><b>62</b> Types of Drinks (Header for this screen; red background, white font) <b>K</b></p>	<p><b>63</b> Blood Alcohol Content (BAL) (Header for this screen) <b>K</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>True or False?</p> <p>Drinking isn't all that dangerous!</p>	<p>If you answered False, you are correct!</p> <p>1 in 3, 18-24 year olds that are admitted to emergency rooms for serious injuries are intoxicated. Alcohol is associated with physical and emotional distress!</p>	<p>True of False?</p> <p>Men and women can tolerate the same amount of alcohol?</p>
<p><b>64</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>	<p><b>65</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>	<p><b>66</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>If you answered False, you are correct!</p> <p>Women process alcohol differently than men. No matter how much men drink if women drink the same amount, they will be more intoxicated and more impaired.</p>	<p>True or False?</p> <p>I'm better in bed when I've been drinking.</p>	<p>If you answered, True you are incorrect!</p> <p>Actually alcohol decreases sexual arousal and sexual response. In particular men may have trouble getting an erection and if they are able to get an erection they may have difficulty ejaculating (<u>cuming</u>) if they are drunk.</p>
<p><b>67</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>	<p><b>68</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>	<p><b>69</b> Alcohol Myths (Header for this screen; red background, white font) <b>A</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>Now that we've covered some basics facts about alcohol and cleared up a few myths, check out a video scenario where college students suffer some negative consequences from drinking.</p> <p><a href="#">Drinking and Sex</a></p>	<p><b>In order to prevent some negative consequences from drinking, follow our tools and skills to stay safe.</b></p> <p><b>Tools/ Skills to Stay Safe</b></p> <ul style="list-style-type: none"> <li>• Avoid getting drunk</li> <li>• Stay aware of your surroundings (your location, people that are around, etc.)</li> <li>• Always hang out with friends that you know and trust</li> <li>• Call 911 for emergency help</li> </ul>	<p>Just remember to always plan and be responsible when you are drinking!</p> <p>Always have a plan of action to avoid dangerous situations!</p> <p>Know whom to contact if your situation is dangerous or you find yourself in an emergency situation!</p>
<p><b>70</b> Drinking Consequences (Header for this screen; red background, white font) <b>SN</b></p>	<p><b>71</b> Tool to Stay Safe (Header for this screen; red background, white font) <b>SE</b></p>	<p><b>72</b> Alcohol Conclusion (Header for this screen; red background, white font) <b>SE</b></p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>Wow! We have covered very important information about condoms, contraception, communication and alcohol!</p> <p>We hope that you have learned a lot about sexual health and how to stay safe.</p> <p><b>Remember:</b></p> <p>See a health care provider (e.g., school nurse, doctor) if you have signs or symptoms of an STI.</p> <p>Many STIs do not have signs or symptoms so get tested regularly if you are sexually active.</p>	<p>University of South Carolina Student Health Services  <a href="http://www.sa.sc.edu/shs/">http://www.sa.sc.edu/shs/</a></p> <p>Get Yourself Tested!  <a href="http://www.sa.sc.edu/shs/wc/gyt/">http://www.sa.sc.edu/shs/wc/gyt/</a></p> <p>South Carolina Department of Health and Environmental Control  <a href="http://www.scdhec.gov/">http://www.scdhec.gov/</a></p>	<p>MTV IYSL  <a href="http://www.itsyoursexlife.com">www.itsyoursexlife.com</a></p> <p>The National Campaign to Prevent Teen and Unplanned Pregnancy  <a href="http://www.thenationalcampaign.org/">http://www.thenationalcampaign.org/</a></p> <p>Bedsider  <a href="http://bedsider.org/">http://bedsider.org/</a></p>
<p><b>73</b> Wrap-Up</p>	<p><b>74</b> Local Resources (Header for this screen; red background, white font)</p>	<p><b>75</b> National Resources (Header for this screen; red background, white font)</p>
<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>	<p>White screen, black writing, Chalkboard font.</p>

<p>References:</p> <p>Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2013.</p> <p>Planned Parenthood Federation of America, Inc. (PPFA), 2013.</p> <p><u>Bedsider</u>, National Campaign to Prevent Teen and Unplanned Pregnancy, 2013.</p> <p>Boyer, C.B., Shafer, M., Shaffer, R.A., <u>Brodine</u>, S.K., Pollack, L.M., <u>Betsinger</u>, K., Chang, Y.J., Kraft, H.S., &amp; <u>Schachter</u>, J. (2005). Evaluation of a cognitive-behavioral group randomized controlled intervention trial to prevent sexually transmitted infections and unintended pregnancies in young women. <i>Preventative Medicine</i>, 40, 420-431.</p> <p><u>Dimeff</u> LA, Baer JS, <u>Kivlahan</u> DR, <u>Marlatt</u> GA. Brief Intervention College Student Drinkers: A Harm Reduction Approach for Alcohol Abuse. <i>The Addictive Behaviors Research Center</i>, 1996, Seattle, Washington.</p> <p><u>Giarratano</u> SC. Tobacco, Alcohol and Drugs: Choosing Health High School. ETR Associates, 1997, Santa Cruz, CA.</p>	<p>Remember all information that you shared during the completion of this sexual health intervention will be kept private. Only the principal investigator (Dawnyea Jackson) and the research team will have access to the data collected.</p> <p>If you need to contact the PI or research team for any reason please email <a href="mailto:dawnyea@gmail.com">dawnyea@gmail.com</a>!</p>	<p>Thank you so much for completing, "SEX 101!"</p> <p>Don't forget 3 months from now we will contact you via email to remind you to log back into the app to complete the follow-up survey.</p> <p>Your name will be entered in a raffle to when a \$50 Amazon.com gift card for your follow-up survey completion!</p> <p>Your feedback is important to us, so we hope to receive a completed survey for you.</p>
<p><b>76</b> References (Header for this screen; red background, white font)</p>	<p><b>77</b> Module Conclusion (Header for this screen; red background, white font)</p>	<p><b>78</b> THE END/ THANK YOU! (Header for this screen; red background, white font)</p>
<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>	<p>White screen, black writing, <b>Chalkboard</b> font.</p>



APPENDIX D: ELIGIBILITY FORM

SEX 101

Not your normal sex education program!

Would you like to learn more about condoms, contraception or communicating about sex?

Then SEX 101 is for you!

The web-based education program (complete on Smartphone, tablet, and/or computer) will take about 1 hour to complete and your name will be entered in a raffle to receive a \$50 Amazon.com gift card!

If you would like to participate please fill out the information below:

Name: \_\_\_\_\_

Age: \_\_\_\_\_

Gender: \_\_\_\_\_

Race: \_\_\_\_\_

Year in School: \_\_\_\_\_

E-mail: \_\_\_\_\_

Have you ever had sex? Yes \_\_\_\_\_ No \_\_\_\_\_

## APPENDIX E: IRB APPROVAL LETTER 1



OFFICE OF RESEARCH COMPLIANCE

April 9, 2013

Ms. Dawnyea Jackson  
Arnold School of Public Health  
Health Promotion, Education & Behavior  
800 Sumter Street, Room 216  
Columbia, SC 29208

Re: **Pro00024914**  
Study Title: *The Development of an Interactive Mobile Application Intervention to Reduce Sexual Risk Behaviors among College Student*

FYI: University of South Carolina Assurance number: FWA 00000404 / IRB Registration number: 00000240

Dear Ms. Jackson:

In accordance with 45 CFR 46.101(b)(2), the referenced study received an exemption from Human Research Subject Regulations on **4/9/2013**. No further action or Institutional Review Board (IRB) oversight is required, as long as the project remains the same. However, you must inform this office of any changes in procedures involving human subjects. Changes to the current research protocol could result in a reclassification of the study and further review by the IRB.

Because this project was determined to be exempt from further IRB oversight, consent document(s), if applicable, are not stamped with an expiration date.

Research related records should be retained for a minimum of three years after termination of the study.

The Office of Research Compliance is an administrative office that supports the USC Institutional Review Board. If you have questions, please contact Arlene McWhorter at [arlenam@sc.edu](mailto:arlenam@sc.edu) or (803) 777-7095.

Sincerely,

A handwritten signature in blue ink, appearing to read "Lisa M. Johnson".

Lisa M. Johnson  
IRB Manager

cc: Lucy Annang

## APPENDIX F: IRB APPROVAL LETTER 2



OFFICE OF RESEARCH COMPLIANCE

August 20, 2013

Ms. Dawnyea Jackson  
Arnold School of Public Health  
Health Promotion, Education & Behavior  
800 Sumter Street, Room 216  
Columbia, SC 29208

Re: **Protocol Change: Ame1\_Pro00024914** - Requested on 8/20/2013

Study title: *The Development of an Interactive Mobile Application Intervention to Reduce Sexual Risk Behaviors among College Student*

Dear Ms. Jackson:

The Institutional Review Board (IRB) approved the revisions to the above referenced project on **08/20/2013**. The requested revision(s) do not change the current Exempt status; therefore, further IRB oversight is not required unless additional changes are requested. Because changes could result in a reclassification of the study, you must inform the IRB of any changes in procedures involving humans.

Note: All research related records, including Informed Consent document(s), if applicable, are to be retained for at least three (3) years after termination of the study.

The Office of Research Compliance is an administrative office that supports the USC Institutional Review Board. If you have questions, please contact Arlene McWhorter at [arlanem@sc.edu](mailto:arlanem@sc.edu) or (803) 777-7095.

Sincerely,

A handwritten signature in blue ink, appearing to read "Lisa M. Johnson".

Lisa M. Johnson  
IRB Manager

## APPENDIX G: SEX 101 INTERVENTION SURVEY

### Sex 101 Intervention Survey

#### Condom Use Survey Questions

#### Knowledge\*

1. Male condoms should be used during each sexual act to aid in the prevention of STIs and HIV.	T	F
2. A condom blocks the transfer of bodily fluids, to decrease the risk of getting STIs and HIV.	T	F
3. Using water-based lubricants can damage condoms.	T	F
4. STIs are infections and viruses that are caused from having unprotected sex.	T	F

No Cronbach's alpha for knowledge

#### Questions adapted from:

Boyer, C.B., Shafer, M., Shaffer, R.A., Brodine, S.K., Pollack, L.M., Betsinger, K., Chang, Y.J., Kraft, H.S., & Schachter, J. (2005). Evaluation of a cognitive-behavioral, group randomized controlled intervention trial to prevent sexually transmitted infections and unintended pregnancies in young women. *Preventative Medicine*, 40, 420-431.

#### Attitudes

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. Using condoms with my sex partner(s) is a good way to prevent STIs and HIV.	1	2	3	4	5
2. Using latex condoms with my sex partner(s) each and every time we have sex is unrealistic.	1	2	3	4	5
3. Condoms decrease the feeling during sex.	1	2	3	4	5

4. Using condoms during sex spoils the mood.	1	2	3	4	5
5. Wanting to use condoms says something bad about my partner(s).	1	2	3	4	5
6. If my partner(s) looks healthy and they say they are healthy, then we do not need to use condoms.	1	2	3	4	5

Cronbach's alpha= 0.81

Questions adapted from:

Boyer, C.B., Pollack, L.M., Becnel, J., & Shafer, M. (2008). Relationships among sociodemographic markers, behavioral risk, and sexually transmitted infections in U. S. female marine corps recruits. *Military Medicine*, 173(11), 1078-1084.

### Subjective Norms\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. My partner(s) think that it is important to use condoms to prevent STIs and HIV.	1	2	3	4	5
2. Because my partner(s) think that it is important to use condoms to prevent STIs and HIV, I use condoms with my sex partner(s).	1	2	3	4	5
3. My partner(s) do not use condoms when having sex.	1	2	3	4	5
4. Because my partner(s) do not use condoms when having sex, I do not use condoms either.	1	2	3	4	5

\*No Cronbach's alpha for subjective norms

Questions developed by PI and team

### Self-Efficacy

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I feel confident in my ability to put a condom on myself or my partner.	1	2	3	4	5
2. I feel confident that I can use a condom correctly.	1	2	3	4	5
3. I feel confident that I can properly remove and dispose of a condom when I have sex.	1	2	3	4	5
4. I feel confident in my ability to put a condom on myself or my partner without ruining the mood.	1	2	3	4	5
5. I feel confident in my ability to discuss condom usage with any partner I might have.	1	2	3	4	5
6. I feel confident in my ability to suggest using condoms with a new partner.	1	2	3	4	5

Questions 1-4 (Mechanics): Chronbach's alpha= 0.78

Questions 5-6 (Assertive): Chronbach's alpha= 0.80

**Questions adapted from:**

**Brafford, L.J, & Beck, K. H. (1991). Development and validation of a condom self-efficacy scale for college students. *Journal of American College Health*, 39(5), 219-225.**

### Stages of Change\*

Please select the statement that best describes your condom use behavior.

I currently do not always use condoms during sexual intercourse and I am not thinking about starting.	<b>PC</b>
I currently do not always use condoms during sexual intercourse, but I am thinking about starting.	<b>C</b>

I currently do not always use condoms during sexual intercourse, but I am planning to start in the next month.	<b>P</b>
I currently always use condoms during sexual intercourse, but I only started doing so in the last 6 months.	<b>A</b>
I currently always use condoms during sexual intercourse and I have done so for longer than 6 months.	<b>M</b>

\*No Cronbach's alpha for stages of change

Questions adapted from:

Arden, M.A., & Armitage, C.J. (2008). Predicting and explaining transtheoretical model stage transitions in relation to condom-carrying behavior. *British Journal of Health Psychology*, 13(4), 719-735.

### Contraceptive Use Survey Questions

#### Knowledge\*

1. Birth control pills offer some protection against STIs.	<b>T</b>	<b>F</b>
2. Birth control pills are 99% effective if taken as directed.	<b>T</b>	<b>F</b>
3. The "morning after" pill is a type of hormonal birth control that can be used as an emergency method of pregnancy prevention.	<b>T</b>	<b>F</b>
4. "Pulling out" or withdrawal of the penis before a man "cums" or ejaculates effectively prevents pregnancy.	<b>T</b>	<b>F</b>

\*No Cronbach's alpha for knowledge

Questions adapted from:

Boyer, C.B., Shafer, M., Shaffer, R.A., Brodine, S.K., Pollack, L.M., Betsinger, K., Chang, Y.J., Kraft, H.S., & Schachter, J. (2005). Evaluation of a cognitive-behavioral, group randomized controlled intervention trial to prevent sexually transmitted infections and unintended pregnancies in young women. *Preventative Medicine*, 40, 420-431.

### Attitudes

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. Using birth control to prevent unintended pregnancies is solely the responsibility of women.	1	2	3	4	5
2. Bringing up the topic of birth control with my sex partner(s) is too embarrassing.	1	2	3	4	5
3. Having/Causing an unintended pregnancy will hurt my future.	1	2	3	4	5
4. If I unintentionally get pregnant/get a woman pregnant, it would be difficult to decide what to do about it.	1	2	3	4	5

\*Cronbach's alpha= 0.63

Questions adapted from:

Boyer, C.B., Pollack, L.M., Becnel, J., & Shafer, M. (2008). Relationships among sociodemographic markers, behavioral risk, and sexually transmitted infections in U. S. female marine corps recruits. *Military Medicine*, 173(11), 1078-1084.

### Subjective Norms\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. My partner(s) think it would be important for me to use an effective method of birth control to prevent an unintended pregnancy.	1	2	3	4	5
2. Because my partner(s) think that it would be important for me to use an effective method of birth control to prevent an unintended pregnancy, I use an effective method of birth control to prevent an unintended pregnancy.	1	2	3	4	5



3. My partner(s) think that it is important to talk about using some form of birth control before having sex.	1	2	3	4	5
4. Because my partner(s) think that it is important to talk about using some form of birth control before having sex, I talk with my sex partner(s) about using some form of birth control before having sex. If I unintentionally get pregnant/get a woman pregnant, it would be difficult to decide what to do about it.	1	2	3	4	5

\*No Cronbach's alpha for subjective norms

#### Questions developed by PI and team

#### Self-Efficacy

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I am confident that I can talk with my sex partner(s) about using a method of birth control.	1	2	3	4	5
2. I am confident that I can abstain from having sex (not have sex) if a birth control method is not used or available.	1	2	3	4	5
3. I am confident that I can make sure my partner(s) uses a birth control method correctly to prevent an unintended pregnancy.	1	2	3	4	5
4. I am confident that I can visit a health professional to discuss birth control methods that are best for me/partner(s).	1	2	3	4	5

Chronbach's alpha= 0.80

Questions adapted from:

Boyer, C.B., Pollack, L.M., Becnel, J., & Shafer, M. (2008). Relationships among sociodemographic markers, behavioral risk, and sexually transmitted infections in U. S. female marine corps recruits. *Military Medicine*, 173(11), 1078-1084.

### Stages of Change\*

Please select the statement that best describes your contraceptive use behavior.

I currently do not always use a method of birth control during sexual intercourse and I am not thinking about starting.	<b>PC</b>
I currently do not always use a method of birth control during sexual intercourse, but I am thinking about starting.	<b>C</b>
I currently do not always use a method of birth control during sexual intercourse, but I am planning to start in the next month.	<b>P</b>
I currently always use a method of birth control during sexual intercourse, but I only started doing so in the last 6 months.	<b>A</b>
I currently always use a method of birth control during sexual intercourse and I have done so for longer than 6 months.	<b>M</b>

\*No Cronbach's alpha for stages of change

Questions developed by PI and team

### Interpersonal Relationships Survey Questions

#### Knowledge\*

1. Having overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended) increases your risk of contracting STIs and HIV.	<b>T</b>	<b>F</b>
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\*No Cronbach's alpha for knowledge

Questions developed by PI and team

#### Attitudes\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I am likely to engage in sexual intercourse with more than one sex partner in a short period of time.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

2. I do not feel comfortable talking to my sex partner(s) about sex.	1	2	3	4	5
3. Communication is the most important thing in a sexual relationship.	1	2	3	4	5
4. If I can't communicate with my sex partner(s) about sex, then I should not have sex.	1	2	3	4	5
5. When talking about sex with my sex partner(s), I think it's important to be honest.	1	2	3	4	5
6. I think it is important to know what I will do sexually.	1	2	3	4	5
7. I think it is important to know what I won't do sexually.	1	2	3	4	5
8. Talking with my sex partner(s) about sex is just too embarrassing.	1	2	3	4	5

\*No Cronbach's alpha for attitudes

Questions developed by PI and team

### Subjective Norms\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. My partner(s) think that it is important to talk about sex. I am likely to engage in sexual intercourse with more than one sex partner in a short period of time.	1	2	3	4	5
2. Because my partner(s) think that it is important to talk about sex, I talk about sex with my sex partner(s).	1	2	3	4	5

3. My partner(s) think that it is important to be honest when talking about sex. Communication is the most important thing in a sexual relationship.	1	2	3	4	5
4. Because my partner(s) think it is important to be honest when talking about sex, I am honest when I talk to my sex partner(s) about sex.	1	2	3	4	5

\*No Cronbach's alpha for subjective norms

### Self-Efficacy\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I feel confident in my ability to talk about sex with my sex partner(s).	1	2	3	4	5
2. I feel confident in my ability to use a condom with steady partner(s).	1	2	3	4	5
3. I feel confident in my ability to use a condom with non-steady sex partner(s).	1	2	3	4	5

\*No Cronbach's alpha for self-efficacy

### Questions developed by PI and team

### Stages of Change\*

Please select the statement that best describes your communication with your sex partner(s) about sex and your current sexual relationships.

I currently do not always talk to my partner(s) about sex and I am not thinking about starting.	PC
I currently do not always talk to my partner(s) about sex, but I am thinking about starting.	C
I currently do not always talk to my partner(s) about sex, but I am planning to start in the next month.	P

I currently always talk to my partner(s) about sex, but I only started doing so in the last 6 months.	<b>A</b>
I currently always talk to my partner(s) about sex and I have done so for longer than 6 months.	<b>M</b>

Please select the statement that best describes your current sexual relationships.

I currently have overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended) and I am not thinking about stopping.	<b>PC</b>
I currently have overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended), but I am thinking about stopping.	<b>C</b>
I currently have overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended), but I am planning to stop in the next month.	<b>P</b>
I currently do not have overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended), but I only started doing so in the last 6 months.	<b>A</b>
I currently do not have overlapping sexual relationships (starting a sexual relationship with one person before the previous sexual relationship has ended) and I have done so for longer than 6 months.	<b>M</b>

\*No Cronbach's alpha for stages of change

Questions developed by PI and team

### Alcohol Use Survey Questions

#### Knowledge\*

1. Alcohol is a depressant that affects every part of your body.	<b>T</b>	<b>F</b>
2. Small amounts of alcohol make you feel a sense of excitement. However, as the BAL (blood alcohol level) rises the depressive effects take over.	<b>T</b>	<b>F</b>
3. Alcohol use often promotes risky sexually behaviors that can lead to STIs including HIV infection, and unintended pregnancies.	<b>T</b>	<b>F</b>

4. Alcohol increases sexual arousal.	T	F
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\*No Cronbach's alpha for knowledge

Questions adapted from:

Boyer, C.B., Shafer, M., Shaffer, R.A., Brodine, S.K., Pollack, L.M., Betsinger, K., Chang, Y.J., Kraft, H.S., & Schachter, J. (2005). Evaluation of a cognitive-behavioral, group randomized controlled intervention trial to prevent sexually transmitted infections and unintended pregnancies in young women. *Preventative Medicine*, 40, 420-431.

### Attitudes

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I am more likely to have sex with someone I do not know well after I have a few drinks.	1	2	3	4	5
2. I enjoy sex more after I have had a few drinks of alcohol.	1	2	3	4	5
3. I have fun after I have had a few drinks.	1	2	3	4	5

Cronbach's alpha= 0.74

Questions adapted from:

Boyer, C.B. Pollack, L.M., Bencel, J., & Shafer, M. (2008). Relationships among sociodemographic markers, behavioral risk, and sexually transmitted infections in U.S. female marine corps recruits. *Military Medicine*, 173(11), 1078-1084.

### Subjective Norms\*

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. My partner(s) think that having sex after drinking alcohol is no big deal.	1	2	3	4	5
2. Because my partner(s) think that having sex after drinking alcohol is no big, I think having sex after drinking alcohol is no big deal.	1	2	3	4	5

3. My partner(s) think that you cannot have fun without drinking alcohol.	1	2	3	4	5
4. Because my partner(s) think that you cannot have fun with out drinking alcohol, I think I cannot have fun without drinking alcohol.	1	2	3	4	5

\*No Cronbach's alpha for subjective norms

Questions developed by PI and team

### Self-Efficacy

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. I feel confident in my ability to stay close by a trusted friend while I'm drinking.	1	2	3	4	5
2. I feel confident in my ability to find a safe way to get someplace else from where I have been drinking (eg, taxi, designated driver, bus, walk a safe route).	1	2	3	4	5
3. I feel confident in my ability to use a condom if I engage in sexual activity after drinking.	1	2	3	4	5

Cronbach's alpha= 0.92

Questions adapted from:

Rosenberg, H., PhD, Bonar, E. E., Hoffmann, E., Kryszak, E. MA, Young, K.M., Kraus, S. W., Ashrafioun, L., Bannon, E. E., & Pavlick, M. MA (2011). Assessing university students' self-efficacy to employ alcohol-related harm reduction strategies. *Journal of American College Health*, 59 (8), 736-742.

### Stages of Change\*

Please select the statement that best describes your alcohol use while engaging in sexual activity.

I currently engage in sex under the influence of alcohol and I am not thinking about stopping.	PC
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I currently engage in sex under the influence of alcohol, but I am thinking about stopping.	<b>C</b>
I currently engage in sex under the influence of alcohol, but I am planning to stop in the next month.	<b>P</b>
I currently do not engage in sex under the influence of alcohol, but I only started doing so in the last 6 months.	<b>A</b>
I currently do not engage in sex under the influence of alcohol and I have done so for longer than 6 months.	<b>M</b>

\*No Cronbach's alpha for knowledge

Questions developed by PI and team

### General Sexual Health Questions

1. Have you ever had oral sex?	<b>Y</b>	<b>N</b>
2. If yes, what age did you have oral sex for the very first time?	<b>Open Ended</b>	
3. If yes, how many different people have you ever had oral sex with?	<b>Open Ended</b>	
4. Have you ever had vaginal sex?	<b>Y</b>	<b>N</b>
5. If yes, what age did you have vaginal sex for the very first time?	<b>Open Ended</b>	
6. If yes, how many different people have you ever had vaginal sex with?	<b>Open Ended</b>	
7. Have you ever had anal sex?	<b>Y</b>	<b>N</b>
8. If yes, at what age did you have anal sex for the very first time?	<b>Open Ended</b>	
9. If yes, how many different people have you ever had anal sex with?	<b>Open Ended</b>	
10. Have you ever been told by a nurse or doctor that you had an STI?	<b>Y</b>	<b>N</b>



11. If yes, how many times have you been pregnant or have gotten a woman pregnant?	<b>Open Ended</b>	
12. Have you ever been pregnant or have gotten a woman pregnant?	<b>Y</b>	<b>N</b>
13. If yes, how many times have you been pregnant or have gotten a woman pregnant?	<b>Open Ended</b>	
14. If yes, how many of the pregnancies were unintended or a surprise?	<b>Open Ended</b>	

\*No Cronbach's alpha for knowledge

**Questions developed by PI and team**