TEACHING TABOO TOPICS WITHOUT TALKING ABOUT THEM:

AN EPISTEMIC STUDY OF A NEW APPROACH TO

HIV/AIDS PREVENTION EDUCATION IN INDIA

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FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

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March 2009

I certify that I have read this dissertation and that, in my opinion, it is fully adequate in scope and quality as a dissertation for the degree of Doctor of Philosophy.

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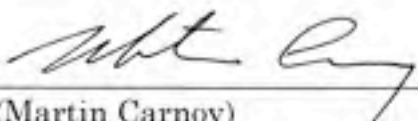(Shelley Goldman) Principal Adviser

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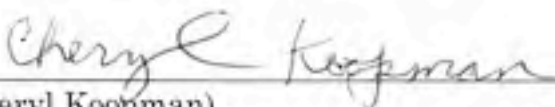I certify that I have read this dissertation and that, in my opinion, it is fully adequate in scope and quality as a dissertation for the degree of Doctor of Philosophy.

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Abstract

Background: Solving the problem of how to provide effective health education on diseases subject to social taboos is an immediate need. The social stigma of HIV/AIDS is particularly prominent in the developing world, where 95 percent of all HIV-infected persons live. Millions of people risk death from HIV/AIDS while cultures and laws resist change. New approaches must be created to provide education despite whatever social, structural, cultural, and legal barriers exist. Fortunately, the emergence of new media and information and communication technologies (ICT) has provided new ways to help bypass social taboos and provide effective education. This dissertation discusses these challenges and presents criteria for evaluating the efficacy of educational campaigns aimed at promoting awareness relating to taboo topics using a specially designed HIV/AIDS curriculum—*Interactive Teaching AIDS*—as an exemplar. In health interventions, knowledge is a necessary, although seldom sufficient, step toward bringing about changes in attitudes and behaviors.

The Interactive Teaching AIDS (ITA) application was developed, tested, and optimized over a two-year period to provide HIV/AIDS education despite social and cultural challenges. It incorporates key pedagogical and communication theories and approaches in order to maximize its efficacy. To provide psychological comfort and promote coherent understanding, this ICT-based application couples the presentation of biological aspects of transmission with culturally-familiar euphemisms and metaphors to communicate ideas about prevention measures. Created using a rigorous, iterative, and research-based process, the 20-minute application provides detailed yet accessible culturally-appropriate explanations of all key aspects of HIV/AIDS prevention. The design process included the

development of multiple prototypes and over 150 iterations in total, starting with concept maps, screenplays, storyboards, and low-fidelity paper prototypes, eventually leading to interactive versions of the curriculum in multiple media, including a final version in Adobe Flash.

Methodology: High school and college students (N=386) from New Delhi, Haryana, and Punjab, were randomly selected across four institutes in India. No one refused to participate. Students at three of the four institutes were assigned to the intervention group, and students at the fourth institute were assigned to the control group. Intervention students received the ITA application. All students received a baseline pretest, followed by an immediate posttest, and finally a retention test one month later to assess outcomes. The assessments measured knowledge of HIV transmission and prevention methods as well as attitudes regarding social acceptance of those infected with the virus.

Results: Experimental students exhibited statistically significant gains in posttest knowledge (p<.001) and positive changes in attitudes (p<.001), even after controlling for pretest knowledge, gender, mother's education and father's education. One month later, the experimental students retained significant amounts of prevention knowledge (p<.001) and displayed positive changes in attitudes (p<.05). On the 40-item knowledge assessment, the experimental group scored 8.25 points higher than the control group participants during the posttest, and 7.03 points higher during the retention test. At onset, males performed significantly better on the pretest than females (p<.01), however, after interacting with the ITA application, there was no differences between the knowledge gained and retained by males or females in the posttest or retention test, closing the achievement gap. Although HIV/AIDS is generally considered a taboo topic

to discuss throughout India, 98.6 percent of intervention students indicated they were comfortable learning from the application, and 94.5 percent said they learned more about prevention through the ITA tutorial than through any other prior communications channel, including television and school. Results revealed that after watching the animated tutorial, a significantly greater proportion of intervention students indicated they felt less afraid of interacting with HIV-infected people rather than feeling more afraid ($p<.001$) and were less afraid of being infected with HIV rather than more afraid ($p<.001$). One month later, 92 percent of students exposed to the intervention had shared information with others ($p<.001$) and 74 percent had sought additional HIV/AIDS-related information on their own ($p<.001$).

Conclusion: For people living in areas that cannot easily access explicit HIV/AIDS materials due to social, cultural or other constraints, these results suggest that it is possible to design curricula that are socially-acceptable and accurate, that promote significant gains in learning, retention, and changes in attitudes. Furthermore, these materials can encourage learners to proactively seek more information regarding the taboo topic and share prevention information with others. Educators who are reticent to teach about such subjects due to embarrassment or lack of health expertise can utilize similar applications to educate students. Such efforts can also close the knowledge gap between female and male learners.

Preface and Acknowledgements

This research would not have been possible without the unwavering support of my family, friends and professors. I would like to thank my passionate and dedicated committee members, Shelley Goldman (School of Education), Clifford Nass (Department of Communication), Martin Carnoy (School of Education), Cheryl Koopman (Department of Psychiatry and Behavioral Sciences) and Randall Stafford (School of Medicine), without whose support this research could not have been done. Over the years, Shelley has taught me so much about curriculum construction, iterative design approaches with interactive technologies, and identifying with the needs and desires of learners. She has always encouraged me to follow my passion and fight for social justice and equality. From the beginning, Cliff made me believe in the impossible and encouraged me to develop a great appreciation for evidence-based practices. His devotion to his students and passion towards helping them excel is truly rare, and I am immensely grateful for all his support. Martin has supported and challenged me to explore new territories and theoretical frameworks with my research. His insights have been invaluable. Cheryl spent countless hours sharing ideas around cultural-sensitivities and the importance of stigma and health-related research and practices. Her experience with developing strong assessment measures has provided a critical foundation for my research. I would also like to thank Randall, whose sagacious judgment and strong statistical background have been extremely helpful in informing my work.

I want to thank my colleagues in the Learning Sciences & Technology Design program, the International Comparative Education program, the Human and Interactive Media (CHIMe) Lab at the Department of Communication, and the Stanford Prevention Research Center at the

Most importantly, thank you to my dear family for all your love and your belief that this dream was attainable. To my parents, Manick and Shikha Sorcar, thank you for instilling in me the desire to do great things, and for your unshakeable faith in me. To my parents-in-law, Debabrata and Gauri Ghosemajumder, thank you for your tireless support and encouragement. To my sister, Payal, you have been my source of endless strength and your insights have been invaluable, and your husband and my brother-in-law, Benjamin, is a constant inspiration.

Finally, to my husband Shuman, thank you for teaching me to view the world with so much hope, for your countless hours as a sounding board, for all your love and support, and for inspiring me to seize each moment.

Table of Contents

List of Tables

1 Introduction to Teaching about Taboo Topics

Drawing upon theoretical and empirical literature, this dissertation addresses the challenges of providing education about highly sensitive and taboo topics. Although challenging, in many cases these topics must be effectively addressed in order to protect public health and improve overall social welfare. Chapter 1 presents a conceptualization of laws and norms and a discussion of social prohibitions. Chapter 2 outlines the challenges in teaching about taboo topics and analyzes the various strategies for providing the requisite information and persuasion necessary to address them effectively. It presents criteria for evaluating the efficacy of educational campaigns and curricula. Following this, Chapters 3, 4 and 5 explore existing literature and discuss the procedures employed to develop culturally-appropriate messages, using a specially-designed HIV/AIDS curriculum—*Interactive Teaching AIDS*—as an exemplar. *Interactive Teaching AIDS* (ITA) is an Information Communication Technology (ICT)[1] based application designed to provide prevention education to audiences for whom openly discussing topics related to sexual practices is considered taboo. Furthermore, these chapters discuss various ways through which technology can enable a society to address sensitive topics while respecting social and cultural norms and values. Chapter 6 outlines a theoretical framework for examining the various kinds of educational pedagogies and mass communication techniques employed in designing public health messages for taboo topics. Chapter 7 discusses the various stages in designing the ITA application, developing appropriate survey instruments, and presents the overall research design. Chapter 8 details the statistical

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[1] ICT includes any form of digital technology (e.g. Internet, personal computers, mobile devices and other wireless communications) that helps transmit and receive information and aid communications.

analysis of the learning outcomes, attitudinal measures, and comfort levels associated with the intervention, among other salient findings. Chapter 9 presents the discussion, study limitations, contributions to existing literature, conclusion, and critical open questions in this research area. Finally, Chapter 10 summarizes the growth of *TeachAIDS.org*, an organization launched based on extensions of earlier ITA applications used in formal and informal learning environments in India, China, South Africa, among other countries.

1.1 Laws and Norms

Virtually all societies have formal rules of behavior, called *laws*, which are defined by the state and enforced by a formal governmental apparatus. Even in democratic societies aiming to maximize individual freedom, laws are enforced independent of whether the individual members of the society believe that the rules reflect extant value systems or not (Maine, 2004). Even the most unpopular laws must be enforced to ensure the legitimacy of the entire legal system (Weber, 1978).

All societies also have informal rules of behavior, called *norms*, which are defined by culture and traditions. While many norms are embodied in and enforced by laws, there are also norms that simply set expectations of behaviors. That is, norms are enforced by general societal pressure (sometimes in addition to that of the state) or the collective infliction of non-legal sanctions on deviants, those who disobey the norms, subjecting them to stigmatization, criticism, ostracism, or even non-state force (Posner, 2002).

In addition to the distinction between laws and norms, there is also an important distinction between *positive* versus *negative* laws and norms. Positive laws and norms prescribe behaviors that individuals are required

or pressured to perform. For example, almost all nations have laws requiring children to attend at least some school, some nations have laws requiring military service, and a few legally compel voting. Similarly, there are negative laws and norms, defining what people must not do: murder is illegal in virtually all societies, theft is illegal in most societies, and gum chewing is banned in a few societies, for example. In democratic societies, laws are primarily negatively stated—anything that is not expressly forbidden is permitted—while in totalitarian societies, laws are often positively stated—and anything that is not expressly permitted may be forbidden. Societies also have positive norms which are not related to their laws: virtually all cultures encourage age-based rituals, many cultures have words that are supposed to be spoken to elders, and a few specify markers that should be placed on homes.

1.2 Taboos

The focus of this research is on *taboos*—negative norms that involve actions, practices, or states that carry a strong social stigma[2]. The word *taboo* comes from the Tongan word *tabu* (Webster's Dictionary, 2003), for "forbidden" or "banned". Capitan Cook defined the notion of taboo during his third voyage around the world (Allan & Burridge, 2006) and introduced it into English in 1784, through a publication accounting his trip to Tahiti (Thody, 1997).

Taboos are social prohibitions created over time. They depend on, and are reinforced by, communitywide complicity (Douglas, 2002). They are inextricably linked to culture and thus vary significantly across the world; what is taboo in one culture may be completely acceptable in another.

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[2] According to Erving Gofman, the Greeks originated the term stigma and it can be defined as "an attribute that is deeply discrediting" (Goffman, 1963).

Societies create taboos for a number of reasons, including:

Supporting the Legal System. Laws reflect individuals' covenants with the greater society. That is, to the extent that laws are legitimate, they reflect the society's norms. Thus, with few exceptions (e.g., driving a few miles over the speed limit), violating the law is a taboo in all societies. The stronger the norm in which a law is grounded (e.g., murder vs. copyright violations), the greater the taboo against violating that law.

Supporting Religion and Other Belief Systems. Religious prohibitions are often more strict than legal ones. While an activity may be legal, violating a prohibition of one's religion, particularly in very pious cultures, is taboo. Nearly every religion and culture has one or more foods or drinks that may not be consumed (sometimes under certain circumstances). For example, for Muslims, eating pork is taboo while eating beef is perfectly acceptable, while for many Hindus, the opposite is the case. However, in India, where Islam and Hinduism represent the vast majority of the people, neither is banned by law. In many cases, violating religious prohibitions can actually be considered more taboo than violating laws that prohibit such activities.

Relation to Other Taboos. In some cases, if an action or state is a direct consequence of, or related to, another taboo, then it becomes taboo by this association. Often, the taboo persists even if it is not actually related to the other taboo action or state. For example, the Old Testament forbids the eating of a calf in its mother's milk. This taboo has now been extended such that it is taboo for Orthodox Jews to eat any kind of meat in any kind of milk. Another example is the use of a wet nurse or milk-bank. Since wet nurses are allowable in cases where an HIV-positive mother wants to avoid passing the virus to her newborn, in some communities mothers that do

not breastfeed may be thought to be seropositive. This exposes them to stigma associated with an HIV-infection (Population Reports, 2009). In areas where community members are aware of vertical transmission and breastfeeding is a cultural norm, a mother opting out of breastfeeding for any reason can lead to a taboo by association, even if it is not the reason she chose to forgo breastfeeding (Abiona, Onayade, Ijadunola, Obiajunwa, Aina & Thairu, 2006).

Protection Against Harm. A large number of taboos, arguably the vast majority, evolve from a need to protect against real or perceived harms. Laws against murder or drunk driving fall under this category. However, there are also taboos which have evolved within some groups to protect against harms which are not de jure illegal. Cigarette smoking, for example, is an activity which is generally legal, allowed by most religions, and unrelated to any other significant taboo. Nonetheless, a taboo against it has evolved in many sectors of society due to the fact that anyone in the smoker's immediate vicinity is subject to potential harm via second-hand inhalation of smoke. Some taboos are applied only to special categories of people. For example, some activities, words, and ideas are considered acceptable for adults but harmful to children, either because they are believed to adversely affect a child's development or threaten their "innocence." Thus, in the United States, the movie rating system identifies movies that might be taboo for children ("PG"), those that are particularly taboo for children under 13 ("PG-13"), and those which may not be seen by children under 17 ("NC-17"). Similarly, there are taboos with respect to minorities. These types of taboos most commonly apply to words and symbols which are considered offensive. The most extreme example of this is hate speech. Inciting hatred against a specific group is a form of speech which is illegal in Canada and numerous other countries, but is protected

in the United States under the First Amendment of the U.S. Constitution. However, not only are negative characterizations of any minority group taboo in the United States; associating with individuals who make these characterizations is also considered taboo. Taboos that stem from the desire to protect against harm can take other forms as well. The desire to protect animals commonly kept as pets—e.g., dogs, cats, and horses—leads to taboos that make them inappropriate for consumption. Because pets are often anthropomorphized to a certain extent by their owners, as well as by society at large, using these animals as food may feel to many groups "as if you are eating your own children" (Thody, 1997).

Reinforcement of Power Relations. In some cases, dominant persons or groups define certain topics or behaviors taboo as a way of controlling the actions of others in a population. Just as Newspeak in George Orwell's *Nineteen Eighty-Four* eradicated dangerous ideas by eliminating certain words from a language, so too may some individuals or groups be oppressed or controlled by making certain topics forbidden. Leading members of society and controllers of opinion have the power and influence to make taboos as repressive as they would like them to be (Douglas, 2002). In such cases, criticism is punished or suppressed, and entire topics may become unspeakable and unthinkable (Douglas, 2002). In China, for example, the government takes an active role in censoring not only information, but also certain topics of discussion: Internet searches on terms such as "freedom," "democracy," and "Falun Gong" consistently turn up no results, as these concepts are actively filtered from search engines (Kurtenbach, 2005; Thompson, 2006). What is particularly striking about the Chinese example of censorship is that individual members of society not only play a key role in preventing access to this information, they are openly proud of the fact that they are protecting their society (Thompson,

2006). In many parts of the world, certain power relations have become institutionalized as part of the culture. Criticism of these power relations, or activities which could lead to their criticism or erosion, are often considered taboo. One example is the historical relationship between monarchs in numerous European nations and their countries' citizens. The doctrine of royal absolutism, once common in many nations, dictated that a monarch's word and judgment were beyond contestation. While this took on religious overtones and justifications, this was ultimately a belief system designed to reinforce the power of monarchs over their subjects. While the taboos against criticizing monarchs might have been strong, the taboos concerning actions against monarchs were obviously much stronger. In most countries in the world, crimes of treason still carry some of harshest penalties, and these originate historically from crimes against monarchs themselves. Another example of taboos concerning power relationships is found in the caste system in India. It has traditionally been verboten (and in many circles, still is) for individuals of different castes to intermarry. As with other taboos in this category, while there are protections against harm which provide the ostensible justification for the existence of these taboos, the real origin of the taboo is the preservation of pre-existing power relations. In the case of the caste system, wealth, education, and social status were stratified according to caste, and members of higher castes needed to intermarry in order to preserve that social order. As such, the taboo against marrying someone of a lower caste was much stronger than the taboo against marrying someone of a higher caste. Overall, these sorts of taboos are only discredited, ameliorated, or lifted when leading members of society choose to modify, enrich, or eliminate them (Douglas, 2002).

2 Challenges in Teaching about Taboo Topics

2.1 Comparing Teaching Difficulties

There are two broad categories in which one can place the vast majority of taboos: 1) taboos against actions or states (e.g., divorce, incest, cannibalism, food prohibitions, or trespassing, and 2) communication taboos, including taboos against words, symbols, and topics (e.g., profanity, swastikas, and sex education). The critical difference between action/state and communication taboos is that it is simple and straightforward to instruct individuals to not perform or assume taboo actions or states, or to discuss the efficacy and motivations for the existence of those taboos. However, by definition, it is extremely difficult or even impossible to directly express or discuss taboo words, symbols, or topics.

This difference becomes critical when taboos become unhelpful or anachronistic. For example, in the United States during the 1950s, the action of breastfeeding was taboo among the middle and upper classes because baby formula was viewed as more healthful. However, once there was scientific consensus that breastfeeding was healthier than formula for babies, through extensive deliberation, the previous norm could be discussed, evaluated, and overturned.

Conversely, openly discussing issues related to race and diversity can be extremely difficult, particularly in racially mixed settings (Benton & Daniel, 1996). In many schools and communities, which are comprised of diverse groups, teachers are encouraged to help students talk about their similarities and differences. However, determining the best mechanism to openly discuss such issues and further encourage students to feel safe and

communicative remains a challenge for educators (Benton & Daniel, 1996). Some scholars argue that not talking about race at all—"artificial color-blindness" or being "colormute"— is just as harmful as discussing it in an inappropriate way (Benton & Daniel, 1996; Pollock, 2005). Teachers aim to foster comfortable and open environments in order to support a healthy exchange and communication of ideas, but communication taboos are extraordinarily difficult or impossible to even discuss, let alone overcome.

Figure 1 below presents a set of taboo topics and the (arguable) relative level of difficulty in discussing them. It was only developed for illustrative purposes in order to more easily discuss issues around teaching such topics. The location of the taboo topics will differ greatly based on time, culture, and contexts. However, the point remains that there are highly taboo topics and learning how to effectively teach about them, while respecting social and cultural norms and values, is critical.

Figure 1. Levels of Taboo for Various Topics vs. Difficulty in Teaching
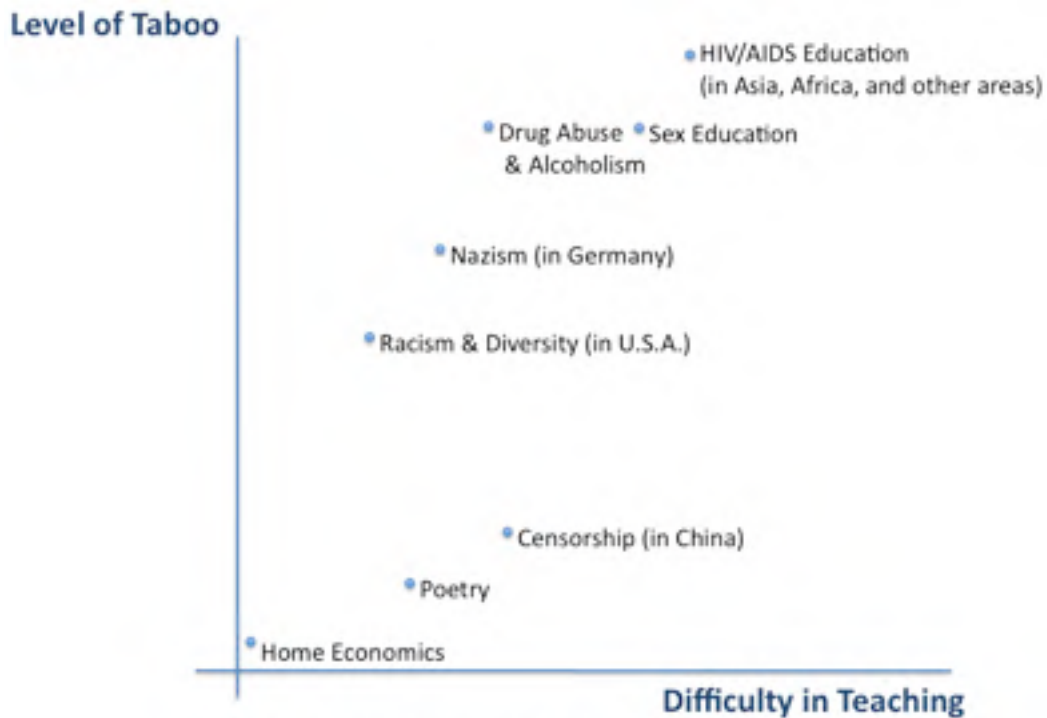
Note: The chart above is not to scale and is for illustrative purposes only.

Home Economics is a basic topic around the world, with few or no taboos associated with it. Hence, teaching it openly is straightforward. *Poetry* is somewhat different, as it is a broader category whose position may vary on the taboo scale based on its content; however, it too is not structurally difficult to teach.

Censorship (in China) may be relatively low on the taboo scale in that people in China know that available information is censored, and many openly support this as a benevolent action by the government to protect its people. However, it may be difficult to teach fully about the concept and subject of censorship in China without being able to directly address which topics are censored and why.

The topic of *Racial Diversity* is taboo in many communities in the United States because of the country's history relating to slavery and civil rights, and the complex nature of race relations that have evolved over time.

Sex Education for youth, although not an illegal topic in most countries, is often still a taboo topic, of varying intensity. It is linked to premarital sex and premarital pregnancy, both of which often violate religious beliefs. The association of sex education to these other taboo topics elevates its position on the taboo scale. Many parents and teachers advocate abstinence-based education because they believe that comprehensive sex education promotes promiscuity among young people (Dhillon, 2006, Smith, Kippax, Aggleton & Tyrer, 2003), which they wish to discourage. Additionally, students may feel uncomfortable openly discussing sex-related topics with their instructors, making the subject even more taboo. In order to enhance comfort during such lessons, some schools separate children by their gender or have outside organizations give specialized talks on these issues.

2.1.1 Why is HIV/AIDS more difficult to teach about?

Educating a population on *HIV/AIDS* is in a somewhat different and arguably more challenging category than educating about other taboo topics. Most importantly, it may rank very high on the taboo scale, because it is a compound of many taboos. This makes it extremely difficult to teach in many socially conservative countries. Many Asian countries in particular historically tend to be socially conservative regarding topics relating to human sexuality. Comprehensive HIV/AIDS education in these countries generally requires teachers to discuss numerous sensitive and highly taboo topics that are associated with the transmission of HIV (e.g., premarital sex, adultery, commercial sex work, homosexuality,

intravenous drug use, and death). One ministry official in Southeast Asia said the following with regards to teaching sex education in their schools:

> *"...sex education (or sexual education or sexuality education) in its liberal sense is not taught in any of the topics in the science syllabus developed by the Curriculum Development Department at any level of education in Brunei Darussalam as this is contrary to the teachings of Islam. Sex [education] that explicitly mentioned the encouragement] use of condoms and other forms of contraceptives including IUDs, sex enhancement devices and drugs including orally taken pills, masturbation, forms of intercourse (oral, anal, vaginal), 'free' sex, multiple partners, exchanging spouses, free intermingle among men and women for pleasure as a pastime, or communal marriage, polyandry, infidelity, the likes of any unnatural forms of sex (including homosexuality and lesbianism) is strongly condemned in Islam. Unlawful and immoral sex practices including premarital sex are all forbidden (haram) in Islam." (*Smith, et. al., 2003*)*

The case of HIV/AIDS has been identified as "dual stigma"—not only is the syndrome itself stigmatized because it is perceived as a threat to health and safety, but, furthermore, it is associated with groups that were already highly stigmatized before the global outbreak (Herek & Glunt, 1988; Derlega & Barbee, 1998). In India, where homosexual acts and commercial sex work are de jure illegal, health care workers are in many cases unable to provide appropriate education on treatment and counseling to these groups at all (Agoramoorthy & Minna, 2007). Taboos relating to discussing issues like race can also come into play, since it is important to dispel misconceptions held by many people that certain groups are more susceptible to the disease. Hence, it is extremely difficult in many socially conservative societies to teach about HIV/AIDS prevention and treatment.

Finally, an unusual challenge in HIV/AIDS education is that even a presentation of the salient information may directly challenge social norms of power or gender relations. For example, the taboo concerning the discussion of issues relating to gender power relations in many parts of the

world is in this category. In societies where men are afforded more sexual freedom than women (which has historically been most societies in the world, though the extent varies considerably), confronting issues such as whether a husband is faithful, can be difficult to the point of being unacceptably offensive. To the degree that governments and public education systems allow the perpetuation of these taboos reinforcing such power relations, curricula, such as HIV/AIDS education materials, which challenge these social mores, may not be approved (a detailed discussion of HIV/AIDS as a taboo topic in India can be found in Chapter 3).

2.2 Previous and Current Approaches to Teaching about Taboo Topics

When a subject is too taboo or difficult to address, there is a strong temptation to avoid the subject entirely. When taboo topics are addressed, a range of pedagogical strategies have been employed:

Metaphors, Euphemisms and Humor—By employing specific metaphors, educators can illustrate a concept without directly mentioning the sensitive subject. Similarly, through euphemisms, educators may rely on subtle and, thus, less offensive expressions to communicate similar messages. It is often difficult to find metaphors or euphemisms that accurately communicate particular concepts clearly. Hence, the validation of the clarity, accuracy, and acceptability of these mechanisms within the target group is essential to their efficacy.

Technical Terms—Some curricula and/or educators utilize technical jargon in place of more commonplace words. This is a common technique to educate about sexuality or more generally the human body (e.g., using the

words "myocardial infarction" instead of "heart attack"). The use of technical terminology may mask or distance the subject, making it more comfortable for both educators and learners to communicate about an issue. However, it may be unclear how well learners are able to understand, let alone absorb the materials.

Direct Approach—Some educators believe the best way to absolve a topic of its taboo status is to talk openly and directly about it, regardless of the resulting discomfort levels among participants. The assumption is that with open discussion, individuals will become more comfortable and, in time, the taboo will diminish or even cease to exist. However, this strategy is not viable when the taboo is reified through law.

Localization—Creating culturally-appropriate versions of curricula, which reflect the local context, is another way to appeal to individual communities. Although customization may be challenging, and in some situations more expensive, it may help learners to further identify with the particulars of a subject. Incorporating feedback from individuals who are familiar with the ground realities, rather than using a one-size-fits-all methodology, can make the materials more acceptable and comfortable for the learners.

Below are two examples that demonstrate the use of existing approaches to educating about taboo topics. Since research indicates that most taboos around the world are related to the human body and its various transformations (e.g., sexuality, disease and death) (Allan & Burridge, 2006), the examples selected below fall within this category. Furthermore, topics that are both taboo and relate to improving human health are especially important to address because they represent tremendous

opportunities and challenges for the population; only through accurate education can individuals inform and protect themselves.

2.2.1 Breast Cancer Education in Native American Communities

There are significant public health efforts to educate women about breast cancer in the United States. Accurate and timely information is provided through multiple sources, including personal doctors, newspapers, magazines, and scholastic resources. However, open discussion about breast cancer is strictly forbidden in certain Native American communities, significantly hindering early detection and appropriate treatment. In the Navajo language, the word "cancer" literally means "the sore that does not heal" and, therefore, conjures a sense of hopelessness, preventing early cancer detection in these communities. Furthermore, it is culturally taboo to talk about cancer because the community believes that to discuss cancer means to invite it (Robinson, Sandoval, Baldwin & Sanderson, 2005).

After being diagnosed with breast cancer, Nellie Sandoval, and her oncologist Frances Robinson, developed a nine-minute pilot informational video to present accurate and valuable information (e.g., early detection, self-examination) to more than 100 Native Americans across several states. To connect with the target population, the video was narrated by a Native American health healer and included a "message of permission" for learners to seek information and accept a new tribal tradition. In the pilot study, 100 percent of the respondents said they received information they needed. The success of the first video triggered the need for a second one based on breast cancer treatment modalities. Researchers associated with this project have plans to conduct a longitudinal study on the efficacy of the culturally-sensitive learning materials (Robinson et al., 2005).

2.2.2 Maternal Health in Mali

As late as the 1990s, pregnancy was considered a taboo topic among certain communities in Mali and was rarely discussed even between husbands and wives. Couples associated issues relating to pregnancy and maternal health with shame and embarrassment (Clemmons & Coulibaly, 2000). The strong social prohibition made it difficult for women to receive the additional care and proper nutrition needed during pregnancy. Even in cases where women wanted to seek maternal health services, their emotions inhibited them from discussing such needs with their partners (Clemmons & Coulibaly, 2000). The lack of direct and open communication was a contributing factor to Mali suffering from one of the highest maternal and infant mortality rates in the world[3] (Singhal & Rogers, 2003).

In 1989, research through the Dioro Child Survival Project revealed the cultural and social barriers to women seeking maternal health services. Researchers built directly on Malian tradition to promote behavioral change. Traditionally, Malian married women wore a white cloth, called the *pendelu*, which symbolized marital roles and duties. The Dioro Project authorities used local *griots* (Malian educators who are also entertainers) to introduce a tacit cultural symbol to represent the change in status. The married Malian women were encouraged to wear a green pendelu (instead of the traditional white) when they became pregnant. Instantly, the people around the pregnant woman, including her husband, knew of her status

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[3] During this time in Mali, infant mortality (170 per 1000 live births) and maternal mortality (2000 per 100,000 live births) were extremely high (Fishman, Gottert, Kanté, Parlato, Anthony, 1998, as cited in Parlato & Seidel, 1998). For children between 3-36 months old, 11 percent showed signs of acute malnutrition and 25 percent for chronic malnutrition (National Demographic and Health Survey, 1987, as cited in Parlato & Seidel, 1998).

and could support her appropriately, without any discussion needing to take place. This tacit symbol dramatically increased transparency, knowledge, and communication between husbands and wives while maintaining sensitivity to the context of cultural change. Three months after the campaign, survey results demonstrated that communication about maternal health rose from 3 percent to 65.5 percent among married couples (Clemmons & Coulibaly, 2000). Also, 41.7 percent of the husbands interviewed said they lightened their wife's workload during her pregnancy and 49.6 percent said they made sure she received good nutrition (Clemmons & Coulibaly, 2000).

The above examples employ different combinations of the techniques described earlier to teach about taboo topics as illustrated below:

Table 1. Techniques for Teaching About Taboo Topics

	Avoidance (Indirect Discourse)	Metaphors & Euphemism	Technical Terms	Direct Approach	Localization
Example 1: Breast Cancer Among Native Americans			X	X	X
Example 2: Child and Maternal Health in Mali	X	X			X

2.3 Framework for Evaluating of Curricula Relating to Taboo Topics

Being able to provide education materials is only the first step in the learning process. It is equally important to evaluate whether the learners are absorbing the target messages after the content has been delivered to them. There are multiple dimensions to consider when evaluating the effectiveness of a given curriculum or approach to educating on taboo topics. I propose four questions that should be addressed when evaluating any attempt to teach a taboo topic:

How socially acceptable is the approach? Being able to coexist with cultural norms is of critical importance in educating about a taboo topic. There are many advocates of addressing taboos "head-on" by providing materials which themselves become taboo. This approach will limit whether the materials will ever be used in the contexts in which they are most needed. We will discuss ways to promote social acceptability, for instance, integrating images that are acceptable to learners in later chapters (Chapter 6).

How accurate/complete is it? This is normally not a consideration for evaluating curricula in general because it is assumed that all materials within a competently designed curriculum will be accurate. However, in educating about taboo topics, there are often tradeoffs that must be made, for example, between social acceptability and accuracy. If a curriculum is accurate to the point of being blunt about a topic whose discussion is taboo, then it will fail the social acceptability test. In other cases, the curriculum may be accurate but incomplete, leaving out the most taboo details in order to provide education on related but less taboo ones. This dimension includes the level of inclusion of specific information about a topic and not

simply what is covered being accurate. The best curricula will find a way to present accurate and relatively complete information using an alternate vocabulary, medium, conceptual model, or other approach, in order to keep the materials socially acceptable.

How effective is it? It is not sufficient for a curriculum to be socially acceptable and accurate/complete—it must also be effective and result in learning and retention (and where appropriate, attitude and behavior change). An educational approach may be too technical, foreign, esoteric, or otherwise ineffective, and that will override any advantages in other domains it may have.

How easy is it to deploy? The greatest theoretical educational approach in the world will not produce results unless it can actually be deployed in the real world. Infrastructure, language, and cost considerations are examples of the additional dimensions along which a curriculum must be evaluated.

The last two criteria—efficacy and ease of deployment—are the typical dimensions upon which general curricula are evaluated. Social acceptability and accuracy are unique dimensions for curricula on taboo topics. The following table illustrates how different approaches to teaching taboo topics have advantages or disadvantages along these four dimensions.

Table 2. Advantages and Disadvantages of Framework for Evaluation

	Social Acceptability	Potential Accuracy/ Completeness	Potential Efficacy	Ease of Deployment
Avoidance	**High** No education is being provided	**Low** No education is being provided	**Low** No education is being provided	**High** No education is being provided
Metaphors & Euphemism	**Medium** Depends on the nature of the taboos and the metaphors and euphemisms	**Medium** Depends on the nature of the taboos and the metaphors and euphemisms	**Medium** Depends on the nature of the taboos and the metaphors and euphemisms	**High** Deploying alternate curriculum based on context
Technical Terms	**Medium** Depends whether the designer/educator can find appropriate ones to fit context	**High** Technical terms can actually be more precise	**Medium** May be hard to understand and challenging to train instructors	**High** Deploying alternate curriculum based on context
Direct Approach	**Low** You cannot address the taboo subjects directly	**High** Implies that effectively anything can be said	**Medium** Being overly blunt about taboo topics can distract from what is being taught	**Medium** There may be resistance from instructors and channel owners
Localization	**High** Materials are culturally-appropriate, enhancing acceptability within the local community	**High** Depends on how complete the materials are presented	**High** Depends on context and application of localization methods	**High** Deploying alternate curriculum based on context

Based on Table 2, there are two important observations which should be made. The first is that it is possible (and in fact typical) for different approaches to be combined any given curriculum. For example, for certain sections of the curriculum, metaphors may be used, while for others technical terms or a direct approach may be used. The second observation is that a localized curriculum has the potential to fulfill all of the key

requirements we have identified, so in contexts where taboos around a topic are prevalent, localization is almost certainly going to be a required feature of the curriculum.

Drawing on the previous conceptualizations and evaluation criteria, is a case study which provides a detailed description of the development of a new curriculum to teach about a highly taboo topic – HIV/AIDS – in India. Its goal was to maximize the various categories introduced in the framework on evaluation and ground them in pedagogical techniques and communication strategies (Chapter 6) to create materials appropriate for learners.

The next few chapters will provide an extensive background for the HIV/AIDS case study (Chapter 3), review literature and strategies to combat and educate around HIV/AIDS in India (Chapter 4), and present arguments for a technological solution appropriate for particular taboo contexts (Chapters 4 and 5). I will then present pedagogical techniques and communication strategies to create materials appropriate for learners (Chapter 6). These techniques ground a consideration of the various categories introduced in the framework by demonstrating both design and evaluation based on them.

3 Case Study Background: HIV/AIDS Education in India

In India, HIV/AIDS is one of the most challenging taboo topics and contexts for educators. The taboo around openly discussing topics like sexual practices among other sensitive ones has made addressing HIV/AIDS either taboo or extremely difficult. The fact that this single subject matter compounds several taboo topics into a single discussion (e.g., commercial sex work, homosexuality, adultery, premarital sex, intravenous drug use and death) presents unique and particularly difficult challenges (discussion of general challenges in Chapter 2). If a sound educational approach can be created to effectively address such a complex taboo, similar approaches may be employed to tackle relatively less taboo topics.

The following sections provide more detailed information on the particular context in India and previous attempts to education on HIV/AIDS education. Later chapters provide a detailed description of how the application was designed to address these challenges, while incorporating key communications and pedagogical theories and approaches to promote efficacy of the application.

3.1 The Challenge and Opportunity

One of the greatest public health challenges facing the world today is how to provide effective health education in Asia. With more than 60 percent of the world's people residing in Asia, the provision of effective prevention and awareness of communicable diseases in this region has direct benefits for the rest of the world, just as not doing so has direct negative consequences. As witnessed during the near pandemic of Severe Acute

Respiratory Distress Syndrome (SARS) originating in China in 2002, deadly diseases can now spread within days around the world. So, prevention is far more important and achievable than containment. The primary global example of this today is HIV/AIDS, with which 33.2 million people worldwide currently live (UNAIDS, 2007). Asia has 14.4 percent of all HIV/AIDS infected people in the world, and India has the world's third-largest national infected population, after South Africa and Nigeria (UNAIDS, 2007).

Disease prevention and management is facilitated when modes of disease transmission can be discussed openly, as was the case for SARS. Historically, illnesses like leprosy, cholera and syphilis, have also been stigmatized (Herek & Glunt 1988; Pradhan, Sundar & Singh, 2006; Valdiserri, 2002). Diseases such as HIV/AIDS that are transmitted sexually, including via commercial sex workers and intravenous drug use, present significant challenges because social stigma often precludes such open discussion (Pradhan et. al., 2006; Valdiserri, 2002). Last year, various organizations spent ten billion USD on HIV/AIDS programs through private donations and government funding in developing countries alone (Sharma, 2008), in hopes of, among other things, raising awareness and curbing stigma.

Solving the problem of how to provide effective health education on diseases subject to social taboos is an immediate need. The social stigma of HIV/AIDS is particularly prominent in the developing world, which has 95 percent of all HIV-infected persons (Noble, 2007). One study comprised of 433 students, faculty and technical staff of public health services in South India found that 42 percent of respondents believed seropositive individuals should be quarantined, 31 percent said that infected students should be kept out of classes, and 36 percent stated that it would be better

for everyone if persons with AIDS killed themselves (Ambati, Ambati, Rao, 1997). This kind of stigma not only makes it difficult to provide awareness and prevention-related education, but it also complicates estimates of societal levels of high-risk behaviors and disease prevalence. In fact, nine out of ten people infected worldwide do not know they are seropositive for HIV (Singhal & Rogers, 2003). In Asia, the challenge is significantly exacerbated by the social stigma associated with discussing sexual practices or anything at all related to sex (Bennett, 2000; Reuters, 2006; Sharma, 2005; Solomon & Chakraborty, 2004; Wong, Lee & Tsang, 2004;). In many states of India[4], the National AIDS Control Organization (NACO)-issued sex education curriculum[5]—which included the official HIV/AIDS education curriculum—has been banned entirely from public schools[6] (Chadha, 2007; Gentleman, 2007; Sabha, 2007 ; Sify News, 2007; Zaheer, 2007). This is despite reports showing that pre-marital sex is increasingly common among young people (Abraham & Kumar, 1999; Bio-Medicine, 2005; Biswas, 2003; Sachdev, 1998; Sharma, 2005). One study, which Sharma (2001) notes was suppressed by India's Health Ministry, found that a quarter to a third of India's young people (ages 15-24) living in slums in Delhi and Lucknow are engaging in premarital sex (Sharma, 2001). In a 2002 survey by *The Week Magazine*, 69 percent of unmarried young males and 38 percent of young females admitted to premarital sex in India (The Week, 2002, as cited in Sharma, 2005; The HIV Update International, 2002).

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[4] The states of Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Rajasthan Chhattisgarh and Kerala have banned or refused the use of the official curriculum (Gentleman, 2007; Zaheer, 2007).

[5] The official curriculum called the Adolescence Education Programme was developed through the Ministry of Human Resource Development and NACO together (Sabha, 2007).

[6] Sexually explicit materials banned in some parts of India located in Appendix E.

India also presents a unique opportunity to explore and deliver innovative methods of HIV/AIDS prevention education. Many agencies have predicted India will be the next hot zone for HIV/AIDS, shifting the epidemic's center from South Africa (Padma, 2005; Perry, 2005; Sudha, Vijay & Lakshmi, 2005; Yang, 2003). With approximately 2.5 million infected individuals (UNAIDS, 2007), it is imperative to provide effective prevention education as the virus continues to spread. However, India's socially conservative culture often prevents open communication of transmission-related information. Furthermore, India's diverse population, consisting of dozens of distinct cultures, over 200 languages and dialects, and significant class-related issues, present daunting challenges. Any form of education must consider the complex culture, history, and regional differences in order to raise awareness and promote change in knowledge, attitudes, and beliefs.

With the increasing number of HIV-positive individuals and the current ban on sex education by several state governments (Chadha, 2007; Gentleman, 2007; Sabha, 2007 ; Sify News, 2007; Zaheer, 2007), it is clear that an alternative method of delivering prevention education is required in order to delay the spread of the virus. According to the National AIDS Control Organization in India (organizational chart in Appendix F), the primary mode of transmission is via sexual fluids. Sexual transmission accounts for 86 percent of HIV infections in India today, followed by other means such as injection drug-use (2.4 percent), blood transfusion and through blood products (2.0 percent)—iatrogenic transmission—and vertical transmission (3.6 percent) among other unspecified routes (6.0 percent) (National AIDS Control Organization, 2005, as cited in, Correa & Gisselquist, 2006; UNAIDS, 2007).

Several recent studies indicate that Indians generally lack accurate knowledge about transmission and tend to be unaware of health-related

resources, even in relatively well-educated circles (Perry, 2005; Pramanik, Chartier & Koopman, 2006). For example, a recent survey found that 59 percent believed there is a cure for HIV available (Medical News Today, 2007). Another study found that although college students were more open to premarital relationships and sexually active, they were "ignorant" of issues around sexual anatomy and functions (Sachdev, 1998). The virus is also no longer limited to high-risk populations, such as commercial sex workers and truck drivers, and has spread throughout the general urban and rural populations with presence in all states and union territories (Avert, 2009; Noble, 2007; Solomon, Kumarasmy, Ganesh & Amalraj, 1998; UNAIDS, 2007). In fact, most seropositive individuals fall outside of the high-risk groups (Avert, 2009), including the rich and poor, with infection rates among young people and women progressing at an alarming rate (Cichocki, 2007; Sharma, 2008; UNAIDS, 2007).

As a result of all of these factors, there is clearly a need to develop new means of providing effective prevention education for the general population in India. Although the estimated prevalence (0.2 – 0.5 percent)[7] among adults (15-49) living with HIV is low relative to other countries[8] (UNAIDS, 2008), with such a large population in India, a mere 0.1 percent increase in prevalence will result in an estimated more than half a million additional infections (Avert, 2009).

The official numbers may underestimate the true infection rate, since a large number of HIV/AIDS cases go unreported (National AIDS Control Organization (NACO), 2006; Avert, 2009). There are several reasons for this. First, individuals may not know they are seropositive since a

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[7] Estimates based on 1122 sentinel sites and the National Family Health Survey, a country-wide community based household survey (NACO, 2007.
[8] India Population Totals located in Appendix B.

characteristic of the disease is an ability to live for many years without any AIDS-defining clinical symptoms (Derlega & Barbee, 1998). Early symptoms are similar to the influenza and HIV is asymptomatic (Ambati et al., 1997; Porter, 1993).

Second, although there has been a vast increase in HIV sentinel surveillance sites (176 in 1998 to 1134 in 2007) (NACO, 2007), individuals may avoid getting tested or reporting their infection for fear of being stigmatized and/or ostracized by their family, healthcare officials and the community at large. Singhal and Rogers (2003) describe HIV/AIDS patients and their families as a new class of 'untouchables'. In fact, the stigma is so strong in India that unlike nearly every Western nation, no famous Indian personality has ever publicly disclosed their HIV-positive status even though several have been infected (Singhal & Rogers, 2003).

Third, according to many experts, some officials may have downplayed the crisis and/or exaggerated the positive effects of its educational efforts (Padma, 2005). In 2005, the Indian government announced that, in one year alone (2003 to 2004), it was able to reduce the rate of new infections by 95 percent (Perry, 2005); the Health Minister claimed that India reduced the 520,000 new infections in 2003 to a low 28,000 in 2004 (Mukherjee, 2005). Furthermore, some states previously said to have had hundreds of thousands of HIV-infected people were deemed AIDS-free (Perry, 2005). The figures were met with mass disbelief from various international agencies and health experts working in the field, claiming that they were misrepresentative of the underlying data and that the ground realities were different (Padma, 2005).

3.2 Identifying the Source of the Taboo Topic

Designing an effective solution requires first understanding the primary source of the taboo and discussing the possible reasons for its existence. Specifically, for this case study, is the dearth of sex education or HIV/AIDS education in Indian schools related to a desire to oppress the weaker members of Indian society in some way? In other words, is HIV/AIDS education withheld as a form of intentional repression or is it a desire to reinforce certain power relationships (see Chapter 1)?

Systematic and intentional repression based on power relations does not appear to account for the HIV/AIDS stigma in Indian society. India is a relatively conservative society, where members of the opposite sex holding hands or kissing in public may lead to fines or worse[9]. These penalties are applied equally to men and women. In 2006, conservatives asked Vasundhara Raje, the Chief Minister of Rajasthan, to resign after she offered a ceremonial kiss on the cheek to welcome a businesswoman friend at the World Economic Forum (Dhillon, 2006; Sappenfied, 2007). Bollywood actors generally cannot kiss in movies, and the limits of what is considered indecent is much lower than in occidental societies. Shailendra Dwivedi, a lawyer in Madhya Pradesh, filed a criminal case against a kiss between two actors in the movie *Dhoom 2* (released November, 2006) accusing "the stars of lowering the dignity of Indian women and encouraging obscenity among India's youth" (Dhillon, 2006). Perhaps one of the most controversial public displays of affection was in April 2007 between Hollywood actor Richard Gere and Indian actress Shilpa Shetty. Gere embraced Shetty and kissed her several times on the cheek at an AIDS awareness rally in New Delhi. Following this event, protestors shouted "death to Shilpa Shetty," while demonstrators burned effigies of

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[9] There is a fine of $12 for kissing in public in Delhi (Sappenfied, 2007).

Gere (BBC News, 2007). News of the public kiss was carried on the front page of numerous Indian newspapers. Gere publicly apologized numerous times and according to BBC News, Shetty said, "[Richard Gere] especially told me to tell the media that he didn't want to hurt any Indian sensibilities" (BBC News, 2007). A court in Jaipur, Rajasthan issued a warrant for Gere's arrest on charges of indulging in an obscene act (BBC, 2007; Hindustan Times, 2007; Singh, 2007), however, he was cleared of the charges, and the case was thrown out by the Supreme court (BBC, 2008). As such, there is a strong taboo against public displays of affection and discussing topics around sexual practices openly, which is directly related to these cultural values.

While many taboos around ideas or topics are relaxed when presented in professional (e.g., medical, governmental, or educational) settings, the taboo against discussing sex openly, in many Indian classrooms, is just as strong. There is a widespread belief amongst Indian parents that open discussions of sex and related topics – even in the classroom – is obscene and may lead to higher incidences of pre-marital sex and other indecent behavior (Dhillon, 2006; Smith et. al., 2003).

This point of view is not unique to India. It is shared by proponents of abstinence-based sex education even in the United States. In fact, this view is so strong among certain groups in the United States that the federal government, which has not had any set initiative for comprehensive sex education, has increased funding for abstinence-only programs from $9 million in 1997 to $176 million in 2007 (Howell, 2007; Masters, Beadnell, Morrison, Hoppe & Gillmore, 2008), despite the government's own federally-funded evaluation of numerous abstinence-based programs indicating they do not delay sexual initiation, reduce teen

pregnancy or sexually transmitted infections (Avert, 2009; Howell, 2007; Mathematica, 2009). Although some reports suggest positive effects of abstinence-only or "abstinence until marriage" initiatives, experts claim these studies are not methodologically sound or do not provide robust empirical evidence indicating a strong case (Oakley, Fullerton, Holland, Arnold, France-Dawson, Kelley & McGrellis, 1995). The Society for Adolescent Medicine has stated that, although abstinence should be included as one of the many options within comprehensive sex education programs, funding towards abstinence-only programs should be replaced with funding for medically-accurate comprehensive sex education (Masters, 2008; Society for Adolescent Medicine, 2006).

Empirical research has shown that comprehensive sex education is actually more effective than abstinence-only programs in delaying sexual initiation and other perceived negative sexual outcomes (Kirby, 2002; Masters, 2008; Santelli, Ott, Lyon, Rogers, Summers & Schleifer, 2006; Sharma, 2005). Moreover, sex and HIV/AIDS education programs do not increase sexual behavior either in the United States (Kirby, 2002) or in the developing world (Kirby, Obasi & Laris, 2006; Kirby, Laris, Rolleri, 2007). However, this is generally not believed by conservatives throughout the United States and certainly not by many parents in India.

As a result of this skepticism, numerous state governments across India (e.g., Maharashtra, Gujarat, Madhya Pradesh, and Karnataka among others) have banned sex education in public schools altogether. However, it is important to note that this is limited exclusively to school curricula and does not mean these topics are censored for adults. Thus, banning sex education among students does not fit the typical pattern of oppressing groups in order to dehumanize them in some way, because of course,

children will eventually become adults and be immune to such control. Instead, it is more typical of the social and legal limits that all societies set for young people in the belief that it will protect them from harm and allow them to grow in the desired way.

An alternate explanation for the state of HIV/AIDS education in Indian society is that the government is not interested in actually providing these resources since the disease disproportionately affects lower social classes. Similar to criticisms and conspiracy theories relating to the U.S. government, this hypothesis seems to have no basis in fact. The National AIDS Control Organization (NACO) operates under the division of the Ministry of Health & Family Welfare to manage the AIDS epidemic in India. NACO has established 35 HIV/AIDS control societies across all Indian states and Union Territories to respond more appropriately to spread of the virus and coordinate a national response (Avert, 2009; NACO, 2008). NACO has been given an extremely large budget by Indian standards. Launched in 1992, Phase I of the National AIDS Control Program received $99.6 million USD to, among other things, establish and strengthen management capacity in the country, promote public awareness, improve blood safety (Claeson & Alexander, 2008). Phase II included a budget of $460 million included activities around providing prevention interventions for at-risk groups and the general population as well as AIDS care initiatives (Claeson & Alexander, 2008; NACO, 2009). [10] For Phase III, which takes place between 2007-2011[11], the Indian

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[10] This includes funding from the Government of India, World Bank, USAID, CIDA, United Nations Development Program (UNDP), AusAID, Global Fund and DFID.
[11] Minister for Health & Family Welfare, Dr. Anbumani Ramadoss launched the Third Phase of the National AIDS Control Program in July of 2007 (NACO, 2007)

government budgeted a 2.5 billion USD dollar response[12] to the epidemic, with 70 percent earmarked towards prevention efforts (Araujo, 2008; Avert, 2009). This phase includes targeting high-risk groups with evidence-based prevention methods (e.g., condom promotion, peer education), among other activities (Claeson & Alexander, 2008). In addition, there are more than 1000* NGOs, many of which are funded by NACO, working on HIV/AIDS prevention and treatment issues across the country. NACO has also partnered with other organizations to launch campaigns like the Red Ribbon Express, which is a seven-coach train filled with health materials travelling to 166 districts across 23 states in the country (Avert, 2009; NACO, 2007). Public billboards and public service announcements are not difficult to find (although I will discuss their efficacy in Chapter 4 and 6).

Overall, the taboos surrounding HIV/AIDS relate directly to either the taboos around discussing sexual topics or taboos relating to actions or states which are either illegal, highly controversial, or both.

It should be noted that there is a significant difference between merely mentioning, or using the phrase, HIV/AIDS, and actually discussing it. As long as none of the taboo elements relating to it are mentioned, a simple message along the lines of "think about AIDS" (see Chapter 4) is acceptable in many circumstances in which full discussion would not be acceptable. The conflicts with taboos inevitably arise when one attempts to engage in a more comprehensive discussion about the topic, especially about prevention.

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[12] Phase III funding is from a combination of resources including, the Government of India, non-governmental organizations, international non-governmental organizations, industry and other agencies (e.g., World Bank, Bill and Melinda Gates Foundation) (Avert, 2009).

A distinction should also be made between taboos concerning actions or states and communications taboos relating to HIV/AIDS. For example, drug-use is taboo, but there is no communications taboo associated with it, as there is universal agreement on what the message should be—"say no to drugs". On the other hand, homosexuality is considered a taboo state by many in India, but it also has communications taboos associated with it. This is because if falls into the category of actions or states relating to HIV/AIDS are not discussed in schools due to their political divisive nature. That is, there is no clear popular consensus on what the overall message relating to that topic should be. While everyone can agree on drug-use being harmful, homosexuality on the other hand is an issue which takes on a political nature in India—as it does in many countries— and, as a result, there are those who would oppose a message of acceptance as well as those who would oppose a message of condemnation. Considering that homosexual acts are still de jure illegal in India, this is not surprising. Even in the United States, most public schools do not teach about homosexuality because of this similar political divide (Jan, 2006; Newsom, 2008).

Discussions of HIV/AIDS can likely be had without choosing sides, either advocating or denouncing the associated activities or states which are considered controversial. Of course, there are some people and groups who perpetuate the mistaken belief that HIV/AIDS only affects minorities, or even that HIV/AIDS is a form of divine punishment for what they consider to be immoral acts (Kopelman, 2002; Redjimi & Lert, 1993). For them, the provision of HIV/AIDS education to the general population is not only unnecessary but would constitute tacit approbation of those activities or states, and thus they would oppose HIV/AIDS education itself. Fortunately, that mistaken viewpoint is in the extreme minority, and most

people recognize the public and personal benefit of teaching others to protect themselves against an incurable, transmissible, and fatal disease.

Thus, the question which remains is how to provide complete, accurate, and effective HIV/AIDS prevention education without using methods, messages, or language which automatically trigger societal rejection due to conflict with the aforementioned taboos. It is precisely these challenges and opportunities that led me to ponder whether a curriculum could be devised to improve knowledge and change attitudes, despite these barriers.

3.3 Research and Exploratory Questions

This study concerns the efficacy and use of a research-based interactive HIV/AIDS education software designed to avoid taboos and other cultural barriers that have impeded previous attempts at education. The application aims to provide detailed, yet accessible and acceptable, discussions of all aspects of HIV/AIDS. Hence, it has the potential to significantly alter the knowledge levels and attitudes of Indian youth and young adults who receive the intervention.

With the current ban on sex education in many states, access to AIDS education is limited (BBC News, 2007; Mukherjee, 2007). The following questions guided the study, which sought to bridge the need for HIV/AIDS prevention education.

3.3.1 Research Questions

1. Is it possible to design a curriculum, aimed at teaching HIV/AIDS education that is both socially-acceptable, accurate and results in significant gains in knowledge and retention among young adults in India?

2. Will the intervention, which provides prevention education while avoiding normative statements, promote changes in attitudes?

3. Gender-based studies show that young females have significantly less knowledge about HIV/AIDS relative to their male counterparts (Agarwal et al. 1999; Pramanik et al., 2006; Sudha et al., 2005). Will there be a gender difference in the pretest, posttest and retention test?

3.3.2 Exploratory Questions

4. Because HIV/AIDS is a taboo topic in India, a major design consideration for this curriculum was the maximization of comfort levels among learners interacting with the software. Will a significant proportion of the target group feel comfortable interacting and learning from this curriculum?

4 Literature Review

4.1 Previous Attempts at HIV/AIDS Education

In many cases, laws and social norms prohibit the delivery of sexual health information through the standard educational, medical, or public health systems (see Chapter 3 for details). Numerous studies have documented stigma and discrimination faced by patients from medical professionals (Kurien, 2007; Leary & Schreindorfer, 1998). In fact, although the National AIDS Control Organization (NACO) in India advocates confidentiality, one study presented at the 2002 International Conference on AIDS revealed that 95 percent of patients registered for surgical procedures were not only involuntarily tested for HIV, but their surgeries were cancelled if they tested seropositive (Malavade, Shah, Shah, Shah, 2002; United Nations Population Fund, 2009). Hence, there has been heavy emphasis in India in launching HIV/AIDS awareness campaigns through the mass media (e.g., messages on billboards, posters, television spots, radio ads) in order to reach large populations. There have been large-scale combined efforts by news organizations, foundations, and the Indian government to spread awareness through the mainstream media (James, Hoff, Davis & Graham, 2005). Although this method is capable of simultaneously reaching a large number of people to raise awareness, there are many reasons why its exclusive or primary use is incapable of stemming the HIV/AIDS epidemic.

Educational campaigns via mass media have been constrained by cost. Because advertising is priced according to time and space used, educational advertisements are dispersed in terse segments (e.g., television spots are approximately thirty seconds to two-minutes, billboards usually carry one or two messages). Examples of these include

the Buladi campaign (Appendix C), launched by the West Bengal AIDS Control Society, and the Balbir Pasha campaign (Appendix D) launched by the Population Services International. It may be difficult for learners to build knowledge based on these brief presentations, as these campaigns involve limited durations of exposure (see Chapter 6).

Second, depending on the type of media, there are intrinsic limitations on the impact on key sub-populations. For example, television ads are only accessible to homes with television sets. Going one step further, television sets are only available to homes with electricity. Thus, individuals who see television ads at home, tend to have a significantly higher socioeconomic standing. However, the groups most lacking in basic HIV/AIDS education are often of lower socioeconomic standing. HIV/AIDS messages on billboards are usually expressed in written text, which limits their impact to the 62.5 percent of the population that is literate (Census of India, 2001) (Appendix A). Even more problematic, women who are in remote villages are less likely to be exposed to any kind of HIV/AIDS media campaigns at all. A 2006 survey, conducted by the National Family Health Survey (NHFS), found that 70 percent of women in rural Bihar had not even heard of HIV/AIDS (Mishra, 2007).

Finally, mass media campaigns only allow for one-way communication—learners receive the messages but are not able to ask questions or immediately follow-up in any way. It is, therefore, difficult to gauge whether the correct messages are being acquired and spread through these channels. It is also difficult to isolate the effects of particular messages, making it impossible to identify and study targeted improvements from one campaign to the next.

Because there is no cure for HIV, and antiretroviral medications are out of reach for most of India's population (in that they are too expensive and must be taken for an infected person's entire life), prevention is critical in curbing the spread of the epidemic. Although numerous educational materials and interventions are available throughout the world, many are developed by medical personnel, who while having the best intentions and being well-versed in diagnosis and treatment, are less familiar with developing pedagogically-grounded and effective curricula (Singhal & Rogers, 2003). When educating about communicable diseases, being able to adapt curricula to pre-existing notions of behavior is imperative for content to be assimilated in a coherent fashion. The ability to understand and apply HIV prevention strategies properly, especially in high-risk situations, is vital to preventing transmission. At a minimum, properly understanding prevention strategies could significantly curb stigma and fear-related issues associated with the subject. Hence, the development of highly effective education messages should be based on formative assessments, pedagogically sound messages, and culturally appropriate materials. Using the framework for evaluation of curricula relating to taboo topics (presented in Chapter 2), we will determine whether a particular educational effort around teaching taboo topics is likely to be effective for the target group.

4.2 Cultural Challenges

Many activists argue that the socially conservative nature of many Asian cultures put vulnerable populations at extreme risk. In their view, it is the responsibility of the government to help change those cultures to make them more progressive and capable of openly discussing sexual practices (Medical News Today, 2007; Mukherjee, 2007; Sundaram, 2007). Changing ingrained cultural norms, however, is difficult and is obviously opposed by

many conservative groups. In addition, democratically elected governments are generally not eager to tell their constituents that their cultural values are in any way incorrect or outdated. In India, for example, homosexuality is considered a taboo topic and is de jure criminalized:

> *Whoever voluntarily has carnal intercourse against the order of nature with any man, woman, animal shall be punished with imprisonment for life, or with imprisonment of either description for a term which may extend to 10 years, and shall be liable to fine.* (Section 377, Indian Penal Code, 1860)

This provision deters certain marginalized populations from getting tested for HIV out of fear of being ostracized or even imprisoned for their behavior (Agoramoorthy & Minna, 2007). There is also the issue of paternalism: it is difficult to justify an intervention that labels a culture as flawed.

Mass media campaigns aimed at promoting educational messages that do not properly stress evidence-based prevention strategies may actually have devastating effects on society. Decision-makers of each state may continue to ban sex and HIV/AIDS education in schools, claiming that the media campaigns, albeit ineffective, are providing enough education. As such, these mass media campaigns are mere band-aid solutions that do not address many of the root causes of the problem. Moreover, these campaigns do not adequately address many of the underlying issues, such as gender-based inequalities, which promote the spread of the virus through the population.

4.3 Role of Women in Asian Societies Creates Additional Challenges

The role of women and gender inequality in many Asian societies also changes the dynamics of how health education related to HIV/AIDS can

and should be provided. Women are especially susceptible to contracting HIV for both physiological and social reasons (Quinn & Overbaugh, 2005; Sleightholme & Sinha, 1996). Females, in general, have a higher inherent risk (relative to men) of contracting the virus because semen generally contains significantly higher levels of HIV than does vaginal secretion (Amnesty International, 2004). Also, women are more likely to contract HIV through a single heterosexual encounter – the vagina has greater surface area of mucosal epithelial tissue, which is subject to micro-tears, allowing HIV to freely enter the bloodstream (Amnesty International, 2004). A female has a 1 in 100 chance of contracting HIV through a single sexual encounter with an HIV-seropositive male, whereas a male has a 1 in 1000 chance of contracting the virus through a single sexual encounter with an HIV-seropositive female[13] (Moses, Plummer, Ngugi, Nagelkerke, Anzala & Ndinya-Acholoa, 1991, as cited in Singhal & Rogers, 1999). In India, this relative risk is further compounded by the fact that the primary mode of transmission is via heterosexual activity.

Aside from the biological vulnerabilities, social practices make women doubly susceptible to acquiring the virus. First, male clients in India generally tend to refuse commercial sex workers if they are required to use a condom (Bhave et al., 1995; Frontline, 2004; Jagadheesan, 2007; Singh, 1998). These men return home (often in rural villages) after several months and infect their wives, many of whom are unable to ask their partner to wear a condom even if the wife suspects that the husband is potentially infected (Human Rights News, 2002; UNAIDS, 2004). One study, among women of childbearing age in India, found that 68 percent reported rare or no use of condoms during intercourse with their

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[13] This statistic may be exacerbated if either seronegative individual has an STI (Moses et. al., 1991, as cited in Singhal & Rogers, 1999).

significant others (Ananth & Koopman, 2003). Without proper education on the importance of condom use, this virus will continue to spread through the female Indian population.

Because females are more susceptible to the virus, it is arguably more important for them to be well-educated about transmission and protective measures. A recent report indicated the need for greater HIV/AIDS education and awareness of health resources in India, especially for young females, who demonstrated significantly less knowledge about the virus than young males (Pramanik et al., 2006).

4.4 Why Technology and Not Teachers

Although open discussions between students and educators would be an ideal method of imparting accurate prevention education and correcting myths and misinformation, many teachers across India do not feel comfortable addressing the topics of sex or HIV and AIDS in the classroom. Since HIV/AIDS is directly related to other sensitive subjects its relationship to these taboos makes it even more challenging to discuss openly (see Chapter 2 and 3 for detailed discussion). Numerous studies dealing with prevention education have found teachers reticent and uncomfortable to discuss sexual matters with their students (Kirby et al., 2006; Nayak & Bose, 1997; Smith et al., 2003; Verma, Sureender & Guruswamy, 1997). In 2007, teachers in Uttar Pradesh publicly burned materials in bonfires to protest sex education (India Together, 2008). Selected sex education materials banned in India can be found in Appendix E.

Waiting for a country's culture and laws to change, or even trying to change it, is not a viable means of warding off a possibly immediate

pandemic. New approaches must be created to provide education despite whatever social, structural, cultural, and legal barriers exist. Fortunately, the emergence of new media and ICT has provided possibilities for innovative ways to help bypass social taboos and provide effective education in ways that were simply not possible in the past. Self-guided learning mechanisms, whether book, audiotape, or a computer application, allow learners to assimilate information in a private learning environment, free from public scrutiny and embarrassment. This freedom from embarrassment also applies to teachers, who often choose neither to teach about taboo subjects nor emphasize curricula with which they themselves are not comfortable. Additionally, ICT is superior to books and tapes from a monitoring perspective because ICT is inherently trackable—one can know exactly how many learners completed the application, how long it took them to answer particular questions, as well as whether they were able to answer questions correctly. Powerful insights can be gained from granularly tracking how learners interacted with individual modules, enabling one to rapidly improve the efficacy of the applications. Furthermore, Internet applications are amenable to a multitude of functions, for example, providing and exchanging information, use of simulation-based modules, facilitating decision-making and action planning, promoting specific behaviors and self-care, providing social support, and managing demand for health services (Nguyen, Carrieri-Kohlman, Rankin, Slaughter & Stulbarg, 2004; Nguyen, Cuenco, Wolpin, Benditt & Carrieri-Kohlman, 2007; Orlandi, Dozier & Marta, 1990; Sampson & Krumboltz, 1991), which are essential to improving health outcomes. Finally, ICT allows designers to both standardize best practices and readily adapt content to local needs (e.g., adaptation for language, ethnicity, gender differences as well as differing levels of familiarity with the subject).

In some cases, providing education via ICT can actually be more effective than other more traditional means, and hence have been advocated in public health circles (Burnett, Magel, Harrington & Taylor, 1989; Lightfoot, Comulada & Stover, 2007; Orlandi et al., 1990). A recent computer-based HIV prevention intervention, targeted towards delinquent youths in the United States, found that youth exposed to the computer-based intervention were significantly less likely to engage in sexual activity, relative to the non-computer-based group and control group (Lightfoot et al., 2007). Also, the computer-based group reported fewer partners in the follow-up three months later (Lightfoot et al., 2007).

As new forms of ICT have been created, so too have learning applications utilizing those technologies. Some of these applications are for big-screen (projection) formats, while others are for smaller formats such as mobile devices. These types of applications can be used to communicate a message to large groups or one person at a time. Each approach has advantages and disadvantages. Furthermore, some educators choose to use ICT as a form of "edutainment" to enhance comfort or in cases when the teachers may not be as familiar with a subject. The use of technology-based learning has enabled new forms and formats for learning beyond the traditional model of in-person, linear, real-time instruction.

Given the structural, political, legal and cultural constraints in providing effective and yet accessible prevention materials, I assembled an interdisciplinary team of experts to explore these daunting challenges and work towards building an educational approach which could be accessed more openly by the Indian society.

5 Constructing a Technological Solution

5.1 Foundation for Educational Software

With various bans on sex education (see Chapter 3), access to AIDS education is limited in many Indian communities (BBC News, 2007; Mukherjee, 2007). Since HIV/AIDS is a taboo subject in India, a major design consideration for this tutorial was to maximize comfort levels among learners while interacting with the software.

Despite hundreds of millions of dollars spent on HIV/AIDS prevention in India, basic knowledge of transmission is still limited. Thus, I began my research by further investigating the degree of knowledge held by a target population. I interviewed several first-generation Indian undergraduate and graduate students, who had recently migrated to the United States from India about these issues. Because of the deeply sensitive nature of topics relating to sexual practices, building trust with students was an important factor before inquiring about issues around and relating to sensitive issues.

I then built on the original IRB-approved[14] research (protocol 5279), conducting research on 200 young adults in India. Using insights from this work, I developed an application that bypassed Asian cultural sensitivities and yet provided highly effective HIV prevention education. In order to sufficiently address the complex nature of this problem, I organized a team of leading interdisciplinary experts spanning the fields such as public health, communication, human computer interaction and education, (Appendix H). Building on their expertise, I authored an interactive

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[14] It is mandatory for all protocols involving research, clinical investigations and human subjects to be reviewed and approved by the Institutional Review Board at Stanford University before conducting research.

HIV/AIDS prevention application. The pilot application was developed, tested, and optimized iteratively, over the course of two years. Ultimately, it provides detailed, yet accessible and culturally acceptable, explanations of all aspects of HIV/AIDS.

Interactive Teaching AIDS is an ICT-based application aimed to provide research-based, HIV/AIDS prevention education to audiences who often find it challenging to discuss sensitive topics, particularly related to sexual practices (Sorcar, 2006).[15] It has the potential for widely altering the knowledge and associated risk behaviors of areas that have difficulty teaching about these kinds of taboo topics. The development process of *Interactive Teaching AIDS* more broadly informs educational practice, communication campaigns, and design theories related to altering knowledge and risk behaviors related to taboo topics. The final version of the application was implemented in Adobe Flash, and can be executed both online as well as from CD.

The application uses a question-driven approach. The questions in the animated tutorial are based on: 1) the most frequently asked questions by learners in the design and research phase and 2) the most misunderstood facts about HIV/AIDS transmission and prevention as documented by public health literature. Furthermore, unlike other types of curricula which are either purely scientific (e.g., HIV transmission discussed in the context of virology or infectious disease) or teach learners to avoid the questionable activity entirely (e.g., "Just Say No" and other abstinence-based sex education campaigns), this method takes an entirely different approach. To maximize comfort and promote coherent understanding, it couples biological aspects of transmission with culturally familiar

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[15] The *Interactive Teaching AIDS* applications can be accessed at TeachAIDS.org.

euphemisms and metaphors to communicate ideas about prevention measures, utilizing numerous education and communication theories. Entertainment education, commonly known as "edutainment", has been documented as being a powerful tool to bring sensitive subjects, such as HIV/AIDS, into public discourse (Piotrow, Kincaid, Rimon & Rinehart, 1997; Singhal & Rogers, 1999).

6 Theoretical Framework

The curriculum is grounded in numerous pedagogical theories and communication strategies. Below are descriptions of each theory and the underlying reasons for utilizing it.

6.1 Developing a Coherent Conception: The Fan Effect

Media campaigns about HIV/AIDS that are limited in scope (e.g., billboards carrying one or two main messages, or television ads of 30 seconds to 1 minute) (see Chapter 4) can cause misconceptions if the learner does not have a firm grasp of the basic concepts. Learning about HIV/AIDS protective measures is in some ways analogous to learning to drive. If a student learns about using the car mirrors from a billboard, turning the wheel from a television commercial, and utilizing the car breaks from a radio ad, it would be challenging for them to piece all the concepts together to drive a car properly. Imagine this difficulty coupled with the inability to ask those around you open questions about driving because it was a sensitive or taboo subject. Similarly, learners receive fragmented data about HIV/AIDS transmission through various mass media campaigns in India, making it difficult for them to create a coherent overall picture for prevention and understanding. Furthermore, the misunderstandings may become even more convoluted when they are coupled with the reticent behavior of individuals of all ages around this subject.

Research shows that expert knowledge centers on concepts that are connected and assembled in an organized fashion (Bransford, Brown & Cocking, 1999). Usable knowledge is, therefore, quite different from a large set of disconnected facts.

Fan Effect learning theory shows that the more individual facts that a person learns about a single concept, the more difficult it is for them to retrieve particular facts from memory (Anderson, 1974; Anderson & Reder, 1999). This retrieval mechanism is especially difficult when the set of facts do not have an internal cohesiveness or integration (Spoehr, 1994). Furthermore, connecting facts in a coherent fashion allows learners to build patterns and relationships leading to a deep understanding as well as greater transfer to novel situations (Bransford et al., 1999).

One common way educators present health education in a cohesive manner is through a list of "DOs" and "DON'Ts" (e.g., do take steps to protect yourself, don't engage in risky behaviors). Previous research on effective methods to promote HIV prevention has shown that this presents "superficial knowledge" and is therefore unlikely to translate into actionable prevention methods and may even increase fear among learners (Au & Romo, 1996; Au, Roma & DeWitt, 1999). When teaching about HIV/AIDS prevention to young people, it is imperative to avoid fragmented knowledge (e.g., "dos"and "don'ts") and focus on creating a coherent conception (e.g., teaching concepts around bodily fluids, fluid transmission). This allows students to organize considerable information, as well as to learn to reason through novel settings (Dooling & Lachman, 1971).

Since sex and reproductive health education is not mandatory in India, it is unclear how individuals piece together the disparate bits of information they might receive. For instance, promoting the popular ABC campaign (Abstinence, Be Faithful, Use Condoms) among people who do not understand the basics of fluid transmission can make understanding the underlying message more difficult. However, a person with limited knowledge, who follows this campaign blindly, may be especially at risk.

For instance, the 'B' in 'Be Faithful' is in reference to having a monogamous faithful relationship with their partner. Consider a case where a man is having relationship with a female commercial sex worker and he is "being faithful", in the sense that he is visiting the same commercial sex worker (CSW) and, therefore, abstains from using a condom. Although he is following the advice of the ABC campaign literally, he is still at risk if the CSW is having sexual relations with other clients.[16] Similarly, a faithful wife may follow the ABC campaign verbatim; however, if her husband is having an extramarital affair, she is still at risk. Being able to simply repeat rules and campaign messages is not good enough. Individuals must understand the underlying concepts underlying these messages are grounded in. In both the above scenarios, all individuals involved are at risk of an HIV infection. With little knowledge of transmission, blindly following the advice of a public campaign can have ill effects. Due to these sorts of misunderstandings, organizations such as Population Services International have launched campaigns to improve comprehension of exactly this sort of transmission-related issue (Population Services International, 2003).

The baseline surveys coupled with the one-on-one interviews with first-generation Indians revealed several misunderstandings among our target group, such as the belief that HIV can be transmitted through kissing, hugging, or water. Several students knew that HIV could be transmitted through blood and noted they had seen ads about such educational messages. However, when asked "how" one could get HIV from blood (e.g., touching blood, licking blood), it was evident the learners had superficial knowledge about the topic. The ITA curriculum therefore, does not rely heavily on prior knowledge in order to understand fundamental concepts of

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[16] Note, that an average commercial sex worker in Mumbai services approximately seven clients each night (Singhal & Rogers, 2003).

transmission. Rather it starts with a broad description of how bacteria and viruses work within our body, through an analogy of soldiers within a country. It then moves to the concept of body fluids – reviewing high-risk and no-risk fluids in our body. Next, the application helps the learner understand that high-risk fluids must literally enter the human body to create a risk of infection. Finally, the application helps the learner identify and connect various actions (e.g. coughing, hugging) with bodily fluids and transmission modes. This entire sequence was developed, through an iterative design approach based on testing, to give learners a coherent conception of how the virus survives in the human body and to provide the learner with a way of assessing whether he or she is at risk. Furthermore, providing visual representations of the concepts help to orient learners and have shown to facilitate retention (Pinsky & Wipf, 2001).

Figure 2. Developing a Coherent Conception
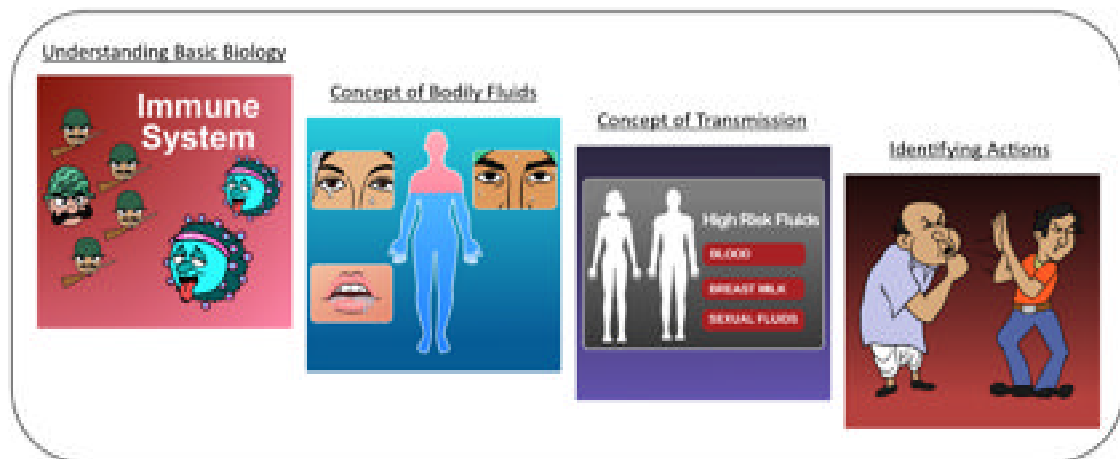
The ITA application takes the learner through various steps in order to fully conceptualize HIV transmission.

6.2 Balancing Social Acceptability with Accuracy and Efficacy

Although some research indicates that fear-based approaches, in specific cases, can increase information processing and associated gains in learning (Kim, Sorcar, Um, Chung, Lee, 2008; Lee & Ferguson, 2002), teaching about taboo topics requires particular sensitivity to maintaining comfort for both students and administrators. Fear-based interventions tend to be highly graphic and disturbing. With the ban on sex education in India and sensitivity around subjects like HIV/AIDS, they would likely not be acceptable to traditional institutions, regardless of their efficacy.

Selecting images that are both comfortable and efficacious is both important and extremely challenging. On the one hand, communicating sensitive messages via simple representations, like stick figures, would maintain higher levels of overall comfort. However, the abstract nature of the representation might hinder accurate message communication, and thus learning. On the other hand, designers can use highly graphic and explicit images, which would communicate exact actions to best understand transmission. However, these sorts of images would be uncomfortable for learners. Feeling comfortable with the materials may further ensure that learners share information with others. Our goal was to identify images that would be both clear and effective but also maximize comfort and social acceptability.

6.3 Identifying Socially-Acceptable Graphics

6.3.1 Acceptability Among School Administrators

In April of 2006, we conducted a Stanford IRB-approved anonymous baseline survey (protocol 5297) on 200 undergraduate students in New

Delhi, India to better understand the mindset of young adults, assess their baseline knowledge, and understand what types of pictures could be used to communicate messages to maximize comfort and learning around communicable diseases. School officials restricted the kinds of pictures allowed in the surveys, limiting the range of the data that could be collected. However, this negotiation process was highly informative, as it allowed me to further understand the kinds of images and information accepted within the scholastic environment. The schools rejected the survey content several times. Seven iterations were required before approval was granted and we could administer the survey to students. Furthermore, even though the administrators had access to both high school and college populations, they preferred we run the survey only on the college population.

Early in the survey design process, I wanted the students to draw their own understanding of HIV/AIDS transmission methods through the use of concept maps. I was hoping to code the student drawings to better understand their perceptions and knowledge base, to witness their connections between various concepts, and, furthermore, to assess their understandings/ misunderstandings regarding various issues around HIV/AIDS. However, the administrators would not allow for this method of data collection –voicing their concern around inappropriate and unacceptable pictures the students might produce in class.

After the idea of constructing concept maps was rejected, I utilized pictures from existing HIV/AIDS curricula in India[17] and inserted them into the survey for students to explain and rate how they felt about the images. In

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[17] Image Sources: Global Strategies for HIV Prevention, Rural Education and Development, Sahaya International, International Training and Education Center on HIV, Global Strategies for HIV Prevention and Lives in Focus.

addition to understanding general knowledge and perception around multifarious concepts relating to HIV/AIDS, I was particularly interested in the level of comfort that young people felt with images depicting various modes of transmission (e.g., sexual intercourse and intimacy, breastfeeding, child-delivery, intravenous drug-use).

The initial versions of the survey contained a wide range of images, including many explicitly graphic ones, all of which were selected from existing HIV/AIDS curricula developed to educate the Indian population. However, the school administration was concerned about particular images and phrases and asked to have questionable materials removed before approving the content for dissemination. Furthermore, I was requested, and eventually instructed, to change the name of the survey from "HIV/AIDS Survey" to something more "scientific" or "general". Much of the curricula around sex and HIV/AIDS education delivered to students in India was titled something like "Life Skills", used as a euphemism for the actual content, to make it more socially acceptable. The final name agreed upon for my survey was "General Health Survey."

With each of the seven survey iterations, I removed questionable and uncomfortable materials and resubmitted a smaller and more euphemistic selection of pictures in the survey for approval to the school administrators and other decision makers (e.g., teachers, principals, friends and owners of the institutes). Interestingly, all the pictures that administrators considered unacceptable (and were hence removed) dealt with the very concepts I was most interested in teaching about. In fact, these were the images most pivotal to understanding the common forms of HIV transmission and, consequently, protection.

Below are a few images that were rejected from the survey in the negotiation process, which took place between mid-February 2006 through early-March 2006. The survey eventually ran in April 2006.

Figure 3. Graphics Rejected by Indian School Administrators

Above are examples of the kinds of pictures rejected by school administrations during the survey development/negotiation process.

Eventually, some of the less explicit pictures were included in the survey run in the colleges.

Surprisingly, the actual survey administered in the college, was not the heavily negotiated version approved by the administration (Appendix I). Instead, administrators ran an earlier, previously rejected, version (Appendix J). Interestingly, I had the most diverse findings for the pictures that were rejected by administrators earlier, but eventually run on the college students.

6.3.2 Acceptability Among Students

It is likely that most HIV/AIDS curricula will need to contain facts about breastfeeding, child delivery and sexual intercourse, since these are all common modes of transmission. The pictures in my survey were all simple black and white drawings from existing HIV/AIDS curricula used by local NGOs. Below is a subset of pictures from the survey depicting these methods of transmission. The numbers associated with each picture (36 percent breastfeeding, 52 percent child delivery, 59 percent intimacy)

represent the percentage of students that indicated that they were unsure, uncomfortable or very uncomfortable with the associated graphics. After reviewing these results, I felt it was imperative to identify other images to communicate the correct messages and maximize comfort levels.

Figure 4. Selected Results from Baseline Survey

The numbers associated with each picture (36% breastfeeding, 52% child delivery, 59% intimacy) represent the percentage of young adults that responded to our baseline survey who were either unsure, uncomfortable or very uncomfortable with the associated graphics.

Over the following several months, I worked closely with my team of experts and target group of learners to explore culturally-sensitive pictorial depictions, which communicated the concept of bodily fluids and transmission related issues. We also explored various degrees of integrating humor into the images, which when used appropriately, can be an effective mechanism to overcome a taboo topic (Fennell, 1993; Singhal & Rogers, 2003).

Below are a few examples of the sorts of pictures[18] my focus groups felt most comfortable with while communicating issues of transmission. These

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[18] The Indian illustrations in the *Interactive Teaching AIDS* software were developed by *Manick Sorcar Productions* and were animated by a medical animation team through the *Medical Research Information Center* and *Care and Visual Ltd.*

are a few examples used to devise a socially acceptable approach, which was discussed as part of the framework for evaluation in Chapter 2. The pictures on the left were tested and replaced with the pictures on the right in the ITA applications.

Figure 5. Representation of Breastfeeding
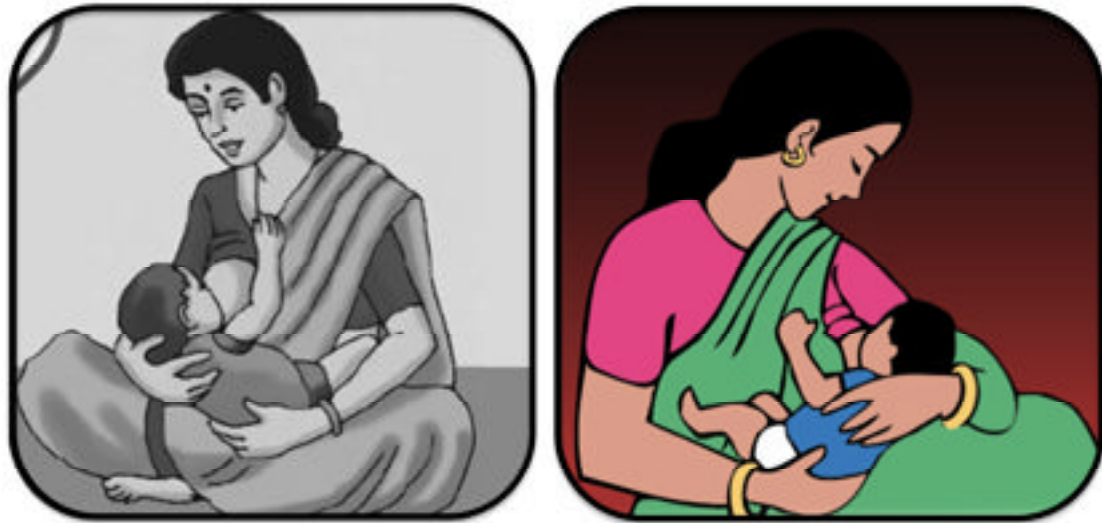
To maximize comfort, the picture (on left) representing breastfeeding was replaced by the picture (on right) exposing less skin.

For the representation of breastfeeding, learners indicated that simply exposing less of the woman's breast increased overall comfort with the image and communicated the same message. The final pictures were also less detailed in that less volumetric shading was used to flatten the image further. The picture on the right was used in the final animation.

Figure 6. Representation of Child Delivery
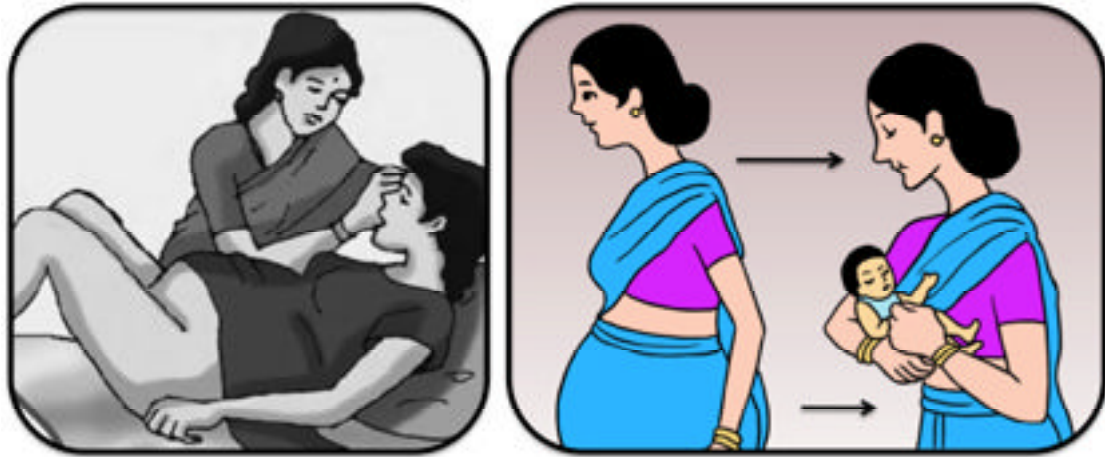
The picture (on left) representing child delivery was replaced by the image (on right). Through animation, the pregnant woman morphs into one holding a baby.

The final application included a simple animated sequence to convey cold-delivery. Instead of showing a half exposed body, as in the picture (left), it featured a woman fully clothed (wearing an *Indian sari*) and then, through animation, a baby appears in her arms. The learners understood this woman to be euphemistically delivering a baby and found this imagery comfortable and even entertaining. With regards to providing information on vertical transmission, it was not the explicit knowledge of how infants are delivered that was central to creating a conceptual understanding, rather connecting the concepts related to transmission of the virus.

In order to represent intimacy, the animation incorporates ideas from old Bollywood movies from the 1960s and 1970s, which are viewed comfortably by masses in India.

Figure 7. Representation of Intimacy #1

The picture (on left) representing intimacy was replaced by a euphemistic image (on right) showing a close-up of the lovebirds kissing instead.

In the picture above, instead of showing a couple publicly kissing (which is taboo in India) (discussed in Chapter 3), the animation shows a couple coming very close to kissing and then the camera pans up a tree (away from the couple) and the lovebirds kiss instead (picture on top right). This is an example of a culturally-appropriate use of a euphemism. The target group clearly understood the concept, especially since this sequence parallels love scenes from old Bollywood movies.

Figure 8. Representation of Intimacy #2
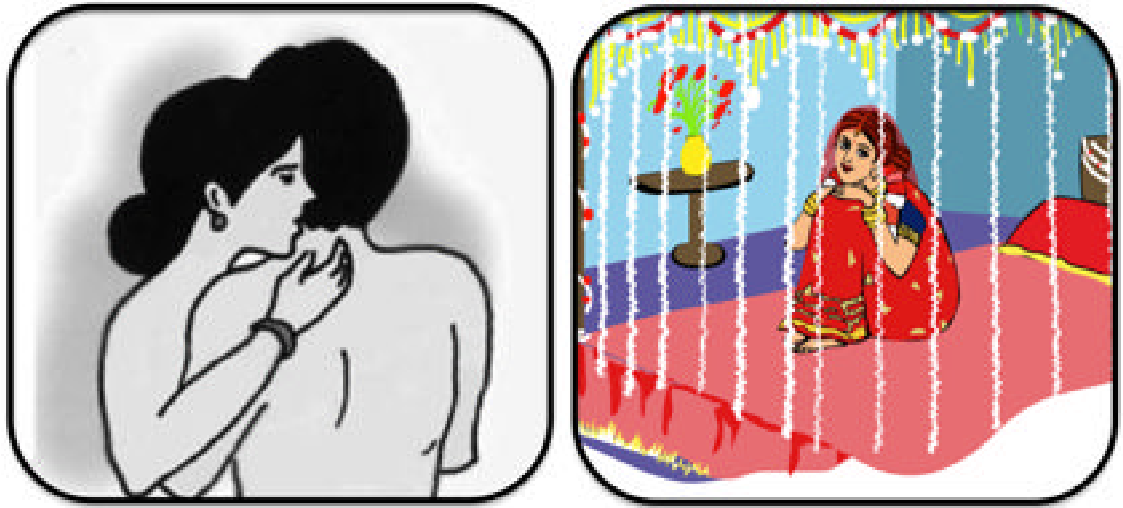
The picture (on left) representing intimacy was replaced by a culturally-appropriate image (on right) of a bride, sitting on her honeymoon bed, decorated by ceremonial flowers, representing a sexual connection.

While discussing sexual intercourse (picture on top right), the animation includes cultural elements from Bollywood movies and Indian traditions. In order to maximize comfort, instead of showing a man and woman intimate with one another, the animation displays an image of a woman in her wedding gown sitting on a bed decorated with flowers. This sort of floral arrangement (the tradition is called "suhag raat") takes place on the bed where a husband and wife will honeymoon on their wedding night.

6.4 Application of The Media Equation

The curriculum draws on the following principle based on 35 studies described in *The Media Equation* (Reeves & Nass, 1996): people apply the same social rules and heuristics when interacting with media as they do when interacting with actual people and places. Furthermore, these responses were true of all the segments they were tested on including

children, college sophomores, business people, and technology experts. These social responses to media are unconscious and automatic.

Due to the sensitive nature of this subject and discomfort among young adults to discuss it openly, we chose ICT to deliver the ITA curriculum. *The Media Equation* suggests that students should be able to learn from the animated characters in a similar way to learning from humans, with the added benefit of knowing they are only interacting with technology. This should help diminish embarrassment or discomfort as the interaction is with a completely non-threatening technological device as opposed to a human. However, one important difference (and benefit) we discovered through our focus groups was that learners felt less embarrassed about sensitive topics when interacting with technology instead of with other people.

While designing the animated characters and discussing their features, we discovered that students in our focus groups felt even more comfortable if the characters did not have names associated with them. Originally, we gave the primary characters in the animation generic names (e.g. Raja, Rani). However, being that these names were generic, our users inevitably knew someone with those names and said they thought about them during their interaction with the curriculum. Suddenly, the students' experience did not feel "private" anymore, consistent with the ideas from *The Media Equation*. Removing character names from the curriculum had the added benefit of avoiding religious or caste classifications.[19] Other HIV/AIDS initiatives have encountered problems with selecting names for campaign characters specifically due to the religious associations (Shah, 2006).

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[19] Most Indian names tend to be associated with a particular religion or caste of the individual.

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6.5 Mnemonic Devices as Learning Tools

Mnemonic devices, which use visual image links, have been shown to enhance retention of difficult concepts (Lorayne & Lucas, 1974; Luria, 1968). They are essentially memory aids designed to help the learner create associations between various constructs.

Figure 9. Mnemonic Device to Facilitate Learning about Fluid Transfer
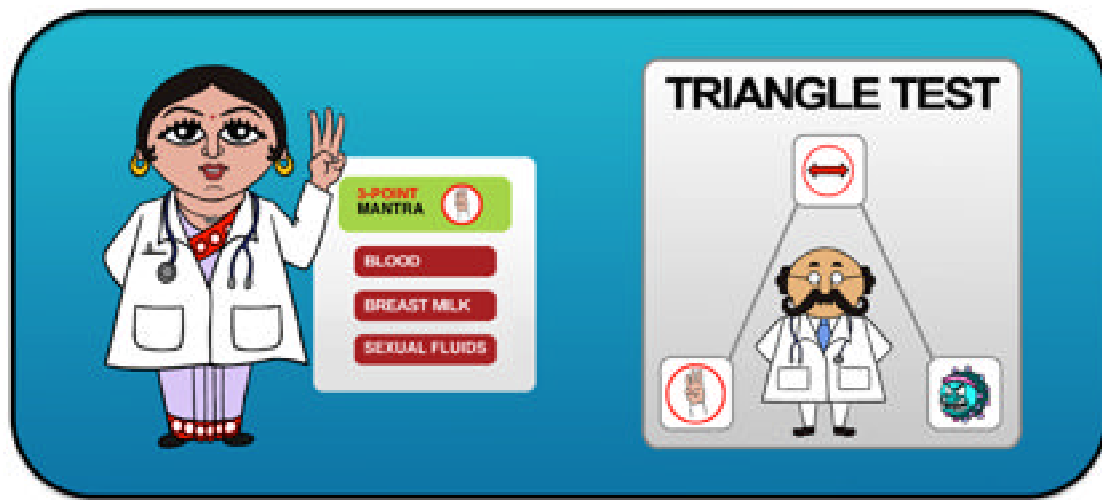
The ITA application uses mnemonic devices to help learners better understand the most important concepts. Above is are examples of the 3-point mantra and the Triangle Test.

The ITA application reinforces primary concepts through various pictorial mnemonic devices. These devices were used to help students retain novel concepts. For instance, students learn about the *Three Point Mantra* (left), which outlines the high-risk transmission fluids (top left). Every time the doctor says *Three Point Mantra*, he/she (depending on the version) holds up his/her three fingers, which are used as a symbol or icon throughout the animation.

3-Point Mantra (High-Risk Fluids)
    1) Blood
    2) Breast Milk
    3) Sexual Fluids

Another example of a mnemonic device is the concept of the *Triangle Test*, which helps the learner assess whether he or she is at risk in a particular situation (top right). There are three parts to the *Triangle Test*, arranged on the three corners of a triangle. The memory aid reinforces that there are three steps for considering the risk of an infection. The doctor character uses his or her (depending on the version) pointer to show the learner the direction to properly use this learning tool. See below for the mnemonic strategy.

Figure 10. Mnemonic Devices for Learning about Risky Behaviors

Above is the example of the Triangle Test. This use of a mnemonic device helps the learner assess whether he or she is at risk of an HIV infection.

Triangle Test

Step One: Is there a HIGH RISK FLUID?
                      If no, stop here. There is no HIV risk.
                      If yes, proceed to STEP 2.

Step Two: Is there DIRECT TRANSFER?
                      If no, stop here. There is no HIV risk.
                      If yes, proceed to STEP 3.

Step Three: There is a POSSIBLE HIV INFECTION.
                      Go see a doctor.

6.6 Voice Properties and Gender Concordance

Nass and Brave demonstrate the applicability of social psychological principles of similarity attraction to the design of computer agents (Nass & Brave, 2005). They discuss the concept of homophily—similars attract—which essentially means that people are attracted to other people who are most similar to them. Participants rated agents similar to themselves as the most credible, trustworthy and friendly. Based on these findings, I chose male and female characters with voices similar to my target audience. Because this animation was aimed towards young adults growing up in India, I recruited voice actors with similar accents and pronunciations within the appropriate age groups.

The current animations features voices selected directly by young people in our target audience. My development team first selects five to six candidate voice actors and then uploads sample clips using an online survey tool. The students in the target group then vote on the voice choices, advocating which ones they like best, given the context. The winning voice actors then record the entire script for the animation. This is an interesting way to incorporate a participatory design approach in order to secure a better local fit for such educational tools.

The animation consists of a discussion between a student and his/her physician through which basic HIV/AIDS-related questions and concepts are explored in order to better understand transmission and prevention methods. I also chose to create separate versions for males and females (the male version has a male doctor and male student while the female version has a female doctor and female student). This decision was based on the evidence that gender concordance is important while discussing sensitive issues (e.g. sex education), particularly among female patients (Fang, McCarthy & Singer, 2004).

6.7 Cultural Embeddings

"If culture is a factor in transmission and impact, it follows that prevention and care require a cultural approach"
                                        – Healthlink Worldwide, 2007

Experts say that cultural embeddings are an integral component to designing HIV/AIDS materials (Commission for Africa, 2005). Integrating values, beliefs and traditions into educational materials helps to build trust and engagement at the community level (Healthlink Worldwide, 2007) and has lead to greater overall program acceptance and sustainability (UNFPA, 2004). It is particularly important to use culturally sensitive materials while designing messages for highly stigmatized subjects as not to offend the learners (Singhal & Rogers, 2003). Some individuals may be interacting with the materials in order to protect themselves and their loved ones. Others may either be seropositive or know someone (e.g. family member, friend, co-worker) who is infected with the virus. Culturally-appropriate approaches have shown greater impact on promoting awareness, changes in attitudes (stigma reductions) and further inclusion of those living with HIV and AIDS (Healthlink Worldwide, 2007). It is particularly important to develop appropriate materials as life threatening illnesses, such as HIV and AIDS, can present tremendous physical and psychological distress on those infected as well as others within their social network (Derlega & Barbee, 1998).

There are several cultural elements embedded into the ITA application in order to make it familiar and appropriate for the learners. Throughout the development process, I worked with numerous individuals with expertise in India related social and cultural issues. A professional award-wining

artist[20], with decades of experience, was engaged to illustrate all the Indian animated characters.

Figure 11. Cultural Embeddings

The ITA application incorporates many cultural embeddings. Above are pictures of some of the characters in the animation.

The ITA application also utilizes ideas from experts who have studied India-related social and cultural issues. We conducted several brainstorming sessions in and around Stanford on Indians who had recently migrated from India to learn about cultural sensitivities and necessities in designing further outreach of the application. In order to be consistent with the expectations of young learners, our materials incorporate ideas from popular Bollywood films, including trends, costumes choices, cultural icons, and analogies through the animated characters.

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[20] We worked with Manick Sorcar Productions (www.manicksorcar.com) to develop culturally-appropriate animated characters.

Figure 12. MS&E 17SI Course at Stanford University

MS&E 17SI: Stanford undergraduate and graduate students brainstorming ideas for the India Interactive Teaching AIDS application through a Management Science and Engineering course.

Based on feedback from my focus groups, I tested and altered several words, phrases and metaphors to be more culturally-appropriate and appear more colloquially. My interaction with experts and the focus groups revealed the importance of using particular phrases correctly to further ensure acceptance of the program. Below are some examples:

a) The proverb "*an ounce of prevention is worth a pound of cure*" is more commonly said and written in India simply as "*prevention is better than cure*". Since the baseline survey revealed that young people had many questions around a cure for HIV/AIDS, the title for the animation became "*Prevention is Better than NO CURE*".

b) Instead of saying "*appearances can be deceiving*", the application uses a more popular Indian derivation, "*appearances are deceptive*".

c) In the chapter describing viruses, I included a list of the most typical viruses affecting Indians (e.g., polio, chicken pox, and measles)

The learning and communication theories summarized in this chapter were carefully examined and tested piecemeal in our focus groups before combining them into the ITA application. In particular, they were used to

maximize cultural appropriateness and promote acceptance of the prevention education. We will test the efficacy and examine the results of this overall approach in the next two chapters (Chapter 7 and 8).

7 Methodology and Data

Two fundamental goals drove this research. The first priority was to develop interactive content concerning HIV/AIDS that avoided social taboos and other cultural proscriptions while providing all of the critical information individuals need concerning basic HIV/AIDS prevention methodologies. The second was to study both the effectiveness of these types of applications as well as how this general approach to stigmatized diseases may be refined, improved, and extended. I conducted this study with input from researchers across multiple Stanford departments and schools, including the School of Education, the School of Humanities & Sciences, and the School of Medicine, as well as with secondary and tertiary institutes through various private educational institutes in India[21]. These stakeholders were actively engaged throughout the development and evaluation process.

The previous sections discussed the various challenges in creating effective HIV/AIDS materials. Also, the baseline study used to develop the first major iteration of the curricula was discussed. Below is a timeline and summary of the gradual development of version 1.0 of the ITA application for India. In the following chapters, I discuss the research methodologies and data collection procedures employed in developing, testing and eventually implementing the ITA curriculum in India.

7.1 Developing the Curriculum and Software

I used the Interactive Teaching AIDS (ITA) curriculum as a springboard for my research to learn about ways to provide critical health information

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[21] The names of the various institutions in India will remain anonymous in order to protect the identity of the schools, colleges, administrators, and survey participants.

despite social and cultural barriers that exist within the community of learners. Based on insights from an interdisciplinary team of experts and potential users, this curriculum was designed through an extensive iterative design process. The process included the development of multiple prototypes, starting with concept maps, screenplays, storyboards, and low-fidelity paper prototypes, eventually leading to interactive versions of the curriculum in PowerPoint, Adobe Acrobat, and Adobe Flash (see Appendix G for details on development process). The curriculum went through over 150 iterations (explained later in this chapter). Each new version was informed by both extensive user testing on the target population and interdisciplinary expert feedback (Appendix G).

The development of Interactive Teaching AIDS began in late 2005. I was interested in the lack of HIV/AIDS awareness in India, despite the enormous efforts and funding of in prevention education and campaigns. The project started with in-depth interviews of first-generation Indian students who had recently migrated to the United States. It was through this process that I quickly discovered the cultural taboos associated with openly discussing sexual practices. I started working with education experts to discuss the learning problem and soon brought on other experts from the disciplines of communications, medicine/public health and regional experts from various parts of India to brainstorm the problem further. It was imperative to recruit an interdisciplinary team to discuss the problem because the problem itself was at the intersection of several subject areas. The research team drew on pedagogically-grounded and research-based approaches to brainstorm ideas and suggest potential prototypes (see Chapter 6 for further details).

7.1.1 Stage 1 (early 2006)

In April 2006, my team, which included several school administrators and educators in India, ran a Stanford IRB-approved baseline survey (see Chapter 6 and Appendix J for baseline survey) on 200 young adults in an urban private college in New Delhi to assess their knowledge of HIV/AIDS transmission and measure comfort levels with various health-related graphics. I also studied the target group's gaps in knowledge and their technology use to guide needs assessment and curriculum construction.

7.1.2 Stage 2 (mid-2006 to late-2006)

The next stage of assessment was conducted on 26 Stanford students over several months. These assessments consisted of one-on-one interviews, which spanned thirty minutes to three hours, depending on the learner's background, comfort level and interest in the research. At the end of this assessment phase, the storyboard changed over 150 times and grew from 50 to 200 scenes. The curriculum design process resulted in changes in content as well as character and interface development (see below as well as in Appendix G for development details).

These iterations included changes like:

Content
- Altering key words to be more colloquial
- Arranging concepts and central ideas (from chapter to chapter) to maximize understanding and build a coherent story
- Tweaking metaphors to fit the cultural context
- Breaking down complex concepts into more simple ones
- Modifying mnemonic devices to facilitate scaffolding

- Deciding how and when particular words should be presented on screen to enhance learning
- Structural changes in the presentation of certain concepts based on others young people were already familiar with
- Adding information based on learner feedback (e.g., we added an entire section on testing and how the process of testing works in India)

Character Development
- Modifying characters to match Indian sensibilities (e.g., clothing, facial expressions)
- Adding complexities to animations without making the animations too intricate (e.g., doctor's mustache moves when he speaks instead of a mouth)

Interface Design
- Adding and removing various buttons based on user feedback (e.g., rewind, play, pause, print)
- Changing the design of the actual interface (e.g., size, shape)
- Working with various media to determine best presentation options (e.g., Adobe Acrobat, PowerPoint, Flash)

This curriculum enhancement and modification process took place through observing and interacting with the learners directly. Each student was orally asked some preliminary questions on HIV/AIDS prevention to assess their current understanding and knowledge of the subject. They were also asked questions such as whether the discussion of sensitive subjects was common among peers and community members, and which resources students used to learn about these issues. Next, students were instructed

to individually interact with the curriculum. They could choose to engage the learning materials on their own or have someone read to them.

Each student was observed and notes were taken during their interaction with the technology-based learning materials. They were asked to "think aloud" and discuss openly any questions and concerns they had regarding HIV/AIDS or the curriculum. After completing the curriculum, learners were asked to answer prevention-related questions along with some additional follow-up questions, such as *can someone be infected with HIV through kissing?*". They were then instructed to describe in detail why the answers were correct or incorrect. After answering, students were asked how they arrived at their conclusion. Having students vocalize their rationale provided critical insights about the kinds of logic the learner was using, where the misconceptions were occurring, and whether the participant used the newly-acquired material in their strategy.

7.1.3 Stage 3 (early 2007)

The third stage of assessments was conducted at Stanford University on a group of Indian students who had lived in the United States for no more than a few years. This group tested the prototype application on their own (the learning materials were not read to them). At onset, each student sat down at separate times and filled out a pre-program assessment used to gauge their current knowledge of HIV/AIDS. He or she then went through the entire program and took notes during the process. After interacting with the curriculum, learners answered a post-program assessment, which contained the questions from the pre-program assessment and additional questions not taught in the curriculum. The session ended with a one-on-one discussion about the efficacy of the program, including any questions he or she still had about HIV or other related concepts. Learner feedback

informed the design of our current prototype.

Figure 13. Learner Testing of ITA Curriculum

First generation Indian students interacting with pilot ITA application at Stanford University.

7.2 Assessing Tutorial Outcomes

7.2.1 Overview of Experimental Design

After completing several smaller pilot studies on young adult learners, the next step was to conduct a larger study on several hundred students in multiple regions in India to assess overall efficacy of the ITA application, primarily focusing on the learning and attitudinal outcomes.

7.2.2 Leveraging Experience in India

Our team discovered that conducting research in developing regions, particularly India, was quite challenging. In the developing world, it is considered particularly unethical to conduct research on a population just for the sake of advancing scholarly work and studies. Some of these populations are particularly sensitive to feeling "used" as human subjects to improve knowledge for applications that may not be applicable to them.

Studying the development of innovative approaches to teach HIV/AIDS was a challenging initiative. Because of the stigma associated with the virus, individuals were often shy or embarrassed to work with our team and answer questions. It is often difficult to convince schools to allow experiments and testing when they are in constant fear of parents and student reactions to the curricula. Despite the ban on sex education in multiple states, we successfully developed a number of strategies to allay the fears of teachers, administrators, and government officials. We also gained the trust of our partners. After interacting with our pilot curriculum and recognizing the added-value of this type of research, the stakeholders were confident in our intentions and were willing to partner with us.

7.3 Experimental Design

The central purpose of experimental study was to assess whether a technology-based curriculum, aimed at teaching HIV/AIDS education without discussing sexual practices, would promote short-term and long-term gains in knowledge and changes in attitudes among young adults in India.

7.3.1 Participants and Sampling

Participants in this research include high school (11th and 12th grade) and college students. Individuals in this group are among the most sexually active in the population and are more likely to have multiple sexual partners than other groups (Abraham & Kumar, 1999; Biswas, 2003). Although one would expect this group to have extensive knowledge of HIV/AIDS, our baseline research, along with other research studies (Medical News Today, 2007; Perry, 2005; Pramanik et al., 2006; Sachdev, 1998), suggest a striking lack of knowledge. This group also presents some

practical advantages for our research. They are 1) literate; 2) English-speakers; 3) familiar with questionnaires, knowledge tests, etc.; and 4) have easy access to, and are comfortable with computer and Internet-based technologies.

The study was conducted from September 2007 through October 2007 on 386 students from New Delhi, Haryana, and Punjab, three states in India. Each student was tested over three time periods (pretest, posttest, retention test). The students ranged between 14 and 24 years old (M=17.59; SD=2.23). There were 195 (50.5 percent) female participants and 191 (49.5 percent) male participants.

A trusted faculty member, whose responsibilities cut across the four institutes (two institutes in New Delhi, one institute in Haryana and one institute in Punjab), randomly selected students within each grade to participate in the study. Prior to running the experiment, this faculty member spoke to several other stakeholders including the head of the institutes, the principals of each individual institute, and teachers in order to obtain permission for the study. All stakeholders willingly agreed to participate in the study. The students attending these institutions were fluent in English and invited to participate on a voluntary basis. There were no refusals to participate.

Participant demographic characteristics are summarized in Table 7.

7.3.2 Materials

Each student sat in a stationary chair, at a table, with desk space in front of them. They were separated by approximately two feet. The students in the experimental condition had a personal computer, keyboard, mouse, and their own set of headphones directly in front of them. In addition to the

students, each room had one teacher, one teaching assistant, and a computer specialist to manage computer-related issues (total of three people). The task instructions and survey assignments (similar across all conditions) were given to the teachers ahead of time and the primary instructor read them aloud during the appropriate times in the intervention.

For the experimental conditions, which consisted of participants interacting with the ITA curriculum, the computer specialist checked the campus computers approximately one week prior to running the experiment to ensure they were fully functioning and had Internet capability. The day before the experiment, the computer specialist downloaded the animation on the local hard-drive of each computer.

All students in the experimental condition completed the surveys online (pre, post and retention assessments) using SurveyMonkey.com. A simple redirector link was created for these students in the experimental condition and written on the classroom chalkboard to make it easy for them to access the online surveys quickly and accurately. The link was disabled immediately after the experiment. The students in the control conditions were given the exact same knowledge, attitude and demographics questionnaires on paper (more information on the survey is provided in section 7.4).

Figure 14. Experiment Setup in India

Above is a pictorial representation of the setup for the experiment. This setup was similar across all conditions in New Delhi, Haryana and Punjab.

7.3.3 Procedures and Study Design

The study was a pretest-posttest-retention test control group design (see Appendix K for detailed layout). The confidential assessments administered in this study were conducted in accordance with protocol #5887, approved under the Stanford University non-medical human subjects Internal Review Board (IRB) as well as the respective authorities at the institutes participating in this study (Appendix M, Pretest Assessment; Appendix N, Posttest Assessment; Appendix O, Retention Test Assessment). Participants were recruited on a voluntary basis and notified that if they felt discomfort during the experiment at any time, they could discontinue their participation. There were no refusals to participate.

In order to promote accurate reporting, great effort was taken to make students comfortable and provide confidentiality. Students were discouraged from providing their names on the surveys and were not assigned unique identifiers at the time of the assessment. Furthermore, all activities around data collection were conducted by trained staff members who were well-informed before the surveys were administered.

Four institutes (three high schools and one college) participated in the study from three different states (New Delhi, Punjab, and Haryana) in India. Students at three of the four institutes (a high school in New Delhi (n=92), a high school in Haryana (n=106) and a college in Punjab (n=91)) were assigned to the intervention groups, and students at the fourth institute (a high school in New Delhi (n=97)) were assigned to the control group. Students were allocated to the control (n=97) and experimental groups (n=289) based on which schools they attended. To avoid contamination between experimental and control groups, especially for the retention test that took place 30-40 days after initial exposure to the ITA curriculum, conditions were separated by individual institute. Between 91 and 106 students were randomly selected from each institute, within the grade levels identified, and assigned to either a control or experimental condition. The exact numbers were based upon the number of functioning computers available at each location. Each institute ran the study in multiple rooms on one day, in order to avoid contamination between the student groups.

All students lined up outside the classroom and entered the rooms, sitting at a computer in front of them, at the same time. Measures were taken at three different time periods (pretest, posttest, retention test) through anonymous, self-administered questionnaires. The procedural directions were sent to administrators ahead of time and were read aloud verbatim by a designated teacher in the respective classrooms (see Appendix L for sample directions). Students from both the control and intervention institutions were given 10-15 minutes to respond and submit their pretest answers. The pretest contained the same knowledge and attitude questions for all conditions.

Immediately after completing the pretest, students from the experimental group were exposed to the ITA intervention, which played on the computer in front of them. Each student used headphones to isolate sound from one another. In place of the ITA intervention, the students in the control condition were asked to read silently from their school textbooks (unrelated materials to HIV/AIDS). The control group was given no additional intervention because specific modules on HIV/AIDS prevention are not currently taught in these schools. All students had been exposed to the same level of biology lessons, which included some HIV/AIDS information, approved by the administrative staff.

Figure 15. Indian students interacting with ITA curriculum

After 30 minutes, all students were given another 20-25 minutes to complete a posttest. The posttest contained similar questions to the pretest, but in random order. Students were strongly discouraged to converse with one another while completing the surveys and participating in either the control or experimental conditions.

Approximately one month after initial exposure (30-40 days later, based on the convenience of each school), a 20-25 minute anonymous retention test was administered to the same students. The participants were unaware

that a retention test would be given to them. The retention test was provided to all students enrolled in the same school on the same day, in order to avoid contamination between students. The retention test contained similar questions to the pretest and posttest but again in random order. All students received the retention test in the same format that they received the pretest and posttest. Similar to the pretest and posttest, students were again requested to avoid conversation during the retention test.

For simplicity, T1 refers to the measures collected during the pretest, T2 refers to the measures collected during the posttest and T3 refers to the measures collected approximately one month later during the retention test.

Table 3. Summary of India Research

INDIA STUDY DESIGN (N = 386)					
Institute		New Delhi (control condition)	New Delhi (exp. condition)	Haryana (exp. condition)	Punjab (exp. condition)
Level		High School	High School	High School	College
Research Design Day 1 (60-70 minutes)	T1	Class takes Pretest (10-15 minutes)			
		Read Silently (30 minutes)	Watch ITA application on individual computers using headphones. (30 minutes)		
	T2	Class takes Posttest (20-25 minutes)			
Research Design Day 30-40 (20-25 minutes)	T3	Class takes Retention Test (20-25 minutes)			

7.4 Survey Instrument

A new survey, also called "General Health Survey"[22], was a semi-structured instrument developed to collect data on demographic characteristics and a range of outcome variables measuring knowledge of HIV transmission and prevention methods and attitudes around general acceptance of the virus and human condition.

7.4.1 HIV/AIDS Knowledge Measures

The knowledge section incorporated several questions from previously published measures. Some items were taken from Koopman & Reid (1998). Another set of items were taken from the Sudha, Vijay, & Lakshmi (2005) study, which combined and adapted items from the General Population Behavioral Surveillance Survey questionnaire and the Voluntary Counseling and Testing Center (VCTC) questionnaire. The Sudha, et al. questions were pretested and validated by the National AIDS Control Organization (NACO).

We conducted two kinds of reliability analysis—Cronbach's Alpha and Spearman-Brown Split-Half Coefficient—on the knowledge items in order to determine whether items were related to each other. Our measures consisted of a 40-item knowledge section (T1: Cronbach's Alpha = .80 and Split-Half Coefficient = .73; T2: Cronbach's Alpha = .92 and Split-Half Coefficient = .88; T3: Cronbach's Alpha = .88 and Split-Half Coefficient = .85) that was constructed to measure general knowledge around HIV transmission, prevention and treatment related issues. Each participant selected an answer of "Yes", "No", or "Not Sure". A correct answer was assigned "1" and a "0" was given to any responses that were "Not Sure",

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[22] Since the Indian stakeholders were comfortable with the title "General Health Survey", this title was given to both the Baseline Survey conducted in April 2006 as well as the eventual pretest, posttest, and retention tests conducted in September-October 2007.

incorrect or had a missing value, similar to other studies assessing such measures (Ananth & Koopman, 2003; Sudha et al., 2005). See Table 4 for a partial list of the questions included in the measure of knowledge (see Appendix P for complete list). All indices were highly reliable.

Table 4. Sample Items Measuring HIV/AIDS Knowledge

Selected Knowledge Items
1 Will a mother with HIV always pass the virus to her baby during childbirth?
2 Particular homeopathic medicines can cure HIV, if treated early?
3 Can you tell by looking at someone if he/she has HIV/AIDS?
4 If you are of a particular caste, are you more likely to get HIV?
5 Is there a cure for HIV/AIDS?

6 Can you get HIV from the following activities?
   a Touching a public toilet seat
   b Infected person sneezing on you
   c Breast milk (mother with HIV feeding baby)
   d Sharing plates, forks or glasses with someone with HIV/AIDS
   e Eating food prepared by HIV-infected person

7 Can you get HIV from the following body fluids?
   a Saliva (liquid in mouth)
   b Blood
   c Breast milk

Note: Respondents could answer "Yes", "No" or "Not Sure" to the following questions. *Correct answers*: 1. No; 2. No; 3. No; 4. No; 5. No; 6a. No; 6b. No; 6c. Yes; 6d. No; 6e. No; 7a. No; 7b. Yes; 7c. Yes.

7.4.2 HIV/AIDS Attitudinal Measures

The attitudes section incorporated several questions from previously published measures. Some items were taken from the Stereotypes About AIDS Scale (Snell, Finney & Godwin, 1998) and the Assessment of Knowledge and Beliefs About HIV/AIDS Among Adolescents (Koopman & Reid, 1998).

We conducted two kinds of reliability analysis–Cronbach's Alpha and Spearman-Brown Split-Half Coefficient–on the attitude items in order to determine whether the items were related to each other. Our measures consisted of a 17-item attitudes section (T1: Cronbach's Alpha = .69 and Split-Half Coefficient = .68; T2: Cronbach's Alpha = .74 and Split-Half Coefficient = .67; T3: Cronbach's Alpha = .72 and Split-Half Coefficient = .72) that was constructed to measure attitudes towards greater acceptance around issues of HIV/AIDS, including attitudes towards people living with the virus. Each participant could select an answer of "Agree", "Disagree", or "Unsure". The attitudinal questions measuring greater acceptance around HIV/AIDS related issues was recoded "1" for greater acceptance and a "0" was given to any responses that were "Not Sure" or represented a less positive attitude. See Table 5 for a partial list of the questions included in the measure of attitudes (see Appendix Q for complete list). All indices were highly reliable.

Table 5. Sample Items Measuring HIV/AIDS Attitudes

	Selected Attitudinal Items
1	People with HIV/AIDS should not be allowed to work/study in public schools.
2	I won't talk to or interact with anyone with HIV/AIDS.
3	I am comfortable going to school with someone with HIV/AIDS.
4	If I found out that someone I knew had AIDS, it would be hard for me to continue the relationship.
5	I am scared to have casual contact with someone who has HIV/AIDS.
6	People with HIV/AIDS should not be allowed to handle food in restaurants.
7	It's okay to be friends with someone who is HIV-positive.
8	People with HIV/AIDS deserve what they get.

Note: Respondents could answer "Agree", "Disagree" or "Unsure" to the following questions.

Positive HIV/AIDS answers: 1. Disagree; 2. Disagree; 3. Agree; 4. Disagree; 5. Disagree; 6. Disagree; 7. Agree; 8. Disagree.

The knowledge and attitudinal survey questions were modified using feedback from our baseline study (ran in April 2006) on similar students. The surveys were pretested on young Indian adults in college and administrators, at the participating institutions, and further adapted according to specific cultural nuances. All materials were provided in English, as this was the primarily language of instruction in the institutions.

The pretest, posttest and retention test contained similar questions regarding knowledge and attitudinal outcomes; however, the questions were provided in a scrambled order on each questionnaire. The knowledge

questions were used as a baseline to address general understanding about HIV transmission and prevention issues. The attitudinal measures were used to assess general acceptance and tolerance around HIV/AIDS related issues. The questions were limited to ensure that they did not sensitize the participants. Demographic measures were included at the end of the posttest, so as not to influence the answers of participants. The pretest, posttest and retention test were similar for all participants in both the control and intervention groups. However, the intervention groups answered additional questions concerning the ITA intervention: likability, emotional states and comfort levels.

The pretest, posttest and retention test all contained demographic data on gender, birth date, school, and class, which were combined to develop a unique identifier to match the surveys (T1, T2 and T3) together. Each unique identifier was then given a random number, which is what we used to identify each student.

7.4.3 HIV/AIDS Qualitative Measures

In addition to these outcome measures, several open-ended questions were included in the surveys. See Table 6 for a partial list of the qualitative questions included in the measures (the complete pretest, posttest and retention test assessments can be found in Appendix M, N and O).

Table 6. Sample HIV/AIDS Qualitative Measures

		QUALITATIVE QUESTIONS (PARTIAL LIST)
1	Pretest	What questions do you have about HIV/AIDS?
2	Posttest	Was it more comfortable learning about these sensitive subjects form an anonymous animated tutorial? Please explain your answer.
3	Posttest	What did you learn that you did not know before?
4	Posttest	Were you comfortable with the overall animated tutorial? Please tell us why.
5	Posttest	What remaining questions do you have?
6	Retention test	If you mentioned or discussed any information about this tutorial with anyone – what part did you discuss?
7	Retention test	What questions do you still have about HIV/AIDS?
8	Retention test	Is there anything you would like to share with us?

Although the qualitative questions were not analyzed in a systematic manner for this study, they were incorporated into the surveys for several reasons. First, these questions allow students the ability to share their thoughts in a less structured manner. Second, we wanted to draw on similarities between students to identify patterns. For instance, if there were concepts several students still had questions around, this may inform the design of the curriculum. Most importantly, given that we were not able to speak to the students one-on-one due to privacy related concerns, the qualitative questions allowed us to have a deeper, more meaningful understanding of the "why" type questions.

7.5 Study Measures

7.5.1 Demographic Variables

The demographic characteristics measured were student's age, gender, religion, male and female guardian's education level, female guardian's occupation, male guardian's occupation, and household composition (see

Table 7 below for details).

7.5.2 Outcome Variables

Dependent variables included measuring learning outcomes and changes in attitudes (over three time periods) and comfort levels and likability of the ITA application. Variables used in the regression models included the following:

Pretest_Knowledge is the student's pretest knowledge score at T1

Posttest_Knowledge is the student's posttest knowledge score at T2

Retention_Knowledge is the student's posttest knowledge score at T3

Pretest_Attitudes is the student's pretest attitudes score at T1

Posttest_Attitudes is the student's posttest attitudes score at T2

Retention_Attitudes is the student's posttest attitudes score at T3

Mention_Study measures whether the participant mentioned the study to someone at T3

Searched_More_Info, measures whether the participant searched for information using at least one source (did not search for more information = 0, did search for more information = 1) at T3.

7.5.3 Control Variables

Independent variables included various demographic measures as well as existing knowledge and attitudes, measured through pretest conditions. Variables used in the regression models included the following:

Experimental_Condition is a binary variable indicating which condition the participant was assigned (experimental = 1, control condition = 0)

Intervention1, Intervention2, and Intervention3 are dummy

variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. This is the expanded form of the *Experimental_Condition* variable. Thus, models contain one control variable or the other but not both.

Gender is the male or female gender variable (0 = female, 1 = male)

Age is the current age of the student participating in the study (centered around the sample mean of 17.59)

Mother_Education is the level of education the student's mother received (0 = incomplete college degree or less education or "other" category, 1 = completed college degree or more education)

Father_Education is the level of education the student's father received (0 = incomplete college degree or less education or "other" category, 1 = completed college degree or more education)

Pretest_Knowledge is the student pretest knowledge score at T1

Pretest_Attitudes is the student's pretest attitudes score at T1

8 Results

The data set was analyzed using SPSS 17.0. Descriptive statistics were computed for demographic variables, including age, gender, grade level, religion, mother's education level, father's education level, mother's occupation, father's occupation, household composition and various household items like air conditioner, washing machine, car, DVD player, personal mobile phone and availability of computer access (see Table 8).

Reliability of the pretest, posttest and retention test for the knowledge and attitudinal items were examined using both the Cronbach's Alpha and the Spearman-Brown Split-Half Coefficient measures. Causes of student gains in knowledge and changes in attitudes were determined using multiple regressions, with the significance level set at .05 (two-tailed). Effect size calculations are provided for each of the significant variables to measure practical significance of the effect of the independent variables on the dependent variables.

8.1 Demographic Profile of Students

Of the 386 participants in the study, 191 (49.5 percent) were male while 195 (50.5 percent) were female. Of the participants, 189 (48.9 percent) were from New Delhi, 106 (27.5 percent) from Haryana and 91 (23.6 percent) from Punjab. These were all states where sex education had not been explicitly banned; however, it was still considered a highly sensitive subject and many schools were using watered down versions of these life skills materials.

Figure 16. Map of India with Locations of Study

Among them, 317 (82.1 percent) identified themselves as Hindu, 28 (7.3 percent) were Sikh, 19 (4.9 percent) were Jain and 5 (1.3 percent) were Muslim. The religious composition of India according to the 2001 Census of India is Hindu (80.5 percent), Muslim (13.4 percent), Christians (2.3 percent), Sikhs (1.9 percent), Buddhists (0.8 percent), Jains (0.4 percent), other religions and persuasions (0.6 percent) and religion not stated (0.1 percent). Our sample contained many more Sikh students than the national composition since one of our schools was located in Punjab, where 80 percent of inhabitants are of the Sikh religion. A total of 98 (25.4

percent) were in 11th grade, 194 (50.3 percent) were in 12th grade and 94 (24.4 percent) were in college. The students' ages ranged from 14 to 24 with the average age being 17.59 (*SD*=2.23) years old.

Figure 17. Religious Breakdown of Study Participants
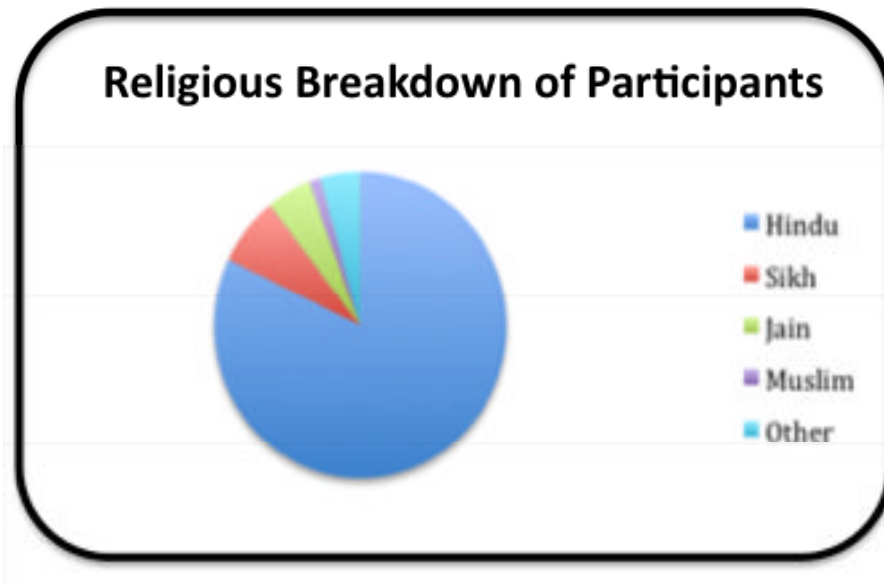
Table 7. Demographic Characteristics of Sample (*N*=386)

Demographic Characteristics of the Sample (*N* = 386)		
Demographic Characteristics	**Frequency**	**Percentage**
States where survey occurred		
New Delhi *(control)*	97	25.1%
New Delhi	92	23.8%
Haryana	106	27.5%
Punjab	91	23.6%
Age		
14-16	166	43.0%
17-19	126	32.6%
20-24	90	23.3%
Undisclosed	4	1.0%
Gender		
Female	195	50.5%
Male	191	49.5%
Grade Level		
11th Grade	98	25.4%
12th Grade	194	50.3%
College	94	24.4%
Religion		
Hindu	317	82.1%
Sikh	28	7.3%
Jain	19	4.9%
Muslim	5	1.3%
Other	17	4.4%

Demographic Characteristics of the Sample (*N* = 386) *continued*

Demographic Characteristics	Frequency	Percentage
Mother's Education Level (completed)		
Elementary School (1-8)	8	2.1%
High School (9-12)	33	8.5%
Incomplete College	17	4.4%
Three-year Bachelor's Degree	164	42.5%
Four-year Bachelor's Degree	33	8.5%
Master's Degree	94	24.4%
Doctoral Degree	14	3.6%
Other	23	6.0%
Father's Education Level (completed)		
Elementary School (1-8)	2	0.5%
High School (9-12)	28	7.3%
Incomplete College	7	1.8%
Three-year Bachelor's Degree	118	30.6%
Four-year Bachelor's Degree	49	12.7%
Master's Degree	124	32.1%
Doctoral Degree	24	6.2%
Other	34	8.8%
Mother's Occupation		
Full-time Homemaker	177	45.9%
Government Services	32	8.3%
Academics	30	7.8%
Human Resources	11	2.8%
Medical	10	2.6%
Financial Services	7	1.8%
Other	119	30.8%
Father's Occupation		
Self-employed	99	25.6%
Government Services	51	13.2%
Engineering	48	12.4%
Sales/Marketing	45	11.7%
Top Management	18	4.7%
Property/Construction	17	4.4%
Financial Services	16	4.1%
Technical	11	2.8%
Medical	10	2.6%
Computers/IT	10	2.6%
Other	61	15.8%
Household Composition		
1-4 people	218	56.5%
5-9 people	149	38.6%
10 or more people	17	4.4%
Undisclosed	2	0.5%

Table 8. Participant Household Items (*N*=386)

	Air Conditioner		Washing Machine		Car		Personal Mobile		Computer Access	
Household Items (*N* = 386)										
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Yes	297	76.9%	352	91.2%	316	81.9%	##	77.7%	321	83.2%
No	82	21.2%	27	7.0%	62	16.1%	86	22.3%	30	7.8%
Sometimes									34	8.8%
Undisclosed	7	1.8%	7	1.8%	8	2.1%			1	0.3%

8.2 Knowledge Outcomes

8.2.1 Baseline Comparison of Knowledge Effects of the Intervention

On the 40-point knowledge pretest at T1, experimental participants scored an average of 28.30 (*SD*=5.02), while control participants scored 27.49 (*SD*=4.90). Specifically, New Delhi participants averaged a score of 27.69 (*SD*=5.10); Haryana participants, 28.46 (*SD*=5.36), and Punjab participants, 28.73 (*SD*=4.51).

Figure 18. Participant Pretest Knowledge Scores
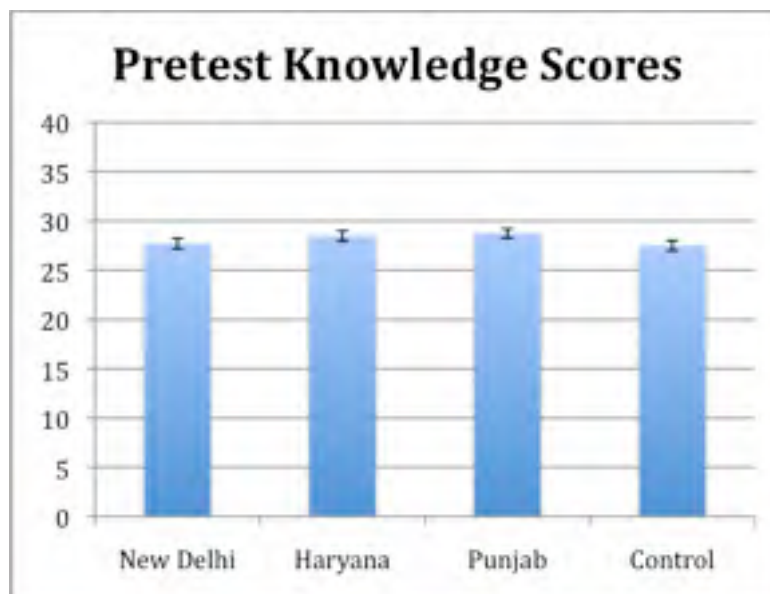
Regression Model 1a:

> **Pretest_Knowledge = β_0 + β_1Experimental_Condition(0/1)**

The dependent variable, *Pretest_Knowledge*, is the student's pretest knowledge score at T1 (40-items). *Experimental_Condition* is a binary variable indicating which condition the participant was assigned (experimental = 1, control condition = 0).

Table 9. Predictors of Pretest Knowledge: Regression Model 1a

	Predictors of Pretest Knowledge						
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	27.489	0.507		54.213	0.001	26.492	28.486
Experimental_Condition	0.811	0.586	0.07	1.383	0.167	-0.342	1.963
R^2 = 0.005; p<0.05							

A simple linear regression found no significant differences ($t(384)=1.38$, $p>.17$) between the points scored by the experimental and control conditions on the pretest. Thus, at onset, participants in the experimental and control conditions did not have significantly different knowledge of HIV/AIDS. Similarly, a regression model analyzing the various institutes independently, found no significant difference between the four institutes.

Regression Model 1b:

> **Pretest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3**

The dependent variable, *Pretest_Knowledge*, is the student's pretest knowledge score at T1. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category.

Table 10. Predictors of Posttest Knowledge: Regression Model 1b

	Predictors of Pretest Knowledge						
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	27.489	0.507		54.224	0.001	26.493	28.486
Intervention1 (New Delhi)	0.199	0.727	0.017	0.274	0.785	-1.23	1.627
Intervention2 (Haryana)	0.975	0.702	0.087	1.39	0.165	-0.404	2.355
Intervention3 (Punjab)	1.237	0.729	0.105	1.698	0.090	-0.196	2.67
$R^2 = 0.011$; $p<0.05$							

We found that the pretest scores between the New Delhi institute ($t(382)=0.27$, $p>.79$), Haryana ($t(382)=1.39$, $p>.17$), and Punjab institute ($t(382)=1.70$, $p>.09$) were not significant. Consistent with our presumption, the null hypothesis stating that there would be no difference between the four institutes, is not rejected.

In order to examine possible variables influencing pretest knowledge, the next regression model controls for gender, mother's education and father's education. Again, there are no significant differences between the institutes.

Regression Model 1c:

>**Pretest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Gender + β_5Mother_Education + β_6Father_Education**
>
>The dependent variable, *Pretest_Knowledge*, is the student's pretest knowledge score at T1. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father

97

received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 11. Predictors of Pretest Knowledge: Regression Model 1c

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	25.342	0.953		26.579	0.001	23.467	27.217
Intervention1 (New Delhi)	0.176	0.722	0.015	0.243	0.808	-1.243	1.594
Intervention2 (Haryana)	1.367	0.705	0.122	1.94	0.053	-0.019	2.753
Intervention3 (Punjab)	1.709	0.773	0.145	2.21	0.028	0.189	3.229
Gender	1.541	0.517	0.154	2.978	0.003	0.524	2.559
Mother_Education	1.351	0.722	0.11	1.87	0.062	-0.07	2.771
Father_Education	0.127	0.776	0.01	0.164	0.870	-1.398	1.652

$R^2 = 0.042$; $p<0.05$

Pretest scores between the New Delhi institute ($t(379)=0.24$, $p>.81$) and Haryana ($t(379)=1.94$, $p>.53$) were not significant, when controlling for the school dummy variables, gender, mother's education and father's education. Scores for the Punjab institute ($t(379)=2.21$, $p<.05$), significantly differed from one of the other experimental groups; however, when comparing each of the states individually to the control group in the pretest condition, controlling for the other variables, none of the differences were significant. Consistent with our presumption, the null hypothesis stating that there would be no difference between the experimental institutes and the control institutes, was not rejected. Furthermore, parental education was not a significant predictor of pretest knowledge. Secondary analysis revealed that age was multicollinear with the *Intervention3* (because these students were college students so age was excluded) variables and was therefore removed as a control variable.

Another critical question was whether there was a gender difference in knowledge and learning of HIV/AIDS materials. Literature in this area shows that males, on average, tend to know more about HIV/AIDS than

females (Agarwal et al. 1999; Pramanik et al., 2006; Sudha et al., 2005). Our findings were consistent with the literature. There was indeed a significant difference between males (M=28.73, SD=4.90) and females (M=27.48, SD=5.04) in our subject pool, with males having greater knowledge of HIV/AIDS at the pretest level. Using the same regression model above, this gender difference was significant (t(379)=2.98, p<.01), controlling for the intervention dummy variables, gender and parental education. It is, therefore, concluded that there is a difference in pretest scores between the two gender groups, with males performing better.

Figure 19. Female vs. Male Pretest Knowledge Scores
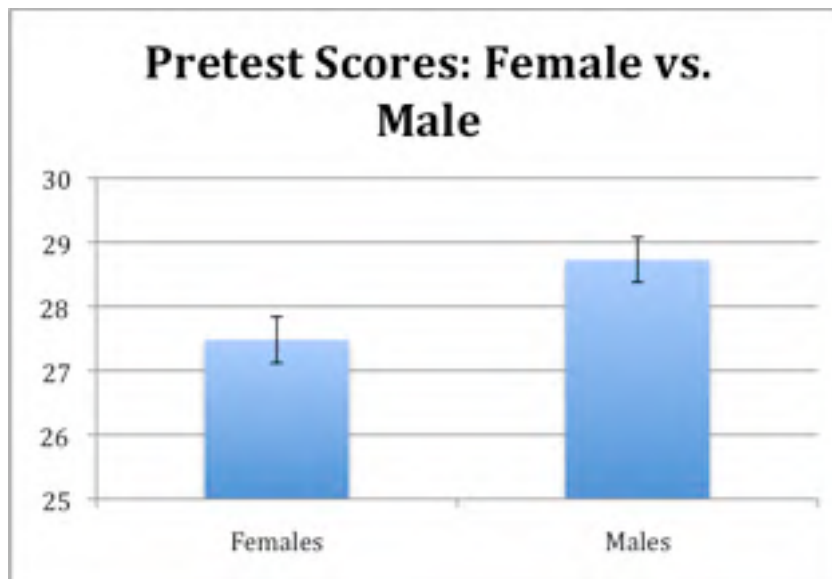
8.2.2 Short-Term Learning Effects

On the 40-point posttest at T2, experimental participants scored an average of 36.54 (SD=2.63), while control group participants scored 28.29 (SD=5.63); a difference of 8.25 points. Specifically, the mean score for New Delhi participants was 36.49 (SD=2.65); Haryana participants, 36.78 (SD=2.85); and Punjab participants, 36.29 (SD=2.35). The effect size *Cohen's d* for the difference between the pooled intervention groups and

control group was 1.88 (effect size of 0.2 = small; 0.5 = medium, 0.8 or higher is considered large; Cohen, 1988).

Figure 20. Participant Posttest Knowledge Scores
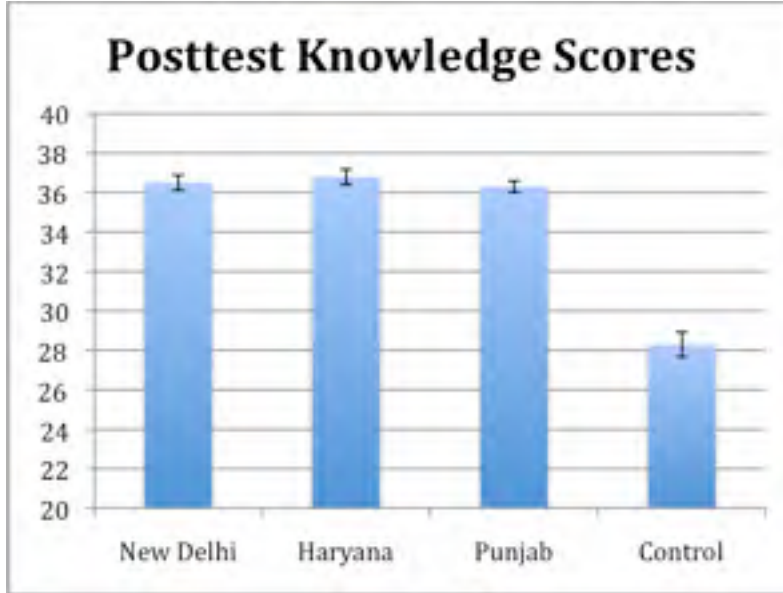
The first regression model used to calculate short-term learning effects of the intervention, which controls for pretest knowledge, was the following:

Regression Model 2a:

> **Posttest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Knowledge**
>
> The dependent variable, *Posttest_Knowledge*, is the student's posttest knowledge score at T2. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate knowledge gain, controlling for prior knowledge, we used the T1 knowledge score, *Pretest_Knowledge*, as a control.

Table 12. Predictors of Posttest Knowledge: Regression Model 2a

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Predictors of Posttest Knowledge							
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	16.999	0.897		18.961	0.001	15.236	18.762
Intervention1 (New Delhi)	8.122	0.436	0.681	18.638	0.001	7.265	8.978
Intervention2 (Haryana)	8.094	0.422	0.711	19.192	0.001	7.265	8.923
Intervention3 (Punjab)	7.493	0.439	0.626	17.083	0.001	6.63	8.355
Pretest Knowledge	0.411	0.031	0.404	13.388	0.001	0.35	0.471
R^2 = 0.66; p<0.05							

Participants that received the intervention performed significantly higher on the posttest (New Delhi: $t(381)=18.64$, $p<.001$; Haryana: $t(381)=19.19$, $p<.001$; Punjab: $t(381)=17.08$, $p<.001$) as compared to the participants in the control group, even after controlling for pretest knowledge. As expected, pretest knowledge ($t(381)=13.39$, $p<.001$) was a significant predictor of posttest knowledge. The null hypothesis that there would be no difference in short-term learning effects of the intervention between the experimental and control groups, was rejected.

In order to examine possible variables influencing short-term learning effects, the next regression model controls for gender, parental education and pretest knowledge. Here, too, there were significant differences between the experimental and control conditions.

Regression Model 2b:

Posttest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Knowledge + β_5Gender + β_6Mother_Education + β_7Father_Education

The dependent variable, *Posttest_Knowledge*, is the student's posttest knowledge score at T2. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the

reference category. To evaluate knowledge gain, controlling for prior knowledge, we used the T1 knowledge score, *Pretest_Knowledge*, as a control. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

**Table 13. Predictors of Posttest Knowledge: Regression Model 2b**

	Predictors of Posttest Knowledge						
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	16.036	0.964		16.627	0.001	14.14	17.933
Intervention1 (New Delhi)	8.151	0.431	0.683	18.899	0.001	7.303	8.999
Intervention2 (Haryana)	8.03	0.423	0.705	18.965	0.001	7.197	8.862
Intervention3 (Punjab)	7.966	0.465	0.665	17.126	0.001	7.052	8.881
Pretest Knowledge	0.407	0.031	0.4	13.256	0.001	0.347	0.467
Gender	-0.425	0.313	-0.042	-1.358	0.175	-1.04	0.19
Mother_Education	1.202	0.434	0.096	2.771	0.006	0.349	2.055
Father_Education	0.278	0.464	0.021	0.6	0.549	-0.633	1.19

R^2 = 0.67; $p<0.05$

The primary research question concerned with whether an HIV/AIDS curriculum designed to be both socially-acceptable and accurate could result in significant gains in knowledge among youth in our study. As expected, pretest knowledge ($t(378)=13.26$, $p<.001$) was again a significant predictor of posttest knowledge. Supporting the central hypothesis of this research thesis, the groups that received the intervention scored significantly higher on posttest knowledge (New Delhi: $t(378)=18.90$, $p<.001$; Haryana: $t(378)=18.97$, $p<.001$; Punjab: $t(378)=17.13$, $p<.001$), compared to the control group, even after controlling for pretest knowledge, gender and parental education. The null hypothesis that there would be no difference in short-term learning effects of the intervention between the experimental and control groups, was rejected. It is, therefore,

concluded that there is a significant difference in knowledge scores between the two groups. Overall, participants exposed to the ITA curriculum scored significantly higher than the participants who were not exposed to the intervention. Mother's education was significant ($t(378)=2.77$, $p<.01$). There were no significant effects of gender or father's education.

We predicted that females would show greater knowledge gains on the posttest, given that literature shows they have significantly less knowledge about HIV/AIDS relative to their male counterparts. Unlike the pretest scores, females ($M=34.73$, $SD=4.97$) scored higher than their male counterparts ($M=34.19$, $SD=5.21$) on the posttest. However, this difference was not statistically significant ($t(378)=1.36$, $p>.18$), controlling for the other variables. The null hypothesis, which stated that there would be no difference in gender-based retention effects of the intervention was not rejected. Females and males in the experimental group performed about the same after initial exposure to the ITA curriculum.

Figure 21. Female vs. Male Posttest Knowledge Scores
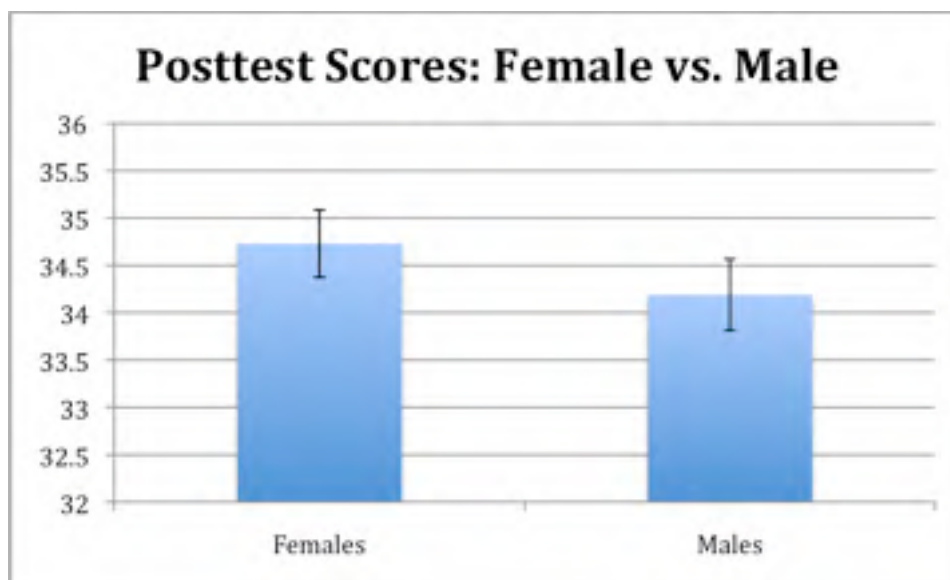
8.2.3 Long-Term Learning Effects

On the 40-point retention test at T3, experimental participants scored an average of 35.14 (*SD*=3.53), while control participants scored 28.11 (*SD*=6.14); a difference of 7.03 points. Specifically, the mean score for New Delhi participants was 34.71 (*SD*=3.71); Haryana participants, 35.45 (*SD*=3.93); and Punjab participants 35.22 (*SD*=2.76). The effect size *Cohen's d* for the difference between the pooled intervention groups and control group was 1.40.

Figure 22. Participant Retention Test Knowledge Scores
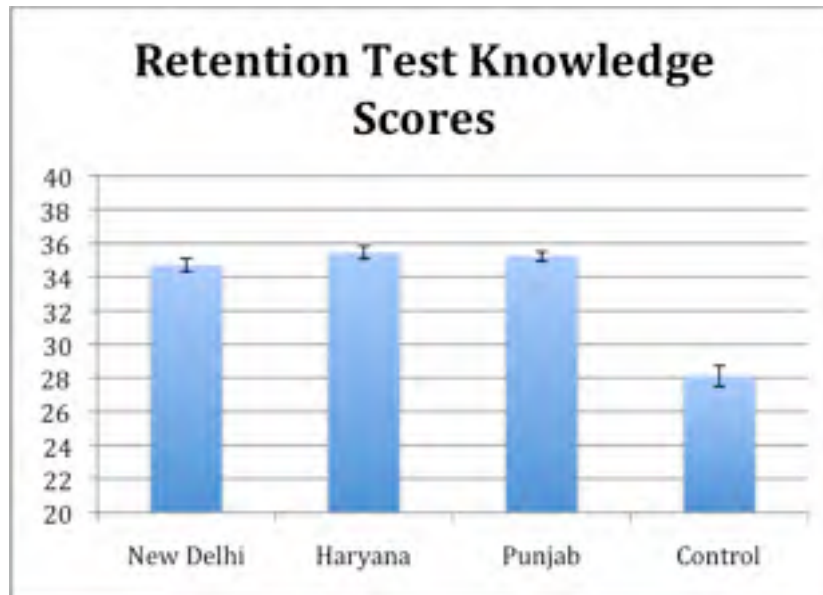
The first regression model used to calculate long-term learning effects of the intervention, controlling for pretest knowledge, was the following:

Regression Model 3a:

> **RetentionTest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Knowledge**
>
> The dependent variable, *RetentionTest_Knowledge*, is the student's long-term knowledge score at T3. *Intervention1, Intervention2, and*

Intervention3 are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate knowledge gain, controlling for prior knowledge, we used the T1 knowledge score, *Pretest_Knowledge*, as a control.

Table 14. Predictors of Retention Test Knowledge: Regression Model 3a

Predictors of Retention Test Knowledge							
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	16.181	1.126		14.371	0.001	13.967	18.395
Intervention1 (New Delhi)	6.509	0.547	0.524	11.893	0.001	5.433	7.585
Intervention2 (Haryana)	6.917	0.53	0.584	13.058	0.001	5.875	7.958
Intervention3 (Punjab)	6.574	0.551	0.528	11.935	0.001	5.491	7.657
Pretest Knowledge	0.434	0.039	0.41	11.264	0.001	0.358	0.51
R^2 = 0.50; p<0.05							

The groups that received the intervention retained significantly higher knowledge at T3 (New Delhi: $t(381)=11.89$, $p<.001$; Haryana: $t(381)=13.06$, $p<.001$; Punjab: $t(381)=11.94$, $p<.001$), compared to the control group, even after controlling for pretest knowledge. As expected, pretest knowledge ($t(381)=11.26$, $p<.001$) was a significant predictor of retention knowledge. The null hypothesis that there would be no difference in long-term learning effects of the intervention between the experimental and control groups, was rejected.

In order to examine possible variables influencing long-term learning effects, the next regression model controls for gender, parental education and pretest knowledge. Here, too, we find significant differences between the experimental and control conditions.

The retention effects of the intervention were calculated using the following regression equation:

Regression Model 3b:

> **RetentionTest_Knowledge = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Knowledge + β_5Gender + β_6Mother_Education + β_7Father_Education**

The dependent variable, *RetentionTest_Knowledge*, is the student's long-term knowledge score at T3. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate knowledge gain, controlling for prior knowledge, we used the T1 knowledge score, *Pretest_Knowledge*, as a control. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 15. Predictors of Retention Test Knowledge: Regression 3b

Predictors of Retention Test Knowledge							
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	15.861	1.225		12.947	0.001	13.452	18.27
Intervention1 (New Delhi)	6.516	0.548	0.525	11.894	0.001	5.439	7.593
Intervention2 (Haryana)	6.753	0.538	0.57	12.557	0.001	5.695	7.81
Intervention3 (Punjab)	6.769	0.591	0.543	11.457	0.001	5.607	7.931
Pretest Knowledge	0.439	0.039	0.414	11.253	0.001	0.362	0.516
Gender	-0.72	0.397	-0.068	-1.812	0.071	-1.502	0.061
Mother_Education	0.72	0.551	0.055	1.307	0.192	-0.363	1.804
Father_Education	-0.037	0.589	-0.003	-0.063	0.950	-1.195	1.121
R^2 = 0.51; p<0.05							

Using a retention test, given approximately one month after initial exposure, long-term learning effects were observed for the ITA curriculum. As expected, pretest knowledge ($t(378)=11.25$, $p<.001$) remained a significant predictor of retention knowledge. Supporting the central

hypothesis of this research thesis, the groups that received the intervention all performed significantly higher on retention knowledge test (New Delhi: $t(378)=11.89$, $p<.001$; Haryana: $t(378)=12.56$, $p<.001$; Punjab: $t(378)=11.46$, $p<.001$), compared to the control group, which did not receive the intervention, even after controlling for pretest knowledge, gender and parental education. The null hypothesis that there would be no difference in long-term learning effects of the intervention between the experimental and control groups, was rejected.

Therefore, exposure to the ITA curriculum produced significant increases in long-term knowledge. Those participants, who were exposed to the ITA curriculum, retained significantly higher levels of HIV/AIDS-related knowledge than the participants who were not exposed to the intervention. There were no significant effects for mother's or father's education.

Similar to the posttest results, average scores for females (M=33.71, SD=4.99) were higher than their male counterparts (M=33.04, SD=5.58). However, this difference was not statistically significant ($t(378)=1.81$, $p>.07$), controlling for the other variables. The null hypothesis, which stated that there would be no difference in gender-based retention effects of the intervention was not rejected. Gender did not mediate degree of long-term knowledge for participants in the experimental condition.

Figure 23. Female vs. Male Retention Test Knowledge Scores

8.3 Attitudinal Outcomes

8.3.1 Baseline Comparison of Attitudinal Effects

On the 17-item attitudes section at T1, experimental participants scored an average of 13.77 (*SD*=2.6), while control participants scored 13.36 (*SD*=2.83). Specifically, New Delhi participants averaged a score of 13.77 (*SD*=2.71); Haryana participants, 13.58 (*SD*=2.7), and Punjab participants, 13.99 (*SD*=2.35).

Figure 24. Participant Pretest Attitudinal Scores
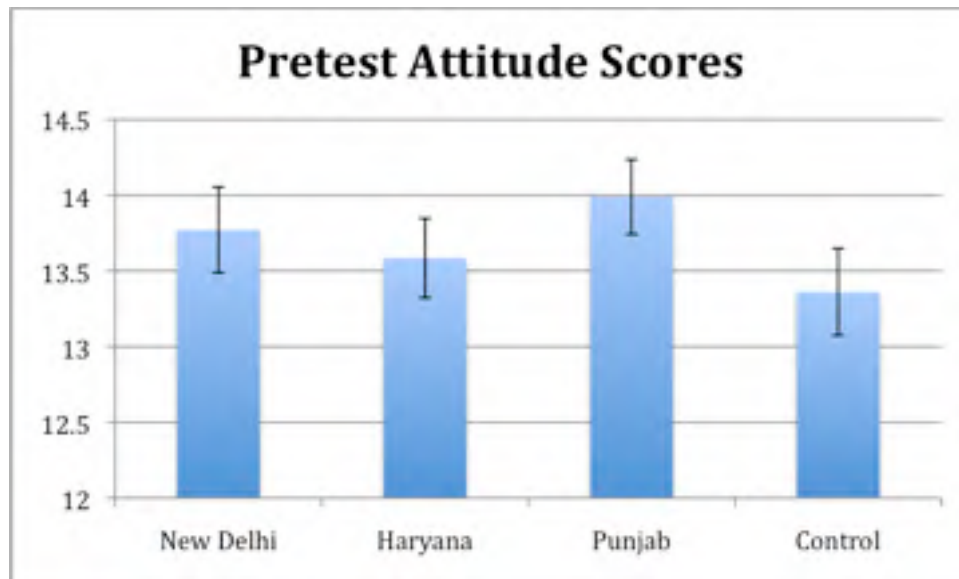
Regression Model 4a:

$$\text{Pretest\_Attitudes} = \beta_0 + \beta_1 \text{Experimental\_Condition(0/1)}$$

The dependent variable, *Pretest_Attitudes*, is the student's pretest attitudes score at T1. Experimental_Condition is a binary variable indicating which condition the participant was assigned (experimental = 1, control condition = 0).

Table 16. Predictors of Pretest Attitudes: Regression Model 4a

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	13.361	0.27		49.467	0.001	12.83	13.892
Experimental_Condition	0.41	0.312	0.067	1.315	0.189	-0.203	1.024

$R^2 = 0.004$; $p<0.05$

A simple linear regression found no significant differences ($t(384)=1.32$, $p>.19$) between the attitude scores of the experimental and control conditions on the pretest at T1, indicating that the participants in the experimental and control conditions did not have significantly different attitudes around HIV/AIDS.

Another regression model examined the various institutes independently, found no significant difference between the attitudes of the four institutes.

Regression Model 4b:

Pretest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3

The dependent variable, *Pretest_Attitudes*, is the student attitude score at T1. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category.

Table 17. Predictors of Pretest Attitudes: Regression Model 4b

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	13.361	0.27		49.411	0.001	12.829	13.892
Intervention1 (New Delhi)	0.41	0.388	0.066	1.057	0.291	-0.352	1.172
Intervention2 (Haryana)	0.224	0.374	0.038	0.599	0.550	-0.512	0.96
Intervention3 (Punjab)	0.628	0.389	0.1	1.616	0.107	-0.136	1.392

$R^2 = 0.007; p<0.05$

Pretest attitude scores between the New Delhi institute ($t(382)=1.06$, $p>.29$), Haryana ($t(382)=.60$, $p>.55$), and Punjab institute ($t(382)=1.62$, $p>.11$) were not significant. Consistent with our presumption, the null hypothesis stating that there would be no difference between attitude scores at the four institutes, is not rejected.

In order to examine possible variables influencing pretest attitudes, the next regression model controls for gender, mother's education and father's education. Again, there were no significant differences between institutes.

Regression Model 4c:

> **Pretest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Gender + β_5Mother_Education + β_6Father_Education**

> The dependent variable, *Pretest_Attitudes*, is the student pretest attitudes score at T1. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1= completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 18. Predictors of Pretest Attitudes: Regression Model 4c

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Predictors of Pretest Attitudes							
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	13.045	0.516		25.266	0.001	12.03	14.06
Intervention1 (New Delhi)	0.42	0.391	0.067	1.075	0.283	-0.348	1.188
Intervention2 (Haryana)	0.27	0.382	0.045	0.708	0.480	-0.48	1.021
Intervention3 (Punjab)	0.716	0.419	0.114	1.71	0.088	-0.107	1.539
Gender	0.161	0.28	0.03	0.576	0.565	-0.39	0.712
Mother_Education	0.097	0.391	0.015	0.249	0.804	-0.672	0.866
Father_Education	0.151	0.42	0.022	0.36	0.719	-0.675	0.977

$R^2 = 0.009; p<0.05$

Pretest attitude scores between the New Delhi institute ($t(379)=1.08$, $p>.28$), Haryana ($t(379)=0.71$, $p>.48$) and the Punjab institute ($t(379)=1.71$, $p>.09$) were not significant, controlling for the school dummy variables, gender, mother's education and father's education. Consistent with our presumption, the null hypothesis that there would be no attitude differences between the four institutes, is not rejected. Gender and parental education were not significant predictors of pretest attitudes.

8.3.2 Short-Term Attitudinal Effects

On the 17-item attitudes section at T2, experimental participants scored an average of 14.84 ($SD=2.22$), while control participants scored 13.60 ($SD=2.63$). Specifically, New Delhi participants, 14.86 ($SD=1.99$); Haryana participants, 14.66 ($SD=2.52$); and Punjab participants, 15.02 ($SD=2.07$). The effect size *Cohen's d* for the difference between the pooled intervention groups and control group was 0.51.

Figure 25. Participant Posttest Attitudinal Scores
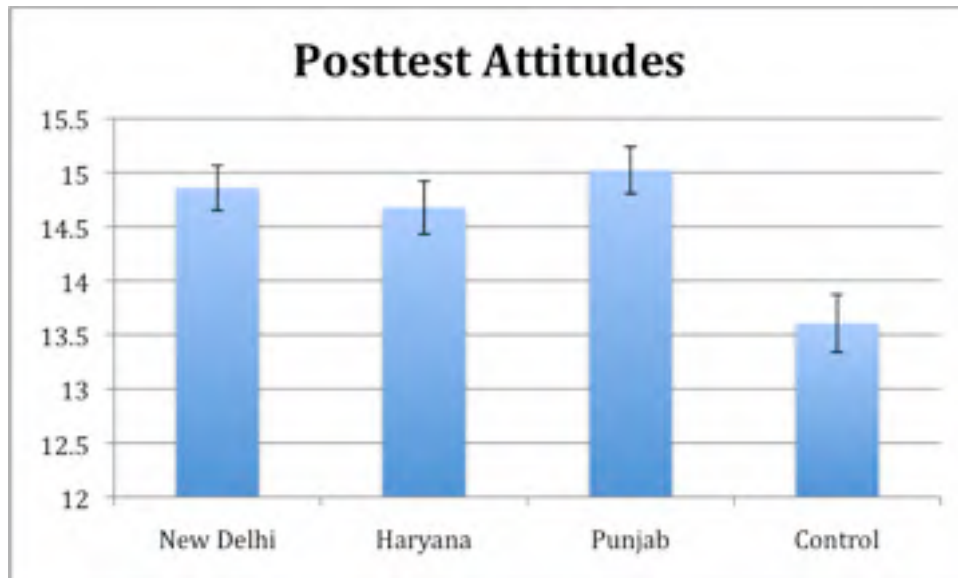
Using a regression model, controlling for pretest attitude scores, there were significant differences between the experimental and control conditions.

The first regression model used to calculated short-term attitudinal effects of the intervention as follows:

Regression Model 5a:

> **Posttest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Attitudes**
>
> The dependent variable, *Posttest_Attitudes*, is the student's posttest attitudes score at T2. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate the gain in attitudes, controlling for prior attitude, we included the T1 attitude score, *Pretest_Attitudes*, as a control.

113

Table 19. Predictors of Short-term Attitudes: Regression Model 5a

Predictors of Short-term Attitudes							
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	6.511	0.512		12.715	0.001	5.504	7.518
Intervention1 (New Delhi)	1.033	0.27	0.185	3.821	0.001	0.501	1.565
Intervention2 (Haryana)	0.95	0.261	0.178	3.644	0.001	0.438	1.463
Intervention3 (Punjab)	1.082	0.272	0.193	3.982	0.001	0.548	1.616
Pretest Attitudes	0.531	0.036	0.593	14.902	0.001	0.461	0.601
$R^2 = 0.40$; $p < 0.05$							

As expected, pretest attitudes were ($t(381)=14.90$, $p<.001$) significantly predicted of posttest attitudes. Groups that received the intervention expressed significantly more positive attitudes on the posttest (New Delhi: $t(381)=3.82$, $p<.001$; Haryana: $t(381)=3.64$, $p<.001$; Punjab: $t(381)=3.98$, $p<.001$), compared to the control group, even after controlling for pretest attitudes. The null hypothesis that there would be no difference in short-term changes in attitudes from the intervention between the experimental and control groups, was rejected.

In order to examine possible variables influencing short-term attitudinal effects, the next regression model controls for gender, parental education and pretest attitudes. Here, too, there are significant differences between the experimental and control conditions.

Regression Model 5b:

> **Posttest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Attitudes + β_5Gender + β_6Mother_Education + β_7Father_Education**

> The dependent variable, *Posttest_Attitudes*, is the student's posttest attitudes score at T2. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute)

was omitted from the model as a dummy variable and used as the reference category. To evaluate the gain in attitudes, controlling for prior attitude, we included the T1 attitude score, *Pretest_Attitudes*, as a control. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 20. Predictors of Short-term Attitudes: Regression 5b

	Predictors of Short-term Attitudes						
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	6.48	0.589		10.996	0.001	5.322	7.639
Intervention1 (New Delhi)	1.048	0.273	0.187	3.845	0.001	0.512	1.584
Intervention2 (Haryana)	0.934	0.266	0.175	3.511	0.001	0.411	1.457
Intervention3 (Punjab)	1.115	0.293	0.199	3.809	0.001	0.54	1.691
Pretest Attitudes	0.531	0.036	0.593	14.846	0.001	0.461	0.602
Gender	-0.089	0.195	-0.019	-0.457	0.648	-0.473	0.295
Mother_Education	-0.071	0.273	-0.012	-0.259	0.796	-0.607	0.465
Father_Education	0.148	0.293	0.024	0.507	0.613	-0.427	0.724

$R^2 = 0.40$; $p<0.05$

A primary research question was whether a curriculum that taught HIV/AIDS prevention issues without explicitly discussing sexual practices, would promote changes in attitudes for participants in our study. As expected, pretest attitudes (t(378)=14.85, $p<.001$) remained a significant predictor of posttest attitudes. Supporting the central hypothesis of this research groups that received the intervention all had significantly more positive attitudes on posttest at T2 (New Delhi: t(378)=3.85, $p<.001$; Haryana: t(378)=3.51, $p<.001$; Punjab: t(378)=3.81, $p<.001$), compared to the control group, even after controlling for pretest attitudes, gender and parental education. The null hypothesis that there would be no difference in short-term attitudinal effects of the intervention between the

experimental and control groups, was rejected. It is, therefore, concluded that there was a difference in attitude scores between the two groups.

Those participants who were exposed to the ITA curriculum scored significantly higher short-term attitudinal scores, meaning they were more accepting of issues around HIV/AIDS, than the participants who were not exposed to the intervention. There were no significant effects of gender or parental education.

8.3.3 Long-Term Attitudinal Effects

On the 17-item attitudes test at T3, experimental participants scored an average of 14.72 (*SD*=2.49), while control participants scored 13.53 (*SD*=2.89). Specifically, New Delhi participants, 14.46 (*SD*=2.74); Haryana participants, 14.43(*SD*=2.58); and Punjab participants 15.33 (*SD*=1.99). The effect size *Cohen's d* for the difference between the pooled intervention groups and control group was 0.44.

Figure 26. Participant Retention Test Knowledge Scores
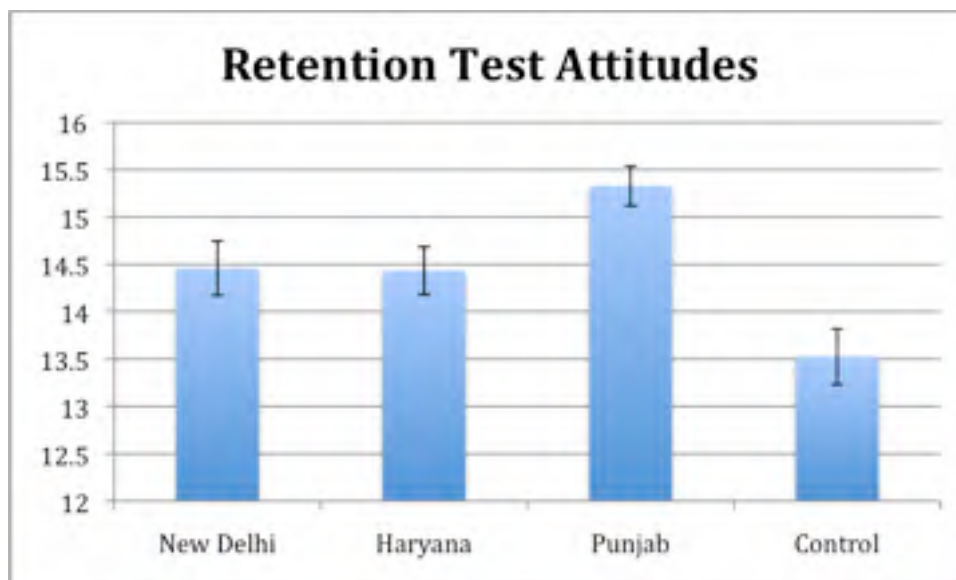
A regression model that controlled for pretest attitudinal scores indicated significant differences between experimental and control conditions.

The first regression model used to calculate short-term attitudinal effects of the intervention was the following:

Regression Model 6a:

RetentionTest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Attitudes

The dependent variable, *RetentionTest_Attitudes*, is the student's log-term attitudes score at T3. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate the gain in attitudes, controlling for prior attitude, we included the T1 attitude score, *Pretest_Attitudes*, as a control.

Table 21. Predictors of Long-term Attitudes: Regression Model 6a

Predictors of Long-term Attitudes							
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	7.92	0.643		12.316	0.001	6.656	9.185
Intervention1 (New Delhi)	0.761	0.34	0.123	2.24	0.026	0.093	1.428
Intervention2 (Haryana)	0.813	0.328	0.137	2.482	0.013	0.169	1.457
Intervention3 (Punjab)	1.539	0.341	0.247	4.511	0.001	0.868	2.21
Pretest Attitudes	0.42	0.045	0.422	9.375	0.001	0.332	0.508
R^2 = 0.23; p<0.05							

As expected, pretest attitudes ($t(381)=9.38$, $p<.001$) significantly predicted participants' long-term attitudes. Groups that received the intervention all demonstrated significantly more positive attitudes around HIV/AIDS related issues on the retention test (New Delhi: $t(381)=2.24$, $p<.05$; Haryana: $t(381)=2.48$, $p<.05$; Punjab: $t(381)=4.51$, $p<.001$) compared to the control group, even after controlling for pretest knowledge. The null

hypothesis that there would be no difference in long-term changes of attitudes from the intervention between the experimental and control groups, was rejected.

In order to examine possible variables influencing long-term attitudinal effects, the next regression model controls for gender and parental education. There were significant differences between the experimental and control conditions.

The long-term attitudinal effects of the intervention were calculated using the following regression equation:

Regression Model 6b:

> **RetentionTest_Attitudes = β_0 + β_1Intervention1 + β_2Intervention2 + β_3Intervention3 + β_4Pretest_Attitudes + β_5Gender + β_6Mother_Education + β_7Father_Education**
>
> The dependent variable, *RetentionTest_Attitudes*, is the student's long-term attitudes score at T3. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. To evaluate the gain in attitudes, controlling for prior attitude, we included the T1 attitude score, *Pretest_Attitudes*, as a control. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 22. Predictors of Long-term Attitudes: Regression Model 6b

	Predictors of Long-term Attitudes						
	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	8.102	0.735		11.029	0.001	6.658	9.546
Intervention1 (New Delhi)	0.725	0.34	0.117	2.134	0.033	0.057	1.393
Intervention2 (Haryana)	0.701	0.332	0.118	2.113	0.035	0.049	1.353
Intervention3 (Punjab)	1.524	0.365	0.245	4.176	0.001	0.806	2.242
Pretest Attitudes	0.422	0.045	0.424	9.454	0.001	0.334	0.509
Gender	-0.43	0.243	-0.081	-1.767	0.078	-0.909	0.049
Mother_Education	0.526	0.34	0.081	1.548	0.123	-0.142	1.194
Father_Education	-0.453	0.365	-0.066	-1.243	0.215	-1.171	0.264

$R^2 = 0.25$; $p<0.05$

Using a retention test, given approximately one month after initial exposure, long-term changes in attitudes were observed for participants exposed to the ITA curriculum. As expected, pretest attitudes ($t(378)=9.45$, $p<.001$) remained a significant predictor of long-term attitudes. Supporting the central hypothesis of this research, the groups that received the intervention had significantly more positive attitudes at T3 (New Delhi: $t(378)=2.13$, $p<.05$; Haryana: $t(378)=2.11$, $p<.05$; Punjab: $t(378)=4.18$, $p<.001$), compared to the control group, even after controlling for pretest attitudes, gender and parental education. The null hypothesis, which stated that there would be no difference in long-term attitudes of the intervention between the experimental and control groups, was rejected. It is, therefore, concluded that there is a significant difference in attitude scores between the experimental and control groups. Those participants, who were exposed to the ITA curriculum, had significantly more positive attitudes around HIV/AIDS than the participants who were not exposed to the intervention. There were no significant effects of gender or parental education.

8.4 Comfort Levels

8.4.1 Overall Comfort

Another central research question was around whether participants felt comfortable interacting and learning prevention education using this curriculum, given that discussing HIV/AIDS is considered a highly taboo subject in India. To test this question we gauged whether a significant proportion of the target group would feel comfortable interacting and learning from this curriculum.

The results showed that, of the 289 students that interacted with the animated tutorial in the experimental condition, 98.6 percent said they were comfortable, 1 percent said they were not comfortable and 0.3 percent said he/she was not sure of their comfort level (see Appendix R).

Table 23. Comfort Levels Associated with Animated Tutorial

Were you comfortable with the overall animated tutorial?			
Result	Frequency	Percent	Cumulative Percent
Yes	285	98.6	98.6
No	3	1	99.7
Not Sure	1	0.3	100
Total	289	100	

Figure 27. Overall Comfort Levels Associated with Animated Tutorial

Of the 289 students in the experimental group, 206 (71 percent) answered the question in more detail on the survey. Below are selected quotes from the students:

> *"It was more comfortable to have an interactive learning through an animation series rather than [through] a live person even doctor"*

> *"[I]…feel very comfortable with this animated tutorial because it is mixture of knowledge, good [content], suitable graphics, clear sound and [the] language is very easy to understand."*

> *"…because [we're] shy when we talk about sexual part[s]. [B]ut in this case first of all it is a animation and second, [I'm] it watching alone so [I] feel much comfortable [than] other methods."*

8.4.2 Emotion States

In addition to simply asking the participants how comfortable they were with the tutorial, the survey included questions about other emotion states to better understand what the students were feeling while learning about

this highly sensitive subject through the anonymous interactive tutorial.

Immediately after the experiment at T2, all 289 participants in the experimental condition were asked to answer more questions on the survey regarding how they were feeling while interacting with the animated tutorial. They were able to answer 'yes', 'no' or 'not sure' to each of the emotion states. On the survey, the emotion states were in random order; however, for simplicity and ease of readability, they had been sorted into pleasant and unpleasant emotions in descending order.

Pleasant Emotion States

When asked if the participant felt informed, 271 (93.8 percent) said 'yes', 8 (2.8 percent) said no, and 10 (3.5 percent) were 'not sure'. When asked whether the participant felt relaxed while interacting with the animated tutorial, 227 (78.5 percent) answered 'yes', 35 (12.1 percent) answered 'no', and 27 (9.3 percent) answered 'not sure'. When asked whether the participant was happy, 208 (72 percent) answered 'yes', 54 (18.7 percent) answered 'no', and 27 (9.3 percent) answered 'not sure'. When asked if the participant felt curious, 202 (69.9 percent) said 'yes', 66 (22.8 percent) said 'no', and 21 (7.3 percent) were 'not sure'. Finally, when asked whether the participant felt entertained, 197 (68.2 percent) said 'yes', 71 (24.6 percent) said 'no', and 21 (7.3 percent) said 'not sure'.

Figure 28. Pleasant Emotion States Associated with Animated Tutorial
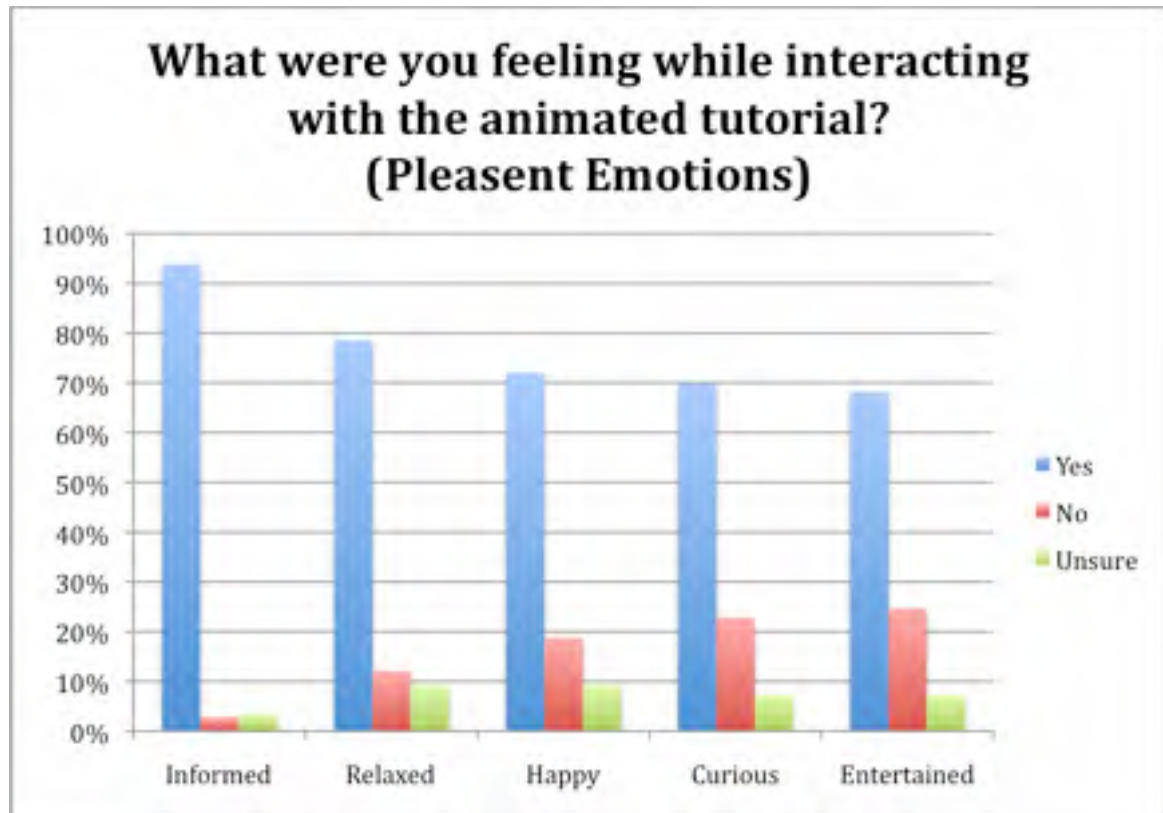
Unpleasant Emotion States

When asked whether the participant felt guilty 4 (1.4 percent) answered 'yes', 278 (96.2 percent) answered 'no', and 7 (2.4 percent) said 'not sure'. When asked whether the participant felt uneasy, 6 (2.1 percent) said 'yes', 273 (94.5 percent) said 'no', and 10 (3.5 percent) said 'not sure'. When asked whether the participant felt sad, 16 (5.5 percent) said 'yes', 265 (or 91.7 percent) said 'no', and 8 (2.8 percent) said 'not sure'. Finally, when asked whether the participant felt nervous, 19 (6.6 percent) answered 'yes', 260 (90 percent) answered 'no' and 10 (3.5 percent) answered 'not sure'.

Figure 29. Negative Emotion States Associated with Animated Tutorial

What were you feeling while interacting with the animated tutorial? (Unpleasant Emotions)
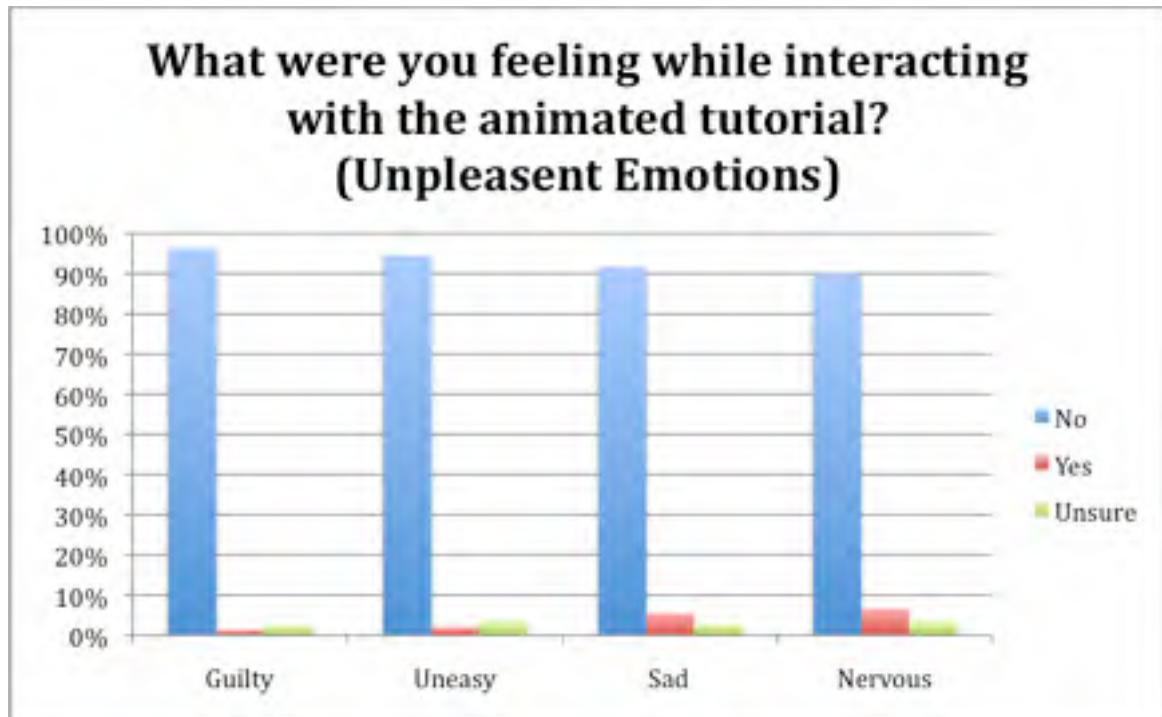
8.4.3 Methods for Learning About Sensitive Subjects

In addition to assessing emotion states, after interacting with the tutorial, we asked the experimental groups a few other questions to measure general comfort around preferred learning methods for sensitive subjects.

When asked whether it was more comfortable learning about these sensitive subjects, 76.5 percent said they were most comfortable with an anonymous animated tutorial, 1.4 percent said they were most comfortable with a teacher, and 22.1 percent said they were equally comfortable with a teacher or the tutorial option.

Table 24. Comfort Levels Associated With Differing Learning Methods

Was it more comfortable learning about these sensitive subjects from an anonymous animated tutorial?			
Result	Frequency	Percent	Cumulative Percent
Most comfortable with tutorial	221	76.5	76.5
Most comfortable with teacher	4	1.4	77.9
Equally comfortable with teacher or tutorial	64	22.1	100
Total	289	100	

Figure 30. Comfort Levels Associated With Differing Learning Methods
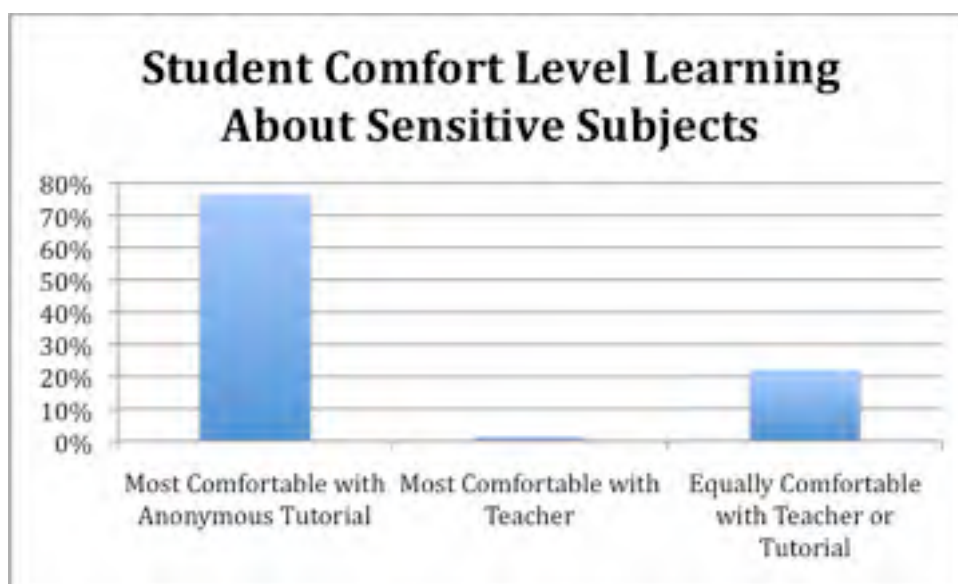
Of the 289 students that interacted with the animation, 175 (61 percent) provided more detailed answers to this question on the survey. Below are a few selected quotes from the students:

> *"Yes, [I] felt more [comfortable]. [The tutorial] was one to one [interaction], with no one watching me. [I]t maintained privacy, and [I] did not feel uneasy. [I] was provided with speakers so no one could listen except me. [I]t was the best way from [which I] could get relevant information about hiv and aids."*

> *"bcoz first of all the identity is anonymous.....and secondly many are shy to talk about these things...so this is a better way"*

"[I] feel more comfortable because an anonymous tutor does not know to whom is he teaching. [L]earning from the class teacher makes it uncomfortable for the students as well as the teacher teaching about sex education."

"[I] feel more comfortable learning about these sensitive topics from an anonymous tutorial as [I] will always feel [hesitate] from my known person about talking on these topics"

8.4.4 Actions Related to Comfort

Furthermore, in order to assess whether our experimental participants felt comfortable with the tutorial, we asked them two questions regarding taking further actions, outside of their scholastic environment. First, we asked whether the participant would be willing to forward this tutorial to others they cared about. Second, we asked whether the participant would be willing to join our team to help stop the spread of HIV/AIDS. This question is especially important because we are asking students to make a commitment.

When asked about forwarding the tutorial to others at T2, 276 (95.5 percent) answered 'yes', 4 (1.4 percent) answered 'no', and 9 (3.1 percent) answered 'not sure'. Gauging whether a student would be willing to forward the tutorial to others the participant cared about could be considered both a measure of comfort with the materials as well as utility of the tutorial.

Table 25. Willingness to Forward Animated Tutorial

Would you be willing to forward this tutorial to others you care about?			
Result	Frequency	Percent	Cumulative Percent
Yes	276	95.5	95.5
No	4	1.4	96.9
Not Sure	9	3.1	100
Total	289	100	

Figure 31. Willingness to Forward Animated Tutorial
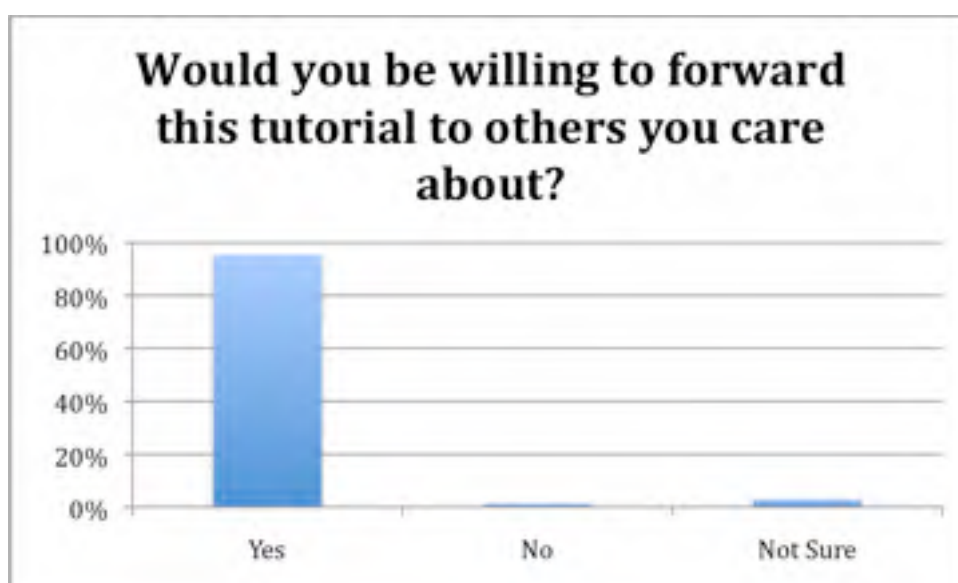
When asked whether participants would be willing to join our team, 226 (78.2 percent) answered 'yes', 24 (8.3 percent) answered 'no', and 39 (13.5 percent) answered 'not sure'. Students followed-up with comments like the following.

"Yes surely, [I] feel it is highly important to spread awareness about this sensitive issue. Here, an animated tutorial is the best way as most of the people feel uncomfortable while discussing such issues" or *"[I] want to serve my country...by [stopping AIDS]."*

Table 26. Willingness to Join HIV/AIDS Awareness Team

Would you like to join our team to help stop the spread of HIV/AIDS?			
Result	Frequency	Percent	Cumulative Percent
Yes	226	78.2	78.2
No	24	8.3	86.5
Not Sure	39	13.5	100
Total	289	100	

Figure 32. Willingness to Join HIV/AIDS Awareness Team
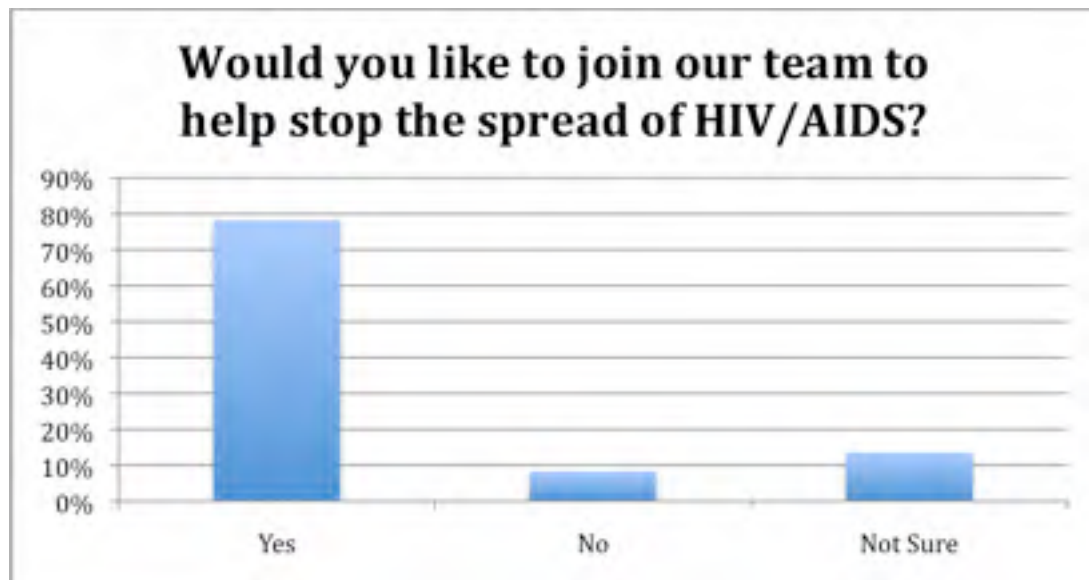
8.4.5 Comfort Discussing Study with Others

Our final measure of comfort was measured at T3, approximately one month after exposure to the study. Given that HIV/AIDS is a controversial and taboo subject, we asked both the experimental and control group students whether they mentioned the study to anyone, and if yes, to whom. Specifically, the control group was asked whether they mentioned the *survey* to anyone, and the experimental group was asked whether they mentioned the *tutorial* to anyone. These questions were important in order to assess whether students felt comfortable enough to generally discuss the

experiment with others. Also, they helped identify which groups participants might share such information with.

At T3, 265 (91.7 percent) participants in the experimental group mentioned information regarding the study to someone, while 73 (75.3 percent) participants in the control group mentioned the study. Specifically, New Delhi participants, 84 (91.3 percent); Haryana participants, 94 (88.7 percent), and Punjab participants, 87 (95.6 percent did mention the study to someone. Next, we measured whether this difference between the experimental and control group was significant. We used a binary logistic regression to assess this.

In our first model we used a binary logistic regression and compared the two conditions. We used *Mention_Study* as our outcome variable and the *Experimental_Condition* as predictor variable.

> The binary dependent variable, *Mention_Study*, measures whether the participant mentioned the study to someone (did not mentioned study = 0, mentioned study = 1). *Experimental_Condition* is a binary variable indicating which condition the participant was assigned (experimental = 1, control condition = 0).

Table 27. Odds Ratios: Comfort Discussing Study, Model 1

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E.	Wald	df	Sig.	Exp(B)
(Constant)	1.289	0.317	16.489	1.000	0.001	3.630
Experimental Condition	1.112	0.235	22.351	1.000	0.001	3.042
Nagelkerke R^2 = 0.077; p<0.05						

Using a simple binary logistic regression, we find significant differences ($p<.001$) between the experimental and control condition. The participants that received the intervention all mentioned the HIV/AIDS study

significantly more than the control group students.

In our second model, we used a binary logistic regression and examined the various institutes independently. *Mention_Study* was the outcome variable. Institutions were the predictor variables.

> The binary dependent variable, *Mention_Study*, measures whether the participant mentioned the study to someone (did not mentioned study = 0, mentioned study = 1). *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category.

Table 28. Odds Ratios: Comfort Discussing Study, Model 2

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E	Wald	df	Sig.	Exp(B)
(Constant)	1.112	0.235	22.351	1.000	0.001	3.042
Intervention1 (NewDelhi)	1.239	0.438	7.984	1.000	0.005	3.452
Intervention2 (Haryana)	0.946	0.386	5.992	1.000	0.014	2.575
Intervention3 (Punjab)	1.967	0.563	12.213	1.000	0.001	7.151
Nagelkerke R2 = 0.092; p<0.05						

The participants that received the intervention on average mentioned the HIV/AIDS study significantly more than the control group students. Specifically, New Delhi ($p<.01$), Haryana ($p<.05$), Punjab ($p<.001$).

The final, and most complex binary logistic regression model used to calculate significance, controls for gender, mother's education, and father's education. Here, too, we find significant differences between each experimental and control conditions.

> The binary dependent variable, *Mention_Study*, measures whether the participant mentioned the study to someone (did not mentioned study = 0, mentioned study = 1). *Intervention1, Intervention2, and*

Intervention3 are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 29. Odds Ratios: Comfort Discussing Study, Model 3

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E.	Wald	df	Sig.	Exp(B)
(Constant)	1.765	0.685	6.636	1.000	0.010	5.843
Intervention1 (NewDelhi)	1.229	0.441	7.754	1.000	0.005	3.417
Intervention2 (Haryana)	0.953	0.395	5.816	1.000	0.016	2.593
Intervention3 (Punjab)	1.755	0.591	8.816	1.000	0.003	5.783
Gender	0.086	0.325	0.07	1.000	0.792	1.090
MotherEducation	-0.53	0.55	0.927	1.000	0.336	0.589
FatherEducation	-0.245	0.618	0.157	1.000	0.692	0.783
Nagelkerke R2 = 0.101; p<0.05						

Supporting the central ideas of this research thesis, the groups that received the intervention mentioned the HIV/AIDS study significantly more than the control group students (New Delhi: $p<.01$; Haryana: $p<.05$; Punjab: $p<.01$), even after controlling for gender and parental education. The null hypothesis, which stated that there would be no difference between the experimental and control groups, was rejected. It is, therefore, concluded that there is a significant difference between the two groups. On average, those participants who were exposed to the ITA curriculum mentioned the study significantly more than the participants who were not exposed to the intervention. There were no significant effects of gender or parental education.

Figure 34 and Table 30 describe the percentage of participants, in both the experimental and control groups, that shared information about the study with others.

Regarding female friends: experimental 160 (55.4 percent) vs. control 40 (41.2 percent), $B=0.570$, $p<.05$; male friends: experimental 134 (46.4 percent) vs. control 37 (38.1 percent), $B=0.338$, $p>.159$; other family: experimental 116 (40.1 percent) vs. control 26 (26.8 percent), $B=0.634$, $p<.05$; parents: experimental 106 (36.7 percent) vs. control 36 (37.1 percent), $B=0.019$, $p=.94$; others: experimental 58 (20.1 percent) vs. control 12 (12.4 percent), $B=0.576$, $p>.092$; teacher: experimental 41 (14.2 percent) vs. control 3 (3.1 percent), $B=1.65$, $p<.01$.

After exposure to the intervention, the experimental participants were more likely to share information with their female friends, other family members, and their teachers. This was measured at T3.

Figure 33. Breakdown of Participant Information Sharing
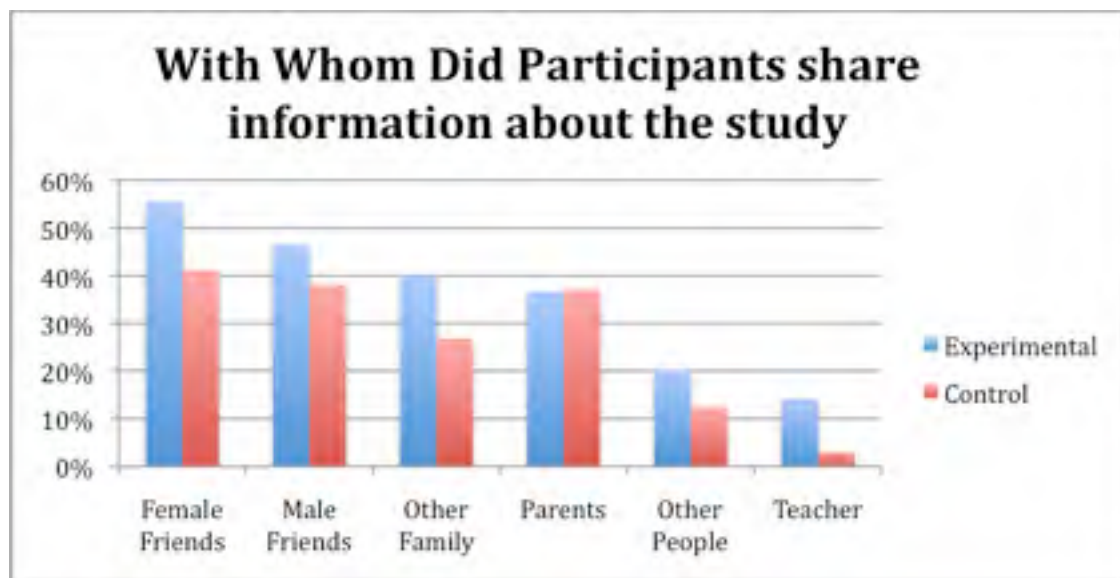
Table 30. Data for Participant Information Sharing

To Whom Did Participants Share Information About the Study												
	Female Friends		Male Friends		Other Family		Parents		Other People		Teacher	
	f	%	f	%	f	%	f	%	f	%	f	%
Experimental	160	55.4	134	46.4	116	40.1	106	36.7	58	20.1	41	14
Control	40	41.2	37	38.1	26	26.8	36	37.1	12	12.4	3	3.1
Beta	0.57		0.338		0.634		0.019		0.576		1.65	
Significance	0.017		0.159		0.014		0.94		0.092		0.007	
Nagelkerke R²	0.02		0.007		0.022		0		0.018		0.056	

8.5 Additional Outcomes of Intervention

In addition to measuring the efficacy and comfort around using this innovative approach to teaching HIV/AIDS education, it is also critical that learners generally like the approach and find it useful. Note although *likability* and *utility* are related topics; learners may find something useful but not like it. This may lead to abandoning the tool entirely. The following questions were only assessed for the three experimental groups (*n*=289) that interacted with the ITA prevention materials. For a complete list of other outcome items see Appendix S.

8.5.1 Likability

Two questions address *likability*. First, students were asked whether they liked the tutorial and second, whether they liked the characters in the animation. Some of the measures used to assess *utility* may also be used to measure likability (see section 8.5.2).

When asked whether the participant liked the tutorial 284 (98.3 percent) students in the experimental group answered 'yes', 5 (1.7 percent) answered 'no'.

Figure 34. Likability of Tutorial
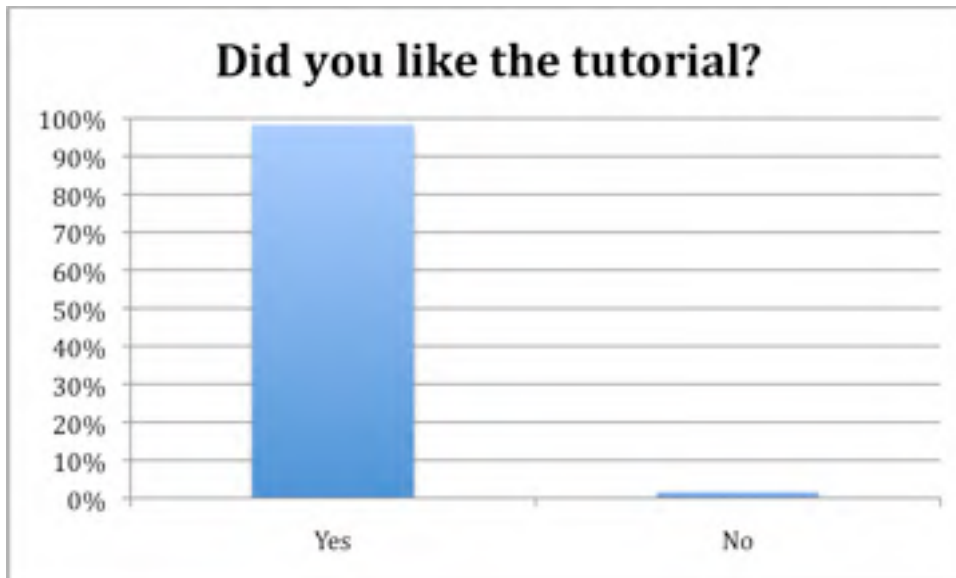
When the participants were asked whether they liked the characters in the animation[23], 272 (94.1 percent) answered 'yes', 10 (3.5 percent) answered 'no', and 7 (2.4 percent) answered 'not sure'.

Figure 35. Likability of Animated Characters

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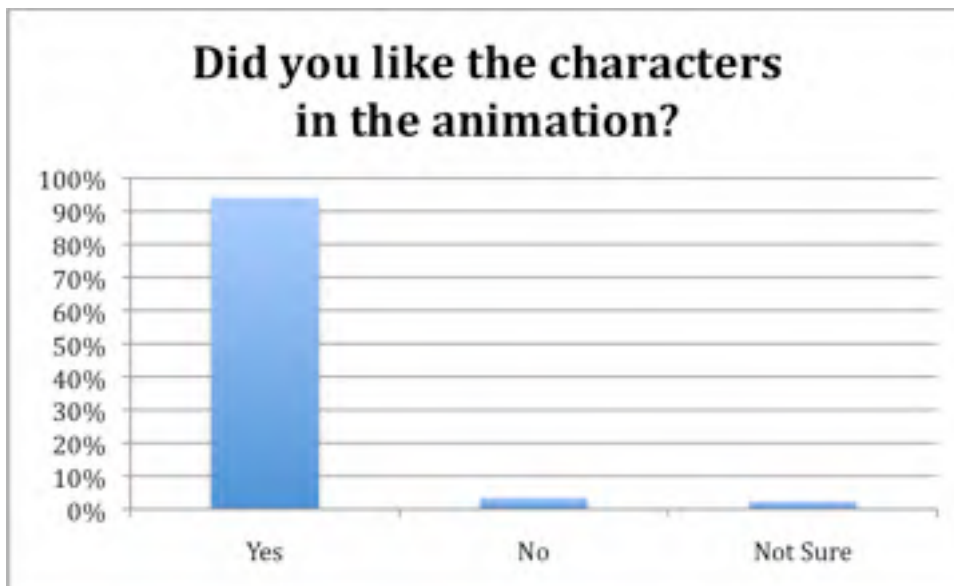
[23] Participants in the experimental condition all watched the male version of the Interactive Teaching AIDS animation.

8.5.2 Utility

A combination of several questions was assessed in order to ascertain usefulness with the ITA approach to learning. Participants were generally asked how they would compare this method to others they have encountered and whether they found it to be a valuable learning tool.

When asked whether the participant learned more about HIV/AIDS prevention through this animated tutorial than other communication method (e.g. television, school), 273 (94.5 percent) said 'yes', 10 (3.5 percent) said 'no', and 6 (2.1 percent) said 'not sure'.

Figure 36. Utility of Application
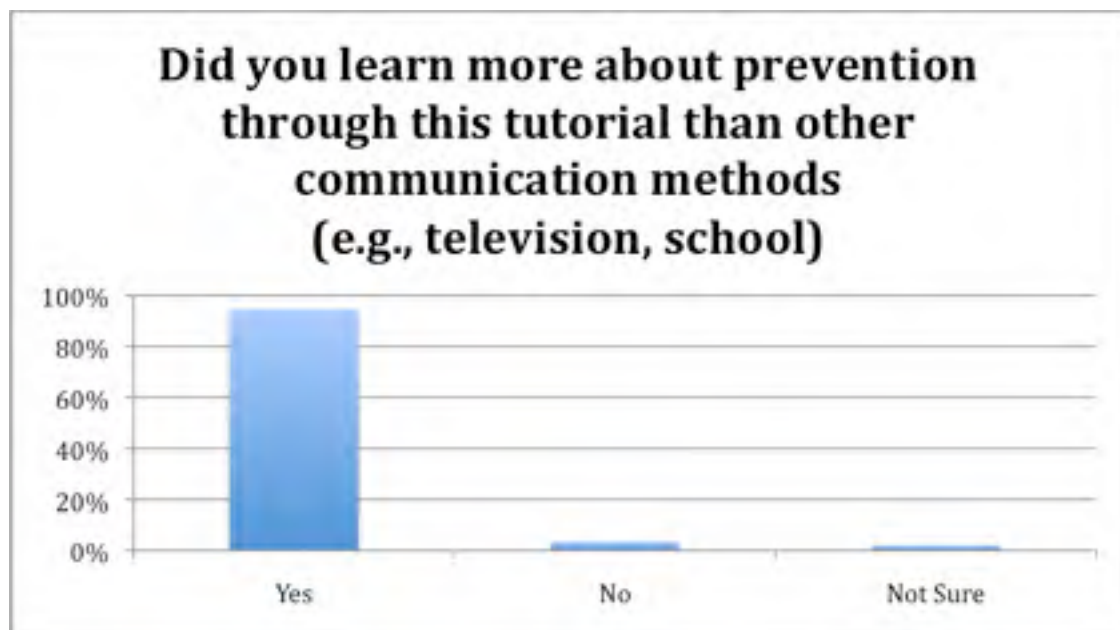
At T2, when asked whether the participant felt that other young adults would learn from this program, 281 (97.2 percent) answered 'yes', 4 (1.4 percent) answered 'no', and 4 (1.4 percent) answered 'not sure'.

Figure 37. Utility of Tool for Young Adults
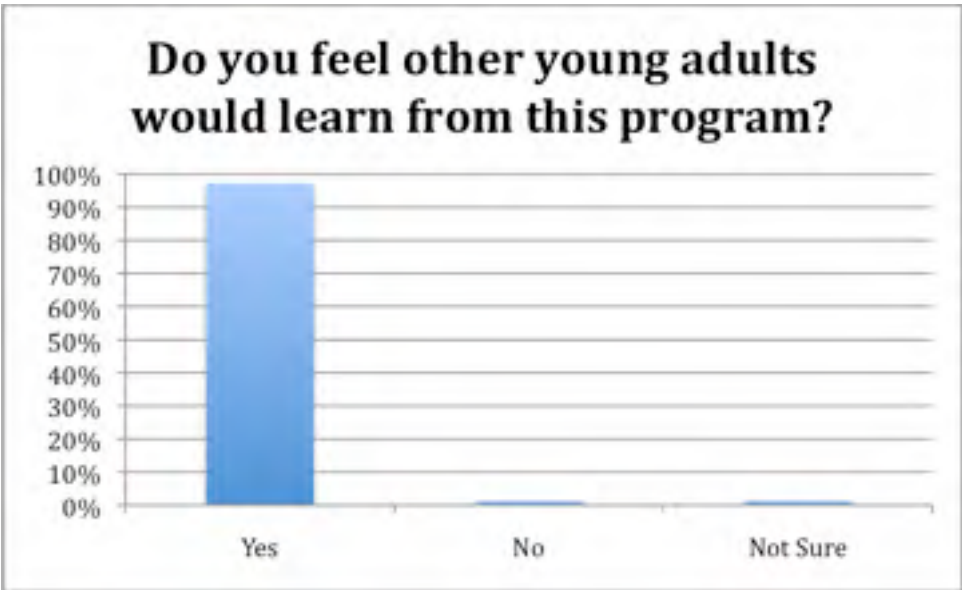
At T2, when the participants were asked whether they had seen a similar HIV/AIDS tutorial like this before, 275 (95.2 percent) answered 'no', 13 (4.5 percent) answered 'yes', and 1(.3 percent) said 'not sure'.

Figure 38. Previous Experience Using ICT-based Tutorials
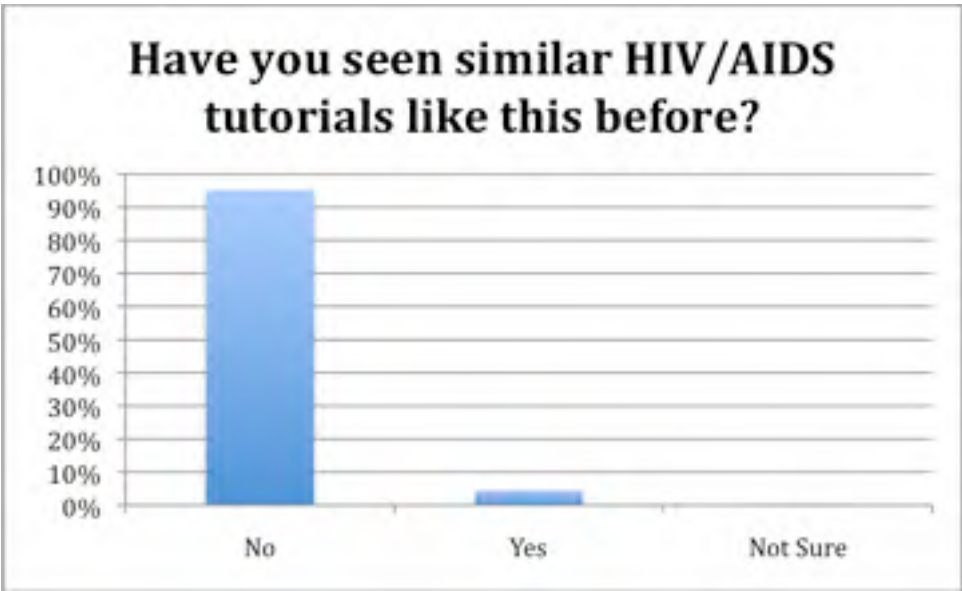
At T2, when participants were asked whether most of their questions about HIVAIDS were answered in the tutorial, 273 (94.5 percent)

answered 'yes', 11 (3.8 percent) answered 'no', and 5 (1.7 percent) answered 'not sure'.

Figure 39. Satisfaction with Knowledge of Intervention
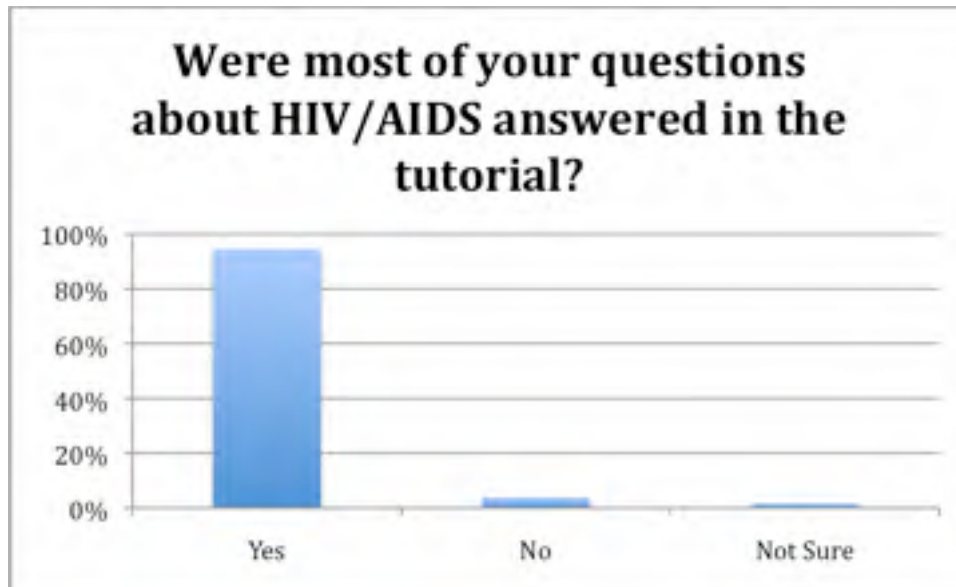
Interestingly, at T2 when participants were asked whether after being exposed to the ITA tutorial they wanted to learn more about HIV/AIDS, 242 (83.7 percent) said 'yes', 35 (12.1 percent) said 'no', and 12 (4.2 percent) said 'not sure'.

Figure 40. Desire to Learn More After Using Application

In the retention test one month later (T3), we measured whether our participants proactively sought out more information to their questions and found that 213 (73.7 percent) participants in the experimental group (New Delhi participants, 69 (75.0 percent); Haryana participants, 79 (74.5 percent), and Punjab participants, 65 (71.4 percent) searched for more information after participating in our study, while 51 (52.6 percent) participants in the control group searched for more information. Next, we measured whether this difference between the experimental and control group was significant. We used a binary logistic regression to assess these differences.

In our first model we used a binary logistic regression and compared the two conditions. We used *Searched_More_Info* as our outcome variable and the Experimental Condition as predictor variable.

> The binary dependent variable, *Searched_More_Info*, measures whether the participant searched for information using at least one source (did not search for more information = 0, did search for more

information = 1) at T3. *Experimental_Condition* is a binary variable indicating which condition the participant was assigned (experimental = 1, control condition = 0).

Table 31. Odds Ratios: Search for More Information, Model 1

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E.	Wald	df	Sig.	Exp(B)
(Constant)	0.103	0.203	0.258	1.000	0.612	1.109
Experimental_Condition	0.927	0.243	14.527	1.000	0.001	2.528
Nagelkerke R² = 0.051; p<0.05						

Using a simple binary logistic regression, we found significant differences ($p<.001$) between the experimental and control condition. The participants that were exposed to the intervention searched for significantly more information after study than the control group participants.

In our second model, we used a binary logistic regression and examined the various institutes independently. *Searched_More_Info* was the outcome variable while the institutions were the predictor variables.

> The binary dependent variable, *Searched_More_Info*, measures whether the participant searched for information using at least one source (did not search for more information = 0, did search for more information = 1) at T3. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category.

Table 32. Odds Ratios: Search for More Information, Model 2

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E.	Wald	df	Sig.	Exp(B)
(Constant)	0.103	0.203	0.258	1.000	0.612	1.109
Intervention1 (NewDelhi)	0.995	0.315	9.977	1.000	0.002	2.706
Intervention2 (Haryana)	0.97	0.302	10.344	1.000	0.001	2.639
Intervention3 (Punjab)	0.813	0.309	6.945	1.000	0.008	2.255
Nagelkerke R2 =.053; p<0.05						

The participants in all three conditions that received the intervention on average searched for significantly more information after the study than the control group students (New Delhi, $p<.01$; Haryana, $p<.001$; Punjab, $p<.01$).

The final, and most complex, binary logistic regression model used to calculate significance, controls for gender, mother's education, and father's education. Here, too, we found significant differences between each of the experimental conditions and the control condition.

> The binary dependent variable, *Searched_More_Info*, measures whether the participant searched for information using at least one source (did not search for more information = 0, did search for more information = 1) at T3. *Intervention1, Intervention2, and Intervention3* are dummy variables for the three institutions receiving the intervention. *The control group* (the fourth institute) was omitted from the model as a dummy variable and used as the reference category. *Gender* is the male or female gender variable (0 = female, 1 = male). *Mother_Education* is the level of education the student's mother received (0 = incomplete college degree or less education, 1 = completed college degree or more education). *Father_Education* is the level of education the student's father received (0 = incomplete college degree or less education, 1 = completed college degree or more education).

Table 33. Odds Ratios: Search for More Information, Model 3

Odds Ratios: Comparing Experimental and Control Group						
Model	B	S.E.	Wald	df	Sig.	Exp(B)
(Constant)	0.149	0.419	0.126	1.000	0.722	1.161
Intervention1 (NewDelhi)	0.992	0.317	9.804	1.000	0.002	2.696
Intervention2 (Haryana)	0.977	0.307	10.12	1.000	0.001	2.657
Intervention3 (Punjab)	0.789	0.333	5.606	1.000	0.018	2.200
Gender	0.037	0.23	0.026	1.000	0.873	1.037
MotherEducation	-0.04	0.323	0.013	1.000	0.908	0.964
FatherEducation	-0.04	0.35	0.011	1.000	0.917	0.964

Nagelkerke R2 = .053; p<0.05

Supporting the central ideas of this research thesis, the groups that received the intervention searched for significantly more information after participating in the study than the control group students (New Delhi: $p<.01$; Haryana: $p<.001$; Punjab: $p<.05$) even after controlling for gender and parental education. The null hypothesis, which stated that there would be no difference between the experimental and control groups, was rejected. It is, therefore, concluded that there is a significant difference between the two groups. On average, those participants who were exposed to the ITA curriculum searched for significantly more information than the participants who were not exposed to the intervention. There were no significant effects of gender or parental education.

We also identified various sources through which our participants used to search for more information. Below is the breakdown of where the participants searched for this information.

Regarding friends: experimental 165 (57.1 percent) vs. control 36 (37.1 percent), B=0.813, $p<.01$; magazines: experimental 86 (29.8 percent) vs. control 18 (18.6 percent), B=0.62, $p<.05$; Internet: experimental 76 (26.3

percent) vs. control 21 (21.6 percent), *B*=0.256, *p*>.37; books: experimental 72 (24.9 percent) vs. control 15 (15.5 percent), *B*=0.595, *p*>.06; family: experimental 44 (15.2 percent) vs. control 14 (14.4 percent), *B*=0.063, *p*>.85; medical personnel: experimental 19 (6.6 percent) vs. control 1 (1 percent), *B*=1.91, *p*>.07; teachers/administrator(s): experimental 16 (5.5 percent) vs. control 1 (1 percent), *B*=1.73, *p*>.10.

After exposure to the intervention, the experimental participants were significantly more likely to search for further information through their friends and through magazines.

Figure 41. Searched for More HIV/AIDS Information
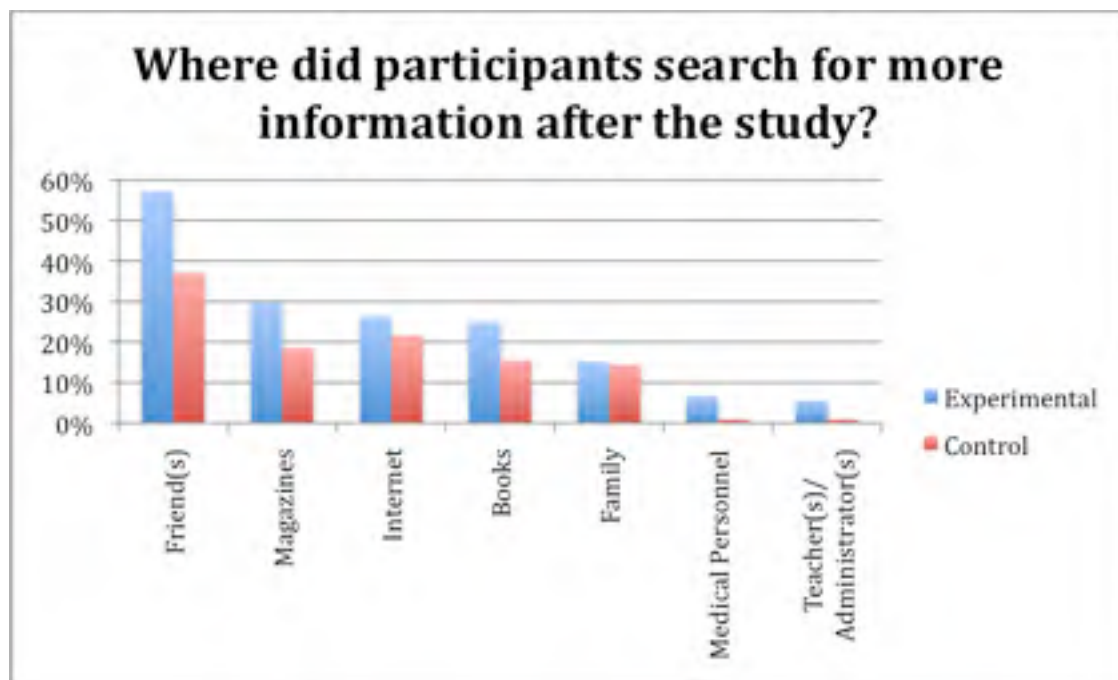
Table 34. Where Participants Searched for Further Information

Where Did Participants Search for More Information After the Study													
	Friends		Magazines		Internet		Books		Family		Medical		Teacher/Admin	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Experimental	165	57.1	85	29.3	76	26.3	72	24.9	44	15.2	19	6.6	15	5.5
Control	36	37.1	18	18.6	21	21.6	15	15.5	14	14.4	1	1	1	1
Beta	0.813		0.62		0.258		0.595		0.063		1.91		1.73	
Significance	0.001		0.033		0.362		0.058		0.85		0.064		0.098	
Nagelkerke R²	0.04		0.018		0.003		0.015		0		0.046		0.039	

At T3, we also included two questions about how fearful participants were of interacting with HIV-infected people and becoming seropositive.

Participants were asked, after watching the tutorial whether they were less afraid of interacting with HIV-infected people. The results showed that 155 (54 percent) said they were never afraid, 120 (41.8 percent) said they were less afraid, 7 (2.4 percent) said they were equally afraid, and 5 (1.7 percent) said they were more afraid.

Treating the first and third categories as missing data, a Chi-square test for equality of proportions revealed that a significantly greater proportion of participants stated that they felt less afraid of interacting with HIV-infected people than more afraid after watching the intervention, $\chi^2(1)=105.8$, $p<.001$.

Figure 42. Feelings of Fear of Interacting with HIV-Infected Persons
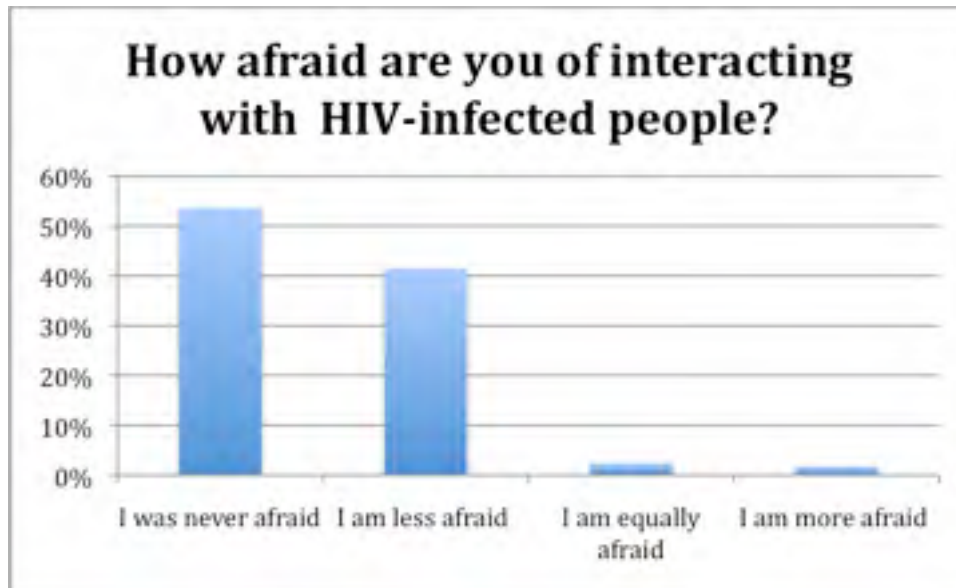
At T3, participants were asked, after watching the tutorial whether they themselves were less afraid of being infected with HIV. The results showed that 76 (26.5 percent) were never afraid, 151 (52.6 percent) are less afraid, 38 (13.2 percent) were equally afraid, and 22 (7.7 percent) are more afraid.

Treating the first and third categories as missing data, a Chi-square test for equality of proportions revealed that a greater proportion of participants stated that they felt less afraid of being infected with HIV than more afraid after watching the intervention, $\chi^2(1)=96.19$ $p<.001$.

Figure 43. Feelings of Fear of an HIV-infection
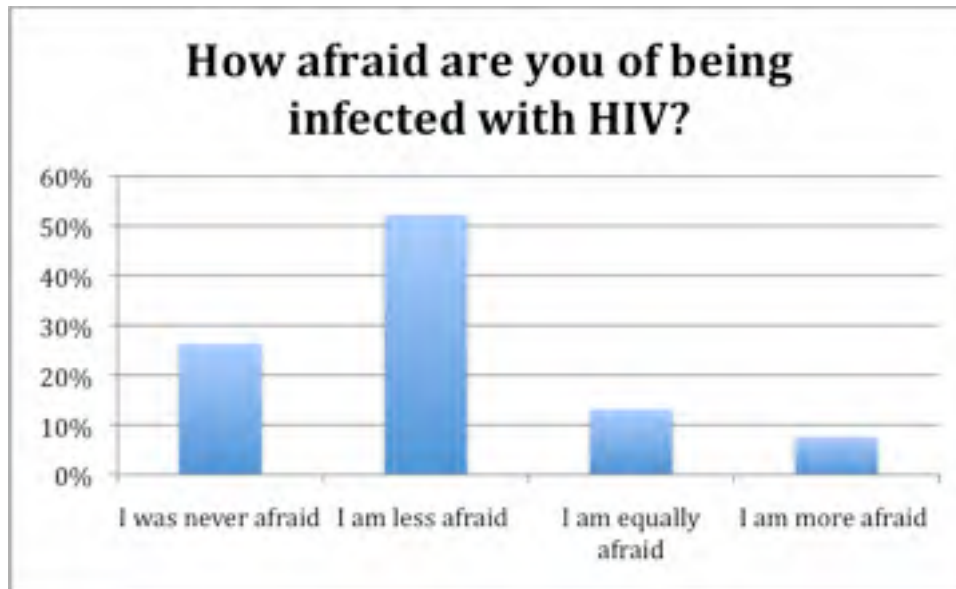
9 Discussion & Conclusion

9.1 Overview

Prevention strategies for HIV/AIDS and other sexually transmitted present significant challenges because social stigma often precludes open discussion and information exchange (Chapter 2). HIV/AIDS prevention education, in particular, ranks at the top of the taboo scale (Chapter 2 and 3) because it is a compound of numerous taboo topics (e.g., commercial sex work, homosexuality, adultery, premarital sex, intravenous drug use and death), making it extremely difficult to teach in socially conservative countries, particularly those in Asia (Kirby et al., 2006; Nayak & Bose, 1997; Smith et al., 2003; Verma et al., 1997). In India, sex education has been banned in schools across multiple states because of the discomfort associated with openly presenting and discussing such topics (Chadha, 2007; Gentleman, 2007; Sify News, 2007; Zaheer, 2007) (Chapter 3).

However, India ranks among those countries with the highest number of infections worldwide. With 0.2 percent - 0.5 percent of the entire population infected (UNAIDS, 2008), and 9 out of 10 infected individuals not knowing they are seropositive (Singhal & Rogers, 2003), there is great opportunity for the virus to infect many others. In order to control the virus from spreading among the vast population, the need to understand topics like the dangers associated with the spread of the virus, prevention-related concepts, treatment and counseling options etc., is necessary to mitigate the problems, including those that are stigma-related.

To at least some extent, the ultimate goal of all public health campaigns is behavior change. There are both direct and indirect means of influencing behavior. An example of indirect influence is raising cigarette taxes to control the incidence of lung cancer in a population. Similarly, an indirect

146

means of controlling the spread of HIV/AIDS in India may be through the introduction of needle exchange programs to reduce the incidence of HIV among injection drug users. Studies show that such programs have proven effective across the United States, United Kingdom, and India, in reducing the incidence of HIV among injection drug users. Perhaps counterintuitively, needle exchange programs have not resulted in increased drug use or the recruitment of first time drug users (Baker & Bowers, 1997; Vlahov & Junge, 1998), and countries threatened by the spread of HIV through injecting drug users have been advised to consider the wealth of supportive evidence around such programs (Wodak & Cooney, 2006). Another example of an indirect means of reducing HIV was through something like the 100 percent condom program initiated nation-wide by the Ministry of Public Health in Thailand (Rojanapitayakorn, 1993), and replicated with much success in Cambodia (Claeson & Alexander, 2008). When engaging with clients, commercial sex workers were required to use condoms, which were distributed freely by the government to brothels, massage parlors, and commercial sex workers. The argument was that if 100 percent of the commercial sex workers used condoms consistently, none of them would lose business when clients objected to condom use (Singhal & Rogers, 2003). Non-compliance resulted in sanctions against commercial sex work establishments (Hanenberg, Rojanapithayakorn, Kunasol & Sokal, 1994). According to surveys by commercial sex workers, the use of condoms increased from 14 percent to 94 percent between 1989 and 1993 (Hanenberg et al., 1994). It is estimated that without this program, Thailand's HIV prevalence may have been ten times higher than it is today (UNAIDS Report on the global AIDS epidemic, 2006, as cited in Avert, 2009). Yet another indirect effort to curb HIV-transmission was initiated by India's National AIDS Control Organization in India. According to several news reports, this organization

is distributing 3.5 billion condoms over the next three years (IBNLive.com, 2007; Telegraph, 2007; Vijian, 2009). The contraceptives are being distributed freely through vending machines at millions of outlets in order to provide more private access for sexually active individuals (Vijian, 2009).

Direct means of influence, however, typically rely upon promoting understanding based in education. It is a well-known phenomenon that knowledge is a necessary, although seldom sufficient, step to bring about changes in attitudes and behaviors (The World Health Organization, 2008). However, numerous states in India, as well as other socially conservative nations, are unfortunately not able or not willing to provide this basic education in schools because of social taboos (Chapter 3). This is significant because it limits the scope for attitudinal and behavior change. More importantly, this basic education, which is necessary in giving accurate information to protect oneself, should be a goal even if the provision of that information does not result in mass behavior change. This is why the UN General Assembly on HIV/AIDS recognized as their top goal the provision of HIV/AIDS information to young people, stating it as a basic human right (Kirby et al., 2006).

The Interactive Teaching AIDS (ITA) application was constructed in an attempt to create an intervention to address these needs while also working within the specified constraints. Using the framework for evaluation outlined in Chapter 2, this application was developed to provide education in a socially acceptable, accurate/complete, effective and localized manner to populations that consider HIV/AIDS, and related topics (e.g., sex education, intravenous drug-use, death), a taboo topic. It provides basic HIV/AIDS education to populations who do not, or cannot, receive it due to these social obstacles.

This study (detailed in Chapters 7 & 8) evaluated the effectiveness of the ITA intervention by measuring resulting changes in knowledge, attitudes and comfort levels associated with the application. The pretest-posttest-retention test control group design was conducted on 389 11th grade, 12th grade and college students in New Delhi, Haryana and Punjab, India in the summer of 2007.

9.1.1 Summary of Research Questions

The premises for several research questions were outlined in Chapter 3. The first question was whether it was possible to design an HIV/AIDS curriculum that was both socially-acceptable and accurate, which would result in significant gains in knowledge among young learners. Furthermore, if there were gains, would learners be able to retain this knowledge? All participants in our study had received some basic HIV/AIDS education through their educational institutions[24] and the mass media. This was demonstrated by their relatively high pretest scores (M=28.10 of 40 points). However, our study results reveal that students who interacted with the ITA intervention dramatically improved their overall knowledge of HIV/AIDS-related concepts. Even after controlling for several factors, including pretest knowledge scores, gender and parental education. Experimental group participants not only had huge gains in short-term knowledge (p<.001), but maintained these high levels one month later (p<.001). There were no short-term or long-term gains in knowledge among the control group.

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[24] Although HIV/AIDS is considered a taboo topic all over India, New Delhi, Haryana and Punjab are not among the states where sex education has been banned.

The second research question was whether the ITA intervention, which provided prevention education while avoiding normative statements, would be able to promote measurable changes in attitudes. Furthermore, if there were changes in attitudes, would learners be able to maintain these changes long-term? Previous studies have shown that changes in knowledge do not necessarily result in changes in attitudes, as attitudes are difficult to change. However, even after controlling for several factors, including pretest attitude scores, gender and parental education, we found that students who were exposed to the ITA intervention demonstrated dramatic positive changes in their attitudes[25] ($p<.001$). Furthermore, all the intervention groups maintained statistically significant changes in attitudes one month later ($p<.05$). There were no short-term or long-term changes in attitudes among the control group.

The third research question was whether there would be a gender difference in the way students learned or retained knowledge relating to HIV/AIDS concepts. Previous studies have shown that females demonstrate significantly less knowledge about such concepts compared to their male counterparts (Agarwal et al. 1999; Pramanik et al., 2006; Sudha et al., 2005). Given this, we were interested in whether females would show greater gains in the posttest and retention test. Results from our pretest confirmed findings from previous studies in that males had significantly more knowledge about prevention education. However, the posttest and retention test results reveal that there was no difference between the knowledge gained and retained by males or females. In short, although female students began with lower scores, they were able to perform equally well as males after being given the opportunity to learn the same information, thereby showing greater relative gains to their

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[25] The attitudinal measured greater acceptance of HIV and human condition.

pretest levels. Another HIV prevention study demonstrated similar effects with females gaining more knowledge relative to their male counterparts in India (Chhabra, Springer, Rapkin & Merchant, 2008). This is particularly important since females are more susceptible to the virus (Chapter 4), and research indicates a great need to introduce gender-based sex education regarding STIs, including HIV/AIDS, in Indian schools (McManus & Dhar, 2008). Our results, in addition to previous studies, may be an argument for providing more (or more effective) education for females since they are demonstrating promising results once they have access to certain types of prevention education.

Finally, we were interested in whether participants felt comfortable interacting with and learning from the 20-minute curriculum. Although the topic of HIV/AIDS is considered highly sensitive, and students interacted with the ITA applications while surrounded by their peers and instructors, an overwhelming 98.6 percent of students said they were comfortable with the overall animated tutorial. Furthermore, 96.2 percent of students said they did not feel any guilt while watching the tutorial. Students provided feedback like:

> *"[I] feel more comfortable learning about these sensitive topics from an anonymous tutorial as [I] will always feel [hesitant] from my known person about talking on these topics"*

> *"In our society, if we talk openly about such sensitive subject, then people takes it in negative sense. So such tutorials give us information and awareness."*

These results show great promise for the development of other efficacious curricula to teach about taboo topics.

9.1.2 Effect Size Calculations

Although many studies reveal results through identifying statistical significance, the more important question may be whether the findings are practically significant. Cohen's effect size calculation is designed to measure whether particular findings are practically significant. According to Cohen's d method (1988), an effect size of 0.2 is considered small, 0.5 is medium and 0.8 or higher is considered large. According to Cohen's convention for effect sizes, our short-term knowledge effect size (1.88) and long-term knowledge effect size (1.40) for the pooled intervention groups and control group are both considered extremely large. Furthermore, the short-term attitudinal effect size (0.51) and long-term effect size (0.44) for the pooled intervention groups and control group is in the medium range.

9.2 Discussion

There are several important findings from this study. First, students exposed to the ITA application were able to effectively learn ($p<.001$) and retain ($p<.001$) significant levels of information about a topic that is considered highly taboo. On the 40-item knowledge assessment, the experimental group scored 8.25 points more than the control group participants on the posttest and 7.03 points more on the retention test (measured one month later). These gains are especially important because the Socioeconomic Impact of HIV in India Report (2006) identified that the lack of knowledge, awareness, and misconception around the disease as the main cause of stigma and discrimination faced by people living with HIV and AIDS and their families in India (Basanta, 2006). And, numerous studies have identified a general lack of accurate knowledge about HIV transmission-related issues, even among relatively well-educated people (Perry, 2005; Pramanik et al., 2006). Although these studies have shown that individuals with more years of formal schooling demonstrated greater

HIV/AIDS knowledge (Ambati et al., 1997; Ananth & Koopman, 2003; Balk & Lahiri, 1997)—with school-going populations being the most knowledgeable group (Sudha et al., 2005)—our intervention was able to increase knowledge amongst even these students by significant amounts. Although our participants scored several points at the pretest knowledge level, those exposed to the intervention demonstrated significant gains and retention of new knowledge. If this basic intervention was able to raise the scores of arguably the most knowledgeable student populations, it is likely that individuals with less education would be able to show even greater gains in short-term and long-term knowledge levels.

Extending this concept, it is likely that students in areas of India who do not currently receive any HIV/AIDS education at all (due to this education, or all sex education, being banned in schools) would show even more significant learning effects. More research will have to be conducted to measure effects on these populations. However, since the study, several organizations in India focused on educating preliterate or semiliterate populations have identified our materials as useful in promoting gains in knowledge. Furthermore, schools located in states where sex-education was rejected have also identified our materials as useful and culturally-appropriate (Chapter 10). Hopefully, the spread of accurate and relatively complete knowledge will help curb the stigma and discrimination faced by many people in India.

Second, although females had significantly less knowledge than males at the pretest level, consistent with previous field research (Agarwal et al. 1999; Pramanik et al., 2006; Sudha et al., 2005), after being exposed to the prevention materials, there was no difference between the final level of knowledge acquired or retained between the two groups. That is, at the posttest level, females were able to make up the difference in education

153

they lacked at T1. This suggests that if given greater exposure to HIV/AIDS education and the opportunity to learn, females may be able to close this achievement gap. Interestingly, we also found that all participants, regardless of whether they were in the experimental or control condition, were most likely to share information with their female companions. This is especially positive given the growing feminization of the virus, making women even more susceptible to an infection (Quinn & Overbaugh, 2005; Sleightholme & Sinha, 1996) (Chapter 4). Significant advances in knowledge and retention among young people is critical given that they are among the most rapidly growing HIV-infected populations in India (Sharma, 2008; UNAIDS, 2007).

Improving general knowledge of HIV-related concepts in a society, particularly around transmission, is important as research reveals that the more contagious people perceive HIV to be, the more they avoid contact with seropositive individuals (Pryor, Reeder, Vinacco & Kott, 1989, as cited in Derlega & Barbee, 1998). In our study, those who were exposed to the ITA intervention said that they felt significantly less afraid of interacting with HIV-infected people than more afraid ($p<.001$). These same students also stated that they felt significantly less afraid of being infected with HIV after interacting with the animated tutorial ($p<.001$). Hence, spreading accurate knowledge and messages that HIV cannot be transmitted through casual contact is of utmost importance in helping to curb stigma around these issues. Properly understanding prevention strategies could potentially curb stigma, fear, and related issues associated with such sensitive subjects.

In our study, students indicated they were able to learn without feeling offended or uncomfortable. The high levels of comfort associated with the presentation of these materials may have been associated with the greater

154

willingness to share information with others and promote further awareness. Students who were exposed to the intervention were significantly more likely to share information with others than the control group participants. Ninety-two percent of the experimental group participants shared information with at least one other person, with their peers being the largest group and their family members following this. Students exposed to the application also were significantly more likely to share information about the study with their teachers relative to students in the control group, therefore opening up some dialog around these sensitive issues in their scholastic environment.

Although students were dealing with a highly taboo topic, over 95 percent said they were willing to forward the tutorial to others they cared about and 78 percent said they would like to join our team to stop the spread of HIV/AIDS. This suggests that if the information is presented in a comfortable way and given the opportunity, young people may be more willing to promote issues of awareness and prevention and even discuss them more openly with their teachers. With this form of education being available for free and accessible through various platforms, like the Internet and Web 2.0 technology, young people have the ability to join the efforts and promote awareness, while associating themselves with a presentation style that is not embarrassing.

Although our students had previously been exposed to HIV/AIDS related curricula through informal and formal learning environments, 94.5 percent of the experimental students said they learned more about HIV/AIDS prevention through this 20-minute tutorial than from any other communication method (e.g., television, school). Following the tutorial at T2, 83.7 percent said they wanted to learn even more about HIV/AIDS. One month later, we measured whether these students proactively

followed-up on their questions. We asked all the participants whether they searched for information and which resources they accessed. We found that students who were exposed to the intervention were significantly more likely to search for more information than the control group students. Almost three-quarters of the experimental students searched for more information with their primary resources being their friends, magazines, the Internet, and books.

We were also interested in the attitudinal effects of this intervention, given its unique approach to addressing the taboo topic. We found that interacting with this 20-minute tutorial lead to significantly altered student attitudes ($p<.001$) that were maintained in the long-run ($p<.05$). For instance, when asked questions like *'It's okay to be friends with someone who is HIV-positive'* and *'People with HIV/AIDS should not be allowed to work/study in public schools'*, students who were exposed to the application demonstrated a more accepting and tolerant attitude towards HIV-related issues.

We found that providing education that keeps students and administrators comfortable is extremely important while dealing with taboo topics. Although some studies have found that fear-based (more explicit imagery) methods, relative to other methods, may increase awareness further (Kim et. al., 2008), this sort of approach to teach taboo topics would not be welcome in conservative schools. After running our study in these institutes, some of the teachers and administrators were openly willing to connecting us to neighboring schools to share the learning materials with more students.

Interestingly, although we are dealing with a communication taboo, which by definition is difficult to discuss, this study reveals that, as a result of

156

being exposed to more HIV/AIDS education in a culturally appropriate manner, students were significantly more likely to discuss the taboo topic more than those who were not exposed to the education. If as a result of exposure to such an application, students are learning more, sharing more, changing their attitudes to be more accepting toward HIV-related issues and becoming less afraid around this taboo topic, over time, there is an opportunity to make a paradigm shift in the way people think about these sensitive issues – possibly leading to greater tolerance and social welfare.

9.3 Limitations

9.3.1 Internal and External Validity

There were many methodological limitations of this study, given that it was not a true randomized-control-group experiment, which limits the extent to which we can generalize and interpret the results. Therefore, these findings are limited to young adult learners (ages 14-24) attending private schools in the cities studied. This research was conducted in private institutions where the students come from relatively high socioeconomic backgrounds and may be more motivated than public school students. Hence, our findings can only be generalized to these groups and excludes other counterparts. Furthermore, the studies were conducted in three states in Northern India, thereby limiting its generalizability to these locations. These states are not necessarily representative of wider populations throughout India, Asian countries, or the world. It is possible that our results would vary depending on the age group, socio-economic background, location and culture of a particular population. Further studies will need to be conducted to more accurately measure these alternative contexts.

The pretest-posttest-retention-test control group design is considered very strong in that it controls for many threats to internal validity and allows for pretest comparisons to identify, and control for, any pre-intervention differences (Cottrell & McKenzie, 2005). However, the possibility of a pretest-intervention interaction could limit external validity. Future users of the ITA application may not have pretests and posttests to use along with the curriculum, which may limit the efficacy of the materials. In order to combat this possible effect, researchers could use the Solomon Four-Group Design. In our research, designing a study with four randomized groups was problematic as some key stakeholders considered it unethical to have several groups not receiving some form of education.

9.3.2 Measures

The survey instruments were also a limiting factor in the study. The survey results relied on accurate self-reporting for questions around attitudes, behaviors and other outcomes. Gathering details around a highly taboo topic is difficult as it is impossible to identify whether participants are answering honestly. In order to make students most comfortable, we used anonymous surveys and discouraged any communication among students during the study. Also, we pretested the questions on similar students to use appropriate language and had them approved by administrators.

In retrospect, if we were to run the study again, there are a couple questions in particular that we would alter or eliminate. For instance one question asked was whether *If a free confidential blood test at a municipal hospital were available to see if [the participant had] AIDS virus, [would they] take it.* The question was trying to gauge whether the participant would be willing to take a test if it was confidential and free. However, mentioning that it would be at a municipal (government) hospital may

158

have been a deterrent to getting tested. An indication of this distrust for public or municipal hospitals came through in some of the qualitative answers that were volunteered by some of the participants. For instance, one student said "*functioning of [municipal] hospital can not be trusted so it is better to have test in a private hospital*" while another said "*not from a municipal hospital....[I] prefer safety and quality...[I] [don't] think [I} trust them much...*". Only 20 percent of Indians are treated in public health facilities in India while most prefer the privately run clinics [AIDS Map, 2007]. Our survey question included the municipal hospital location because HIV tests are indeed free at these centers. However, since the primary goal was to gauge whether individuals would get tested at all, we should have rephrased or asked multiple questions around this concept of testing.

Second, there was a question we included in the study that asked *whether [the participant could] tell by looking at someone if he/she [was infected with the virus].* This question was included as previous studies indicated that many people do not know that seropositive individuals can be asymptomatic (Porter, 1993). Being that HIV is asymptomatic (Ambati et al., 1997; Porter, 1993), many people do not know for years that they themselves are infected. Hence, it was important that we measured participant knowledge around this concept. However, 93 percent of our participants had the right answer to this question in the pretest. Knowing this, we may have followed-up with some more detailed questions to gauge further understanding around this concept.

We would have also liked to include more questions on behavior change in the study; however, it was not possible with this study. Currently, the only questions to measure behavior change were taken during the retention test, one month later. These questions included items *who, if anyone, did*

the students share information with and *where, if anywhere, did the student look for follow-up materials*. As we discovered, it takes time to build trust with our partners especially while trying to educate on a taboo topic. Even after the study was complete, various stakeholders at the institutes were nervous about the study outcomes; primarily concerned about parent complaints. Now that our partners, as well as other organizations and institutions, have became aware of the high comfort levels associated with learning about this subject through our approach, they, as well as others, may be more willing to include additional behavior-based questions in future studies.

9.3.3 Study Conditions

Our team wanted to measure even longer term-effects of our intervention. However, the design of our study was constrained for many reasons. First, experimental studies of this size, especially in a developing country with limited resources, take tremendous effort and coordination to run smoothly. Second, such studies take precious time away from regular class work. Also, we conducted the studies at a time most convenient for the institutes: running another retention test at a later date would have interrupted the class testing schedule and/or vacation time. Because of these reasons, it was difficult to coordinate more than three surveys on the same participants.

Although all our participants took similar surveys, our control group answered the questionnaires on paper-based versions while the experimental groups responded to questions using online surveys. We did not find any differences in pretest knowledge or attitudinal scores among the groups, suggesting that modality was not a problem. However, it is unknown whether the different media had some kind of effect. The original plan was for all the groups to answer the questionnaires using the online

forms. However, at the last minute, the Principal from the control group institute requested that their students take the surveys on paper, saying that it would be much easier for them this way. Additional field studies and follow-ups may need to be conducted to measure whether media played a difference in our measures.

9.3.4 Institutional and Classroom Conditions

Student performances could have also been altered due to the Hawthorne Effect. Because of the consent forms, students knew they were participating in a study which could have altered their behavior in some way. In order to somewhat control this effect, we designed the experiments in as much of a real world setting as possible. Instead of running the experiments ourselves, we asked the familiar school teachers to conduct classes as they would regularly do so. All materials, including the curriculum, were delivered by their usual instructors and administrators. Hence, although students were participating in an out-of-ordinary activity, it was still in their "regular" learning environment (as opposed to a laboratory), where they were using familiar technology.

Students may have answered more honestly had they been in an entirely private or confidential setting. Although students were on their own computer, sitting only a couple feet apart may have prompted participants to feel hesitant or uncomfortable while answering the survey questions. Since the computers were in rows, if desired, students had the ability to look at each other's screens. However, since there were limited questions per screen/form (learner would answer a few questions and then push the next button or flip the page to move to the next set of questions) and the font was quite small on the surveys, this might have enhanced privacy. Nevertheless, we wanted to run this experiment similar to the way the schools would use the materials in the future. For this reason, we designed

the study to work within the regular classroom environment as opposed to a lab-like setting.

Teachers across all institutes read aloud directions sent to them prior to the experiment. They were given detailed instructions so we could closely monitor and replicate the same environment in each condition. However, in real-life the teachers will run the educational materials the way they deem necessary and useful, which may affect the results of the study. Fortunately, even if the teacher changes the settings, the animated curriculum will still remain exactly the same. The teacher may combine more than one student per computer, or limit the use of headphones in the classroom. To test efficacy of the materials in those settings, further experiments need to be conducted.

Both our experimental and control group settings consisted of males and females. Often while discussing a sensitive subject (e.g., sex education, HIV/AIDS education), teachers may consider separating students by gender and addressing them as two separate groups. It is unclear, in our case, whether placing students of differing gender together, as they would be while learning a non-sensitive subject, affected their interactions with the materials and/or performance on the questionnaires. We would argue that since students are more uncomfortable in mixed-gender settings that separating them further (an argument to make the environment even more comfortable) may lead to similar or greater results. However, follow-up experiments will need to be conducted to measure whether results vary based on gender composition.

Finally, since the intervention was delivered in a scholastic environment, where there are strict schedules that need to be followed; it is unclear whether students had adequate time to complete the surveys.

9.3.5 Technology Constraints

Due to some unexpected technical challenges of the medical animation team, the female version (female doctor and female student) of the animation was not complete at the time of the testing. For this reason, we ran the male version of the animation (male doctor and male student) in all the experimental groups. Hence, it is unclear whether changing the gender of the characters would have a significant effect on knowledge, attitudes or comfort for our learners. Additional experiments will need to be conducted to study these potential gender effects.

9.4 Comparison of Case Study to Framework for Evaluation

Table 35 summarizes the ITA application using the framework for evaluation (Chapter 2). It demonstrates how the application ideally fits into the various categories for the framework.

Table 35. Comparison of Case Study to Framework for Evaluation

	Social Acceptability	Potential Accuracy/ Completeness	Potential Efficacy	Ease of Deployment
Interactive Teaching AIDS	*Why it is socially acceptable:* Curricula presents HIV/AIDS prevention material while decoupling it from traditional sex education (may enter into areas where sex education is banned or considered sensitive). Campaign materials based on both what public health officials consider important as well as needs identified by target population (through	*Why it is accurate/ complete:* ICT-based curriculum delivers exactly the same information every time. Materials vetted by numerous medical and health professionals. Cultural euphemisms and metaphors tested on target population to ensure they are communicating the	*Why it is effective:* Learners can utilize the materials in private or semi-private contexts, and control the pace and flow of information. Detailed information can be provided in a full-tutorial context, as opposed to piecemeal approaches of most mass media campaigns.	*Why it's easy to deploy:* Free software has zero marginal distribution cost when used through the Internet, and minimal cost of production on CD. Materials from CDs can be installed on numerous computers. May be administered regardless of teacher's previous knowledge.

	baseline surveys). Characters designed to suit cultural likes and dislikes (e.g. costumes). Character voices selected to reflect Indian accents (selected by target audience). Script adapted to incorporate colloquial phrases (piloted and iterated based on feedback from target audience). Culturally-appropriate metaphors and euphemisms (piloted and iterated based on feedback from target audience). Male and female specific version to accommodate gender preferences and empowerment. Materials available in multiple languages to suit local audiences.	correct messages. Alternate and novel concepts around teaching about HIV/AIDS prevention materials tested on students to ensure efficacy in learning.	Materials developed based on iterative design process (piloted on hundreds of students in India) to test the learning, retention, comfort and overall efficacy of the learning materials. Summative and formative based on target audience were developed and used. Use of pedagogically-grounded strategies and communications theories to improve learning and retention (e.g. mnemonic devices, voice interfaces)	Learning materials can be deployed using various technologies, depending on local context (computers, mobile devices, project with large screen). May be viewed regardless of Internet connectivity. Materials can be used in conjunction with other materials or as a stand-alone mass communications tool. Materials scalable to small or large audiences (use of computer or PDA for one-on-one interaction or projected to numerous people at the same time, which may be most useful in resource-poor locations. Animations contain subtitles for hearing impaired and audio for preliterate learners to ensure greater access to the materials.

9.5 Contributions

With the success of this approach, there is great potential to change the way educators think of addressing and delivering this form of education entirely. Regardless of the ban on sex education throughout India and the cultural sensitivities around discussing this across the globe, we have discovered a way to provide education for all, regardless of their cultural norms and social contexts. This same methodology can be, and already is

being (see Chapter 10), extended to other contexts where taboo topics hinder the effective dissemination of education for potentially life threatening conditions.

9.5.1 Theoretical Contributions

Chapter 1, discussed some of the difficulties in educating about communication taboos. Determining effective methods to openly discuss and educate about sensitive issues, while encouraging learners to feel safe and communicative, remains a tremendous challenge for educators (Benton & Daniel, 1996). Research indicates that most taboos are inextricably linked with the various transformations of the human body (e.g., sexuality, disease and death) (Allan & Burridge, 2006), making these issues particularly difficult about which to educate. Numerous studies have shown that teachers themselves can be reticent and uncomfortable providing sexual education to their students (Nayak & Bose, 1997; Verma et al., 1997). Although these challenges exist, to our knowledge, there is little, if any, guidance on how to develop effective materials for taboo topics. This research will significantly contribute to the literature around best practices to teach about sensitive subjects. We have coupled the theoretical framework identifying the challenges in teaching about communication taboos (Chapter 1 and 2) and the framework for evaluating multiple dimensions and efficacy of such targeted curricula (Chapter 2) with a successful exemplar that future researchers can draw and build-upon to enhance effective communication, particularly in education and public health related fields.

Communicating learning from this new approach is especially important since we have evidence that it is possible to effectively teach about sensitive issues without disrespecting or challenging cultural beliefs and

norms. Unlike other HIV/AIDS curricula, which are based on biomedical approaches (highly technical) or teach avoidance of particular activities to prevent danger (e.g. "Just Say No" campaigns, abstinence-based sex education), this method incorporates the pedagogical and cultural advantages of each. On one side, students are receiving the scientific knowledge in a way they understand and are able to build on prior knowledge, furthermore extend it to novel contexts. On the other side, stakeholders remain highly comfortable with the message itself and its delivery. If the results from this study are any indication of future possibilities, we have unveiled a theoretical framework which researchers and educators can extend to other challenging and sensitive contexts (e.g., Hansen's disease, formerly known as leprosy).

9.5.2 Empirical Contributions

The empirical findings will contribute to the literature around the complex relationship between knowledge and attitudes. Furthermore, they will help us understand the differences between these relationships for different cultures, socio-economic classes etc. Using a similar pattern to develop rigorous measures, we can determine outcomes in other Asian and African countries, which face similar challenges as India around discussing HIV/AIDS issues publicly.

We can also explore porting this curriculum to other contexts and media (e.g. mobile devices, flip-charts, cartoon books, video) to measure the efficacy of using these platforms to spread awareness. This is especially important since, despite obvious need for this education, not all communities have equal and unlimited access to technology. Alternate media and distribution channels have differing advantages and disadvantages in terms of access, ease-of-development, ease-of-use, cost,

efficacy, and other factors (see table 36). Further research will need to be
conducted in order to determine the true cost/benefit analysis of these
models.

Table 36. Advantages and Disadvantages of Different Media

Medium / Channel	Description	Advantages	Disadvantages
Flash	PC, advanced mobile device-based distribution	Interactivity, Internet-based tracking, rich user interface	Access limited to those with funds and access to PCs and Internet or very sophisticated mobile devices
Java	Intermediate mobile distribution	Improved access over Flash version, private learning environment	Limited UI, difficult to port animation, most mobile devices in India and other developing nations not supported
SMS	Widespread mobile distribution	Universal mobile access, private learning environment	Requires reimagining of curriculum to work through an SMS UI, SMS costs money
Audio	Mobile / landline telephone distribution	Universal telephone access, private learning environment	Requires reimagining of curriculum to work through audio UI, calls cost money
Book	Cartoon books, textbooks, flip-charts	Near-universal access (assuming literate and preliterate versions), storyboard will generally translate well to a book	No interactivity or trackability, high distribution costs

9.5.3 Methodological Contributions

Arguably one of the most significant contributions of this work is its
provision of an understanding of the process of development of such a tool.

Using the framework and following the documented step-by-step process will help educators extended curricula to other contexts.

This dissertation outlines two tiers of methodologies that can be followed. First, there are the more broad concepts. These would include lessons such as conducting assessments to identify the source of the taboos, understanding the cultural challenges, assessing various methods to deliver curricula, and iterative testing and development, among others. The second tier includes more specific strategies to appropriate an application, including selection of proper voices, suitable graphics, culturally appropriate analogies, mnemonic devices, and colloquial passages. Together, these strategies can inform the design of more effective interventions.

9.5.4 Scalability and Diffusion of Innovation

The diffusion of innovations theory (Rogers, 1995) concerns how new technology spreads through cultures. With the success of this study, curricula like the ITA application can be disseminated through informal and formal learning environments. Informal learning environments would include museums or by NGOs or other outreach organizations developing HIV awareness campaigns.

Formal learning environments would include school-like facilities. Schools are ideal vehicles for dissemination of accurate and comprehensive HIV/AIDS related information and have been identified by experts as appropriate places to undertake such activities (Kirby, Short, Collins, Rugg, Kolbe, Howard & Miller, Sonenstein & Zabin, 1994; SIECUS, 1999).

First, involvement in and attachment to school and plans to attend higher education are all related to less sexual risk-taking and lower pregnancy rates. Second, students in schools with manifestations of poverty and disorganization are more likely to become pregnant. Third, some school programs specifically designed to increase attachment to school or reduce school dropout effectively delayed sex or reduced pregnancy rate, even when they did not address sexuality. Fourth, sex and HIV education programs do not increase sexual behavior, and some programs decrease sexual activity and increase condom or contraceptive use. Fifth, school-based clinics and school condom-availability programs do not increase sexual activity, and either may or may not increase condom or contraceptive use. Other studies reveal that there is very broad support for comprehensive sex- and HIV-education programs, and accordingly, most youth receive some amount of sex or HIV education. However, important topics are not covered in many schools. (Kirby, 2002)

Because this tutorial does not incorporate explicit images or educate via traditional sex education, its likelihood of acceptance among Indian schools and other informal structures is greater. Also, locating critical information within ICT allows educators to comfortably facilitate and/or augment the learning process and alleviates pressure to deliver accurate medical content and feelings of embarrassment or uneasiness. Outside of these physical environments, it can also be disseminated via the Internet, including social networks like Facebook and Orkut, popular among young learners.

The next stage in scaling this solution is to create a collaborative system to allow participants from around the world to contribute to developing new curricula. This would be a web-based system much like Wikipedia, except with structured data and processes to allow for staged development and high levels of quality control. High quality, verified content is a requirement for any health-related curriculum. The creation of this system will not only allow for the creation of more effective curricula, but it will also allow those curricula to be developed and iterated upon more quickly

169

than ever before. This is particularly advantageous in dealing with possible future public health outbreaks along the lines of conditions like SARS.

9.5.5 Future Research

There are several avenues to extend this research. Because minimal research has been conducted on how to properly develop efficacious materials on taboo topics, the theories and lessons presented in this dissertation can be iterated using other dimensions to further promote effective learning and positive changes in attitudes and behaviors.

First, although we had developed two versions of the animation (male and female) where everything except the gender of the characters were altered, due to technical difficulties, we were only able to utilize the male version in all of our experimental conditions. Medical research suggests that in dealing with sensitive issues around preventative health services, gender concordance between the patient and medical practitioner is an important factor, particularly among females (Fang et al., 2004). For this reason, properly testing whether these same theories of comfort around sensitive issues extend into to the ICT dimension will help researchers and educators understand how to develop and promote more persuasive technologies.

Second, although interactive technologies have shown to be ideal in certain learning conditions, many parts of the world do not have the means to provide one computer per student. In addition to the interactive versions of the learning materials, we have developed nearly identical video (linear) versions for locations with limited technology infrastructure. There are new technologies for these environments where classrooms can use one screen and multiple mice to learn about topics (Moraveji, Inkpen, Cutrell,

Balakrishnan, 2009; Moraveji, Kim, Pawar, Ge, Inkpen, 2008; Pal, Pawar, Brewer, & Toyama, 2006; Pawar, Pal, Gupta, Toyama, 2007). Varying the number of screens, users and mice and examining their effect on learning outcomes may lead to interesting alternatives for learning about sensitive issues.

Furthermore, understanding the effects on comfort levels around sensitive issues, while altering the learning environment may lead to interesting outcomes. Several students noted comments about feeling comfortable because they were interacting with the sensitive materials "alone".

"… [We're] shy when we talk about sexual part[s]. [B]ut in this case first of all it is a animation and second, [I'm] watching it alone so [I] feel much comfortable [than] other methods."

"Yes, [I] felt more [comfortable]. [The tutorial] was one to one [interaction], with no one watching me. [I]t maintained privacy, and [I] did not feel uneasy. [I] was provided with speakers so no one could listen except me. [I]t was the best way from [which I] could get relevant information about hiv and aids."

The current research is interesting because the students were never alone. In fact, they were constantly monitored in the classroom environment. Throughout the study they were surrounded by dozens of their peers and several classroom administrators. Furthermore, each student was watching the same material (at their own pace) so logically they all knew that their peers around them were learning about and interacting with the same sensitive materials. It is unclear exactly what variable, or combination of variables (e.g. headphones, personal computer, animated characters, culturally-appropriate voices), caused students to feel safe in this learning environment. What we do know is that it was important to learners to feel this sense of safety, especially while learning about HIV/AIDS.

Another extension of this research would be to learn more about the communication patterns learners use while sharing this sensitive information, particularly among seropositive individuals. AIDS evokes a sense of anxiety because of its relationship with death (Herek & Glunt, 1988). As seropositive individuals start to show symptoms associated with the virus, they may also start to feel more depressed (Derlega & Barbee, 1998). However, according to one study, the one-year period after the onset of symptoms may be critical as some individuals are less likely to show an increase in their depressive states if they are relatively satisfied with their informational support system[26] (Hays, Turner & Coates, 1992). In these situations, informational social support can be helpful to combat stress associated with HIV symptoms (Hays et al., 1992). Furthermore, having a supportive confidant may decrease the likelihood of an HIV-positive person thinking about suicide (Schneider, Taylor, Hammen, Kemeny & Dudley, 1992, as cited in Derlega & Barbee, 1998). Further research must be conducted to measure whether these findings are generalizable to all HIV-positive populations. As mentioned earlier, our research results show that more than 90 percent of those who interacted with the animation mentioned it to someone they knew. It would be interesting to measure whether seropositive individuals were also likely to share information about HIV or their status with others as a result of such an intervention. Sharing feelings about HIV or divulging seropositivity to loved ones or other individuals (who are also credible informational sources) may help garner the support needed to further combat stress, depression and suicidal thoughts.

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[26] Support may include any trustworthy sources of information (e.g., friends, medical experts)

This research should be extended to rural communities, particularly female populations (Chapter 4), who have arguably the most need and the least access to prevention information. Using the various modes of education (video presentation, cartoon book etc.) researchers can evaluate and extend upon the ways to teach about taboo topics in some of these challenging communities.

Finally, although the primary purpose of this intervention was to provide access to HIV/AIDS education to those who currently do not have access, this research can be extended to the domain of actual behavior change. Besides measuring actions associated with communication (e.g., spreading awareness, researching related topics), researchers can assess whether access to this method of education has an impact on, for instance, measures relating to sexual activity and factors associated with risky sexual behaviors.

9.6 Conclusion

The successful outcomes of the Interactive Teaching AIDS intervention on hundreds of young adults in India have demonstrated that it is possible to create an effective HIV/AIDS education curriculum despite the challenges in educating about taboo topics. We have also proposed several theories and methodologies to teach about taboo subjects despite numerous barriers. Tools like the ITA application can be disseminated through formal and informal learning environments, depending on where it is most suitable. Because these applications do not incorporate explicit images or educate through traditional (Western society-based) sex education approaches, they have been acceptable in various institutes and other organizations throughout India. Using these lessons, reticent educators can more comfortably facilitate the learning process without the pressure

of delivering accurate medical content, while minimizing feelings of embarrassment or uneasiness. Furthermore, such applications can be administered as a standalone learning tools or used as a supplement to an existing curriculum. Educators can use canned versions irrespective of their previous knowledge or extend modules using the similar methodologies.

Building on previous theoretical and empirical literature, we have introduced a framework of evaluation, outlining critical issues to consider while designing effective materials to best educate on taboo topics. Combining the flexibility of ICT-based applications with culturally-appropriate learning materials, educators can develop tools which both maximize learning and simultaneously work within existing cultural norms and traditions. Through the dissemination of effective and carefully crafted messages, we can hope to better provide open access to learning materials and improve the lives of individuals around the world.

10 Epilogue: Success of Interactive Teaching AIDS

"My question, 'What would the reaction here in India be if schools taught a culturally sensitive science and fact based approach to sex education'. I had asked the question in all five countries [US, Rwanda, India, Thailand & Nicaragua] to officials, doctors, and the directors of each organization covered. The responses always extolled the great impetus such an approach could have at removing stigma, creating understanding, and empowering a population with life saving knowledge. However what usually follows is the realization that such programs or practices simply do not take place in large scale. The reason is steeped in taboos stemming from culture, religion, or governmental bureaucracy and no example was more palpable then in India... Whereas my question was only hypothetical, it has now become a reality through Stanford University and the hard work of Piya Sorcar. Their model teaches the issues through facts and a culturally sensitive approach. It absorbs the culture and integrates it into the material without sacrificing the essential messages... Each country has its own culture and that is the beauty of the program; keep the facts and alter the dressing. This computer based model can make a great difference in addressing one of the biggest issues concerning HIV – awareness, prevention, and understanding."

> – Marco Ambrosio
> Global Social Justice Advocate
> United States

During the research and development of this dissertation, the animated prototypes and descriptions of the design process were made available online. We received numerous emails from government agencies, non-governmental organizations, and primary, secondary and tertiary institutions from all over the world. Educators described the great difficulties and sensitivities around teaching about HIV/AIDS and related topics and how this new approach had the potential to revolutionize the way these topics are taught in their communities. Although the various educators and other stakeholders were pleased with the theoretical arguments on which the applications were based, working first-hand with

the ground-realities, they seemed to intuitively and immediately recognize the unique utility of the materials.

> *"What is very impressive is the sensitivity, clarity and simplicity with which the issue has been dealt with and demystified."*

> – Dilreen Kaur
> Head-Projects, Ritinjali
> New Delhi, India

Based on this demand, our organization and its efforts grew quickly. The success of the *Interactive Teaching AIDS* applications led to the development of *TeachAIDS.org*, a non-profit focused on raising HIV/AIDS awareness despite social and cultural barriers. The theory, methodology, and development process outlined in the previous chapters have been extended to create learning applications for people of diverse cultures. Numerous organizations have contacted us about the need for these educational materials while also describing their financial struggles and limitations. The fact that our mission was not only to develop high quality HIV/AIDS educational materials, but also to disseminate them free of cost throughout the world, was met with enthusiasm as well as surprise.

Figure 44. Stanford Students Working on TeachAIDS.org applications

TeachAIDS.org has also partnered with dozens of organizations in order to expand our operation and develop localized versions of our applications, while at the same time make our current versions more easily available to those who need them. Since the development of our first prototypes, our applications have been accessed online by people in more than 40 countries around the world.

Figure 45. ITA Indian and General Applications

Snapshots of the Indian and general version characters from the interactive applications. Illustrations for the Indian version by Manick Sorcar Productions. Illustrations for general version by the Korean National Medical Information Center and Care and Visual Ltd.

We were initially funded in 2006 by the Ministry of Science and Technology of South Korea, when my team started working closely with the Korean National Medical Information Center. A professional medical animation team (medical doctors who were also trained animators) animated our initial applications. Several versions were animated, including ones aimed at addressing Asian cultural sensitivities and another extended to create a general version, where the basic education could be further adapted to many cultural settings.

In late 2006-2007, Mr. and Mrs. Vinod and Neeru Khosla were introduced to the animated materials and generously funded the development of the initial India-specific animations. Several organizations and institutes are now using these materials to educate learners across India.

"TeachAIDS has provided the CMR Schools a simple tool to educate students on HIV/AIDS. It has proved to be engaging to students of all ages, from school kids to undergraduate and post graduates. Not only are our teachers and students comfortable and excited about the animation, but the parent community has been extremely supportive of it too primarily because it is culturally appropriate combating ingrained Indian sensitivities. TeachAIDS is structured and aptly designed for the Indian audience, and there is no doubt that millions of school children in India will be benefited from it in the coming years."

– Sabitha Ramamurthy
President, CMR Jnanadhara Trust
Bangalore, India

Figure 46. Rural Health Education Project in Goa, India

The Canadian International Development Agency (CIDA) uses TeachAIDS.org materials for their Rural Health Education Project in Goa, India. The aim of the project, organized by Algonquin College in Ottawa, Canada, was to address poverty in Goa by designing health education and training programs that address the expressed needs of rural communities.

With the help of educators from numerous organizations coupled with extensive volunteer efforts at Stanford, these materials are now being translated into all the major languages of India.

Figure 47. Military Soldiers Educated in Arunachal Pradesh, India

TeachAIDS.org animations screened to 300 soldiers in military camps and 365 civilians in schools and colleges in Arunachal Pradesh, India, to increase HIV/AIDS awareness, prevention, and treatment methods.

In addition to providing these materials through various formal learning environments, numerous NGOs and other educators have been using them to teach rural populations and at-risk groups in informal learning environments. Dr. Pankaj Singh Poswal, a dedicated army doctor and liaison officer with the civil medical staff of the government of Arunachal Pradesh, conducted numerous massive awareness campaigns in late 2008 to educate several hundred soldiers as well as high school and college students in the neighboring communities. TeachAIDS.org has also partnered with NGOs like Maitri and Cents of Relief to provide materials to educate vulnerable women and children. Through Cents of Relief, the culturally-appropriate materials will be used in a night shelter for young girls whose mothers have been trafficked into prostitution in West Bengal.

Over the past couple of years, TeachAIDS.org has responded to similar needs of stakeholders in several other countries throughout Asia. The materials are available through the Korean National Medical Information Research Center's website for national public use in South Korea. In June of 2008, we partnered with the Fuyang AIDS Orphan Salvation Association and the AIDS Policy Research Institute at Tsinghua University to develop HIV/AIDS materials in response to similar cultural sensitivities that exist in China. Ms. Zhang, the Director of Fuyang AIDS Orphan Salvation Association, and her outstanding organization was featured in 2006 Oscar Winning Documentary *The Blood of Yingzhou District* for their outreach efforts. Over a span of several months, we collaborated using the same rigorous pre-assessment and post-assessment research methods and development process to develop culturally-appropriate animated materials in Mandarin.

Figure 48. Middle School Students in Fuyang, China

Middle school children exposed to TeachAIDS.org materials as part of a massive educational campaign to raise awareness in the Yingzhou District of Fuyang. The campaign was a joint effort between TeachAIDS.org, the Fuyang AIDS Orphan Salvation Association, and the AIDS Policy Research Institute at Tsinghua University.

Because we were translating our materials from English to Mandarin, we used a research-based back-translation process[27] to rigorously ensure the accuracy of our materials. In June-August of 2008, the TeachAIDS.org animations were shown to hundreds of students, across several middle schools, as part of a massive educational campaign to raise awareness in the Yingzhou District of Fuyang; an area highly infected with HIV. With limited resources, the children in these communities had never used computers. Our team developed a special linear (video) version, which was used in these awareness campaigns. We are continuing to conduct research in these areas to further iterate, fine-tune and extend the China versions[28]. Recently, we also partnered with the SEADs organization in Vietnam to conduct research and launch several localized Vietnamese versions for rural communities there. These versions will be released in the summer of 2009.

"TeachAIDS.org in the South African context presents a fresh intervention from the currently overloaded and competing ABC messages targeted at youth. The animation tool provides a platform for direct engagement with youth in a scientific, simple and friendly manner that creates an individualized and safe learning environment. In the context of the Central Johannesburg College, the tool provides a supplementary support to the Life Skills Curriculum."

> – Kokeb G. Kassaye
> Program Manager – Central
> Johannesburg College Workforce and
> Youth Development
> Institute for African Innovation (IFAI)
> Johannesburg, South Africa

Facing similar taboo issues, TeachAIDS.org was approached by numerous organizations throughout Africa. In November 2008, we partnered with

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[27] This back-translation process is used while developing all of our culturally-appropriate education materials.

[28] The TeachAIDS.org animations are available in Mandarin and are currently being extended into Cantonese.

Central Johannesburg College (CJC), one of the 49 publicly-funded Further Education and Training colleges in South Africa, to test the efficacy of various HIV/AIDS education materials amongst the college's 7000 students across five campuses. Together we are conducting large-scale pre-assessment and post-assessment studies in order to develop evidence-based, culturally-appropriate interactive materials to better address stigma-related issues.

Figure 49. Baseline Study in Johannesburg, South Africa

Students at Central Johannesburg College (CJC) in South Africa working on TeachAIDS.org baseline study. These assessments are being used to develop culturally-appropriate materials for learners.

TeachAIDS.org was approached by the Ministry of Education (MoE) in Botswana to develop localized materials as a response to the high prevalence rates there. With an estimated 17 percent of the population (18 months – 74 years) infected.

"Botswana needs a new way to talk about HIV; it needs to be engaging and interactive. I believe that by partnering together we will be able to adapt your product to create an effective tool for Botswana."

> – Lila Pavey
> HIV Specialist,
> Botswana Ministry of Education
> Gaborone, Botwswana

Figure 50. HIV/AIDS Awareness among Youth in Gaborone, Botswana

Youth at Stepping Stones International in Botswana interacting with TeachAIDS.org applications.

TeachAIDS.org has now partnered with various organizations in Botswana to translate the animations into Setswana and adapt them to the local context. The materials have been formally approved by the Curriculum, Development and Evaluation sector and will be implemented into every primary, secondary, and tertiary institution throughout the country.

Outside of the institutional and governmental framework, we have also partnered with multiple reputable NGOs throughout Africa who deal with the ground realities of HIV/AIDS education. In May 2008, we partnered with CARE-International in Rwanda to develop interactive learning tools for rural communities in the local language, Kinyarwanda. The animations will be used as part of the Communities Allied Against Violence and AIDS Project (CAVA), which is partly funded by the European Commission and partly by CARE UK. This program targets 35,000 community members, including staff members of primary and secondary schools, young adults and health service providers. Our animated materials will feature voices from famous personalities from the Rwanda Cinema Center.

Through our partnership with Support for International Change (SIC), an NGO founded to limit the impact of HIV/AIDS in underserved communities, we are in the midst of developing localized materials in Swahili, which will be used by numerous organizations in Tanzania and Kenya, starting the summer of 2009. Recently we partnered with the United States Peace Corps, Population Services International Benin and the Benin Education Fund to develop a Beninese/Francophone version of the animation targeted for West African countries. The animation will be used to supplement existing HIV/AIDS education and awareness raising activities of these organizations.

Figure 51. TeachAIDS.org at Oakland International High School

High school students at Oakland International High School in California, United States, using TeachAIDS.org materials as part of their comprehensive lessons on HIV/AIDS awareness and prevention strategies.

"In earlier discussions about health, sex education, and STDs, it was clear that students from different cultures had different comfort levels engaging with the content. However, with the animations, I felt as though most students were equally comfortable and engaged. By simultaneously connecting graphics, text, and audio, it reinforced the important concepts and new vocabulary words."

– Harriet Huang
Science Teacher, Teach for America
California, United States

We recently partnered with the Stanford Program on International and Cross-Cultural Education in order to develop a supplemental educator's handbook, which will officially be distributed through K-12 schools in the United States and independent schools abroad. The handbook will be available in May 2009.

Figure 52. Stanford Leading Matters Production
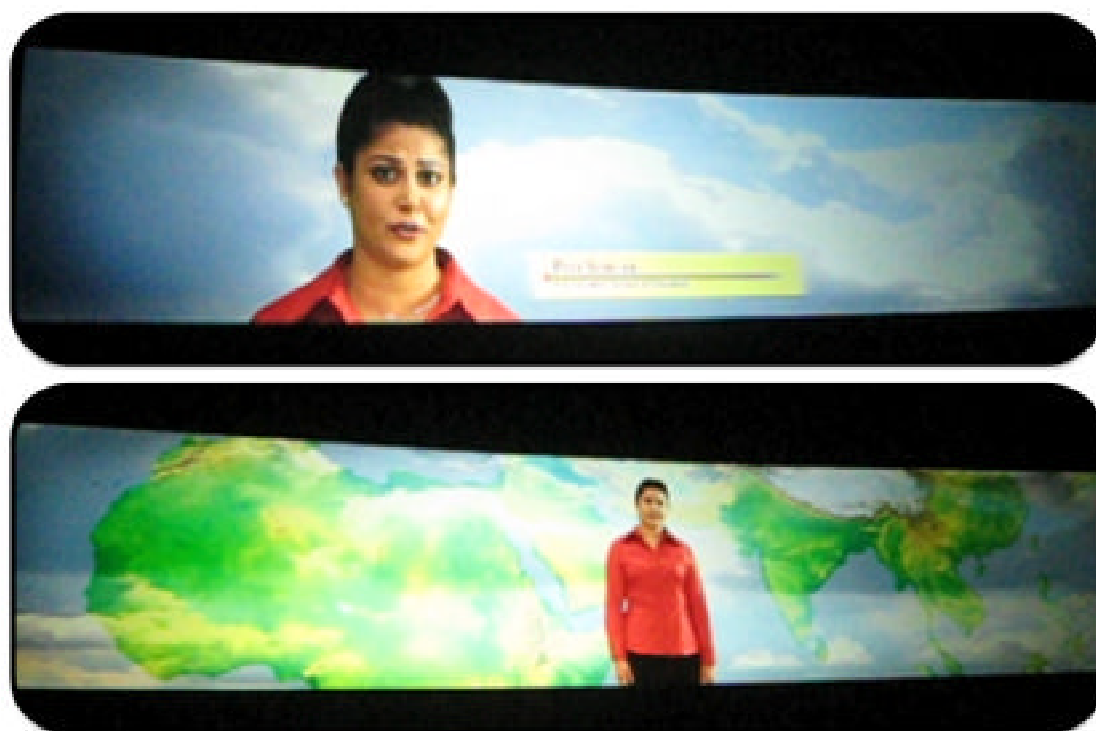
TeachAIDS.org outreach efforts selected for Leading Matters production as part of the Stanford Challenge. Stanford University President John Hennessy is touring this production for three years around the world including Hong Kong, Tokyo and selected locations throughout the United States.

Through our partnership with government agencies, non-governmental organizations, educational and research institutions, and industry, our materials are now available in numerous countries (see Appendix T for partial list of partners, sponsors, and supporters). Our team of interdisciplinary experts continues to work with these entities to conduct sound research and adapt our applications to novel contexts to respond to

cultural sensitivities and taboos. Educating around HIV/AIDS prevention strategies is just the beginning. We are constantly extending and improving our approach to developing these types of materials, we hope to expand our set of curricula to include other critical topics. It is our hope to be able to provide free, effective prevention education to anyone in the world, despite any social and cultural barriers that may exist.

Appendices

Appendix A: Census of India (2001), Literacy Rates

	STATE	LITERACY RATE (2001 Census) (in %)			LITERACY RATE (1991 Census)	CHANGE IN LITERACY RATE (1991-2001)
		PERSONS	MALES	FEMALES		
	INDIA 1	65.38	75.96	54.28	51.63	13.75
1	Andaman & Nicobar Is.*	81.18	86.07	75.29	73.02	8.17
2	Andhra Pradesh	61.11	70.85	51.17	44.09	17.02
3	Arunachal Pradesh	54.74	64.07	44.24	41.59	13.15
4	Assam	64.28	71.93	56.03	52.89	11.52
5	Bihar	47.53	60.32	33.57	37.49	10.04
6	Chandigargh*	81.76	85.65	76.65	77.81	3.94
7	Chhatisgarh	65.18	77.86	52.40	42.91	22.27
8	Dadra & Nagar Haveli*	60.03	73.32	42.99	40.71	19.33
9	Daman & Diu*	81.09	88.40	70.37	71.20	9.89
10	Delhi*	81.82	87.37	75.00	75.29	6.53
11	Goa	82.32	88.88	75.51	75.51	6.81
12	Gujarat	69.97	80.50	58.60	61.29	8.68
13	Haryana	68.59	79.25	56.31	55.85	12.74
14	Himachal Pradesh	77.13	86.02	68.08	63.86	13.27
15	Jammu & Kashmir	54.46	65.75	41.82	NA	NA
16	Jharkhand	54.13	67.94	39.38	41.39	12.74
17	Karnataka	67.04	76.29	57.45	56.04	11.00
18	Kerala	90.92	94.20	87.86	89.81	1.11
19	Lakshadweep *	87.52	93.15	81.56	81.78	5.74
20	Madhya Pradesh	64.11	76.80	50.28	44.67	19.41
21	Maharashtra	77.27	86.27	67.51	64.87	12.39
22	Manipur	68.87	77.87	59.70	59.89	8.97
23	Meghalaya	63.31	66.14	60.41	49.10	14.21
24	Mizoram	88.49	90.69	86.13	82.27	6.22
25	Nagaland	67.11	71.77	61.92	61.65	5.45
26	Orissa	63.61	75.95	50.97	49.09	14.52
27	Pondicherry*	81.49	88.89	74.13	74.74	6.74
28	Punjab	69.95	75.63	63.55	58.51	11.45
29	Rajasthan	61.03	76.46	44.34	38.55	22.48
30	Sikkim	69.68	76.73	61.46	56.94	12.61
31	Tamil Nadu	73.47	82.33	64.55	62.66	10.81

32	Tripura	73.66	81.47	65.41	60.44	13.22
33	Uttar Pradesh	57.36	70.23	42.98	40.71	16.65
34	Uttaranchal	72.28	84.01	60.26	57.75	14.53
35	West Bengal	69.22	77.58	60.22	57.70	11.52

Notes:

1. The population of India includes the estimated population of entire Kachchh district, Morvi, Maliya-Miyana and Wankaner talukas of Rajkot district, Jodiya taluka of Jamanagar district of Gujarat State and entire Kinnaur district of Himachal Pradesh where population enumeration of Census of India 2001 could not be conducted due to natural calamity.

2. Figures shown against Population in the age-group 0-6 and Literates do not include the figures of entire Kachchh district, Morvi, Maliya-Miyana and Wankaner talukas of Rajkot district, Jodiya taluka of Jamanagar district and entire Kinnaur district of Himachal Pradesh where population enumeration of Census of India 2001 could not be conducted due to natural calamity.

3. Figures shown against Himachal Pradesh have been arrived at after including the estimated figures of entire Kinnaur district of Himachal Pradesh where the population enumeration of Census of India 2001 could not be conducted due to natural calamity.

(Source: *Provisional Population Totals : India : Census of India 2001, Paper 1 of 2001*)

Appendix B: Census of India (2001), Population Totals

SL	India/States/ Union Territories*	Population 2001			Percentage Decadal Growth		Sex Ratio(F/1000M)		Population Density		Literacy Rate 2001		
		Persons	Males	Females	1981-91	1991-01	1991	2001	1991	2001	Persons	Males	Females
	India	1027015247	531277078	495738169	23.86	21.34	927	933	267	324	65.38	75.85	54.16
1	Jammu & Kashmir	10069917	5300574	4769343	30.34	29.04	896	900	77	99	54.46	65.75	41.82
2	Himachal Pradesh	6077248	3085256	2991992	18.79	17.53	976	970	93	109	77.13	86.02	68.08
3	Punjab	24289296	12963362	11325934	20.81	19.76	882	874	403	482	69.95	75.63	63.55
4	Chandigarh *	900914	508224	392690	42.16	40.33	790	773	5632	7903	81.76	85.65	76.65
5	Uttaranchal	8479562	4318401	4161161	24.23	19.20	936	964	133	159	72.28	84.01	60.26
6	Haryana	21082989	11327658	9755331	27.41	28.06	865	861	372	477	68.59	79.25	56.31
7	Delhi *	13782976	7570890	6212086	51.45	46.31	827	821	6352	9294	81.82	87.37	75.00
8	Rajasthan	56473122	29381657	27091465	28.44	28.33	910	922	129	165	61.03	76.46	44.34
9	Uttar Pradesh	166052859	87466301	78586558	25.55	25.80	876	898	548	689	57.36	70.23	42.98
10	Bihar	82878796	43153964	39724832	23.38	28.43	907	921	685	880	47.53	60.32	33.57
11	Sikkim	540493	288217	252278	28.47	32.98	878	875	57	76	69.68	76.73	61.46
12	Arunachal Pradesh	1091117	573951	517166	36.83	26.21	859	901	10	13	54.74	64.07	44.24
13	Nagaland	1988636	1041686	946950	56.08	64.41	886	909	73	120	67.11	71.77	61.92
14	Manipur	2388634	1207338	1181296	29.29	30.02	958	978	82	107	68.87	77.87	59.70
15	Mizoram	891058	459783	431275	39.70	29.18	921	938	33	42	88.49	90.69	86.13
16	Tripura	3191168	1636138	1555030	34.30	15.74	945	950	263	304	73.66	81.47	65.41
17	Meghalaya	2306069	1167840	1138229	32.86	29.94	955	975	79	103	63.31	66.14	60.41
18	Assam	26638407	13787799	12850608	24.24	18.85	923	932	286	340	64.28	71.93	56.03
19	West Bengal	80221171	41487694	38733477	24.73	17.64	917	934	767	904	69.22	77.58	60.22
20	Jharkhand	26909428	13861277	13048151	24.03	23.19	922	941	274	338	54.13	67.94	39.38
21	Orissa	36706920	18612340	18094580	20.06	15.94	971	972	203	236	63.61	75.95	50.97
22	Chhatisgarh	20795956	10452426	10343530	25.73	18.06	988	990	130	154	65.18	77.86	52.40
23	Madhya Pradesh	60385118	31456873	28928245	27.14	24.34	912	920	158	196	64.11	76.80	50.28
24	Gujarat	50596992	26344053	24252939	21.19	22.48	934	921	211	258	69.97	80.50	58.60
25	Daman & Diu *	158059	92478	65581	28.62	55.59	969	709	907	1411	81.09	88.40	70.37
26	Dadra & Nagar Haveli *	220451	121731	98720	33.57	59.20	952	811	282	449	60.03	73.32	41.99
27	Maharashtra	96752247	50334270	46417977	25.73	22.57	934	922	257	314	77.27	86.27	67.51
28	Andhra Pradesh	75727541	38286611	37440730	24.20	13.86	972	978	242	275	61.11	70.85	51.17
29	Karnataka	52733958	26856343	25877615	21.12	17.25	960	964	235	275	67.04	76.29	57.45
30	Goa	1343998	685617	658381	16.08	14.89	967	960	316	363	82.32	88.88	75.51
31	Lakshadweep *	60595	31118	29477	28.47	17.19	943	947	1616	1894	87.52	93.15	81.56
32	Kerala	31838619	15468664	26369955	14.32	9.42	1036	1058	749	819	90.92	94.20	87.86
33	Tamil Nadu	62110839	31268654	30842185	15.39	11.19	974	986	429	478	73.47	82.33	64.55
34	Pondicherry *	973829	486705	487124	33.64	20.56	979	1001	1683	2029	81.49	88.89	74.13
35	Andaman & Nicobar Island *	356265	192985	163280	48.70	26.94	818	846	34	43	81.18	86.07	75.29

Appendix C: Buladi Campaign in West Bengal, India

The Buladi campaign[29] was launched in West Bengal in 2005, designed by Oglivy and Mather, sponsored by West Bengal AIDS Control Society. Buladi is a fictitious female rag doll who serves as a counselor and confidante. The idea behind the health intervention was to educate women, and through them, men, about the basics of HIV/AIDS education. These pictures were given to us directly from the West Bengal AIDS Control Society. Below were some of the messages spread across billboards, posters in West Bengal.

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[29] Pictures courtesy of West Bengal State AIDS Control Society

Appendix D: Balbir Pasha AIDS Awareness Campaign

Below are materials from the Balbir Pasha health campaign created by Lowe to target urban men aged 18-34 in lower socioeconomic groups in Mumbai aimed to educate males on HIV/AIDS myths and generate discussion on HIV/AIDS. The campaign was funded by Population Services International. Below were some of the messages[30] spread across billboards, posters in Mumbai, India.

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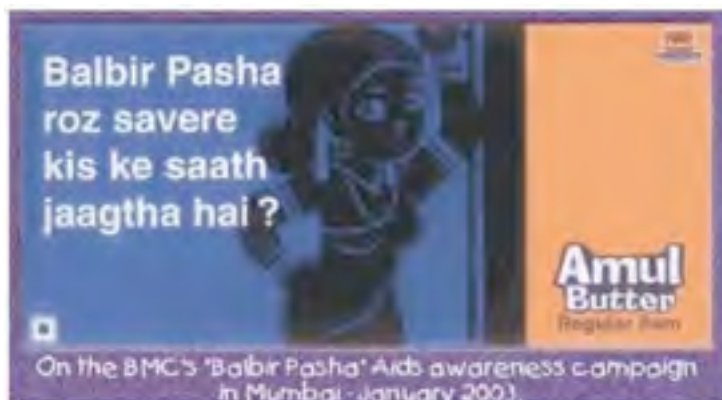
[30] Images from: www.usaid.gov, balbirpasha.com

Appendix E: Selected Sex Education Materials Banned in India

Below are pictures of some objectionable content from the Adolescence Education Programme, designed for secondary and higher secondary classes. The teachers' workbook was a joint effort between the Indian Ministry of Human Resource Development and the National AIDS Control Organization of India (NACO, 2007). According to a press release by NACO, the National Council of Educational Research and Training (NCERT) stated that this curriculum, which includes HIV/AIDS prevention information, was rejected by several state government bodies in India (NACO, 2007). Hence, the materials will not be used in public schools in several states across India.

Before developing the educational materials, NACO held a national seminar encouraging discourse among key stakeholders, including teachers, parents, education experts and state governments (NACO, 2007).

Below is a picture taken in Lucknow. School teachers are burning sex education books and materials. The teachers refuse to teach this sort of education in schools in India. Similar events have occurred throughout India.[31]

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[31] Pictures reproduced from India Together article, 2008

Appendix F: National AIDS Control Organization (NACO)

NACO Organogram[32]

[32] Chart reproduced from National AIDS Control Organization website
http://www.nacoonline.org/NACO

Appendix G: Development Process

The initial stages of Interactive Teaching AIDS required concept mapping and screenplay design based on in-depth interviews with first-generation Indians who recently moved to the United States.
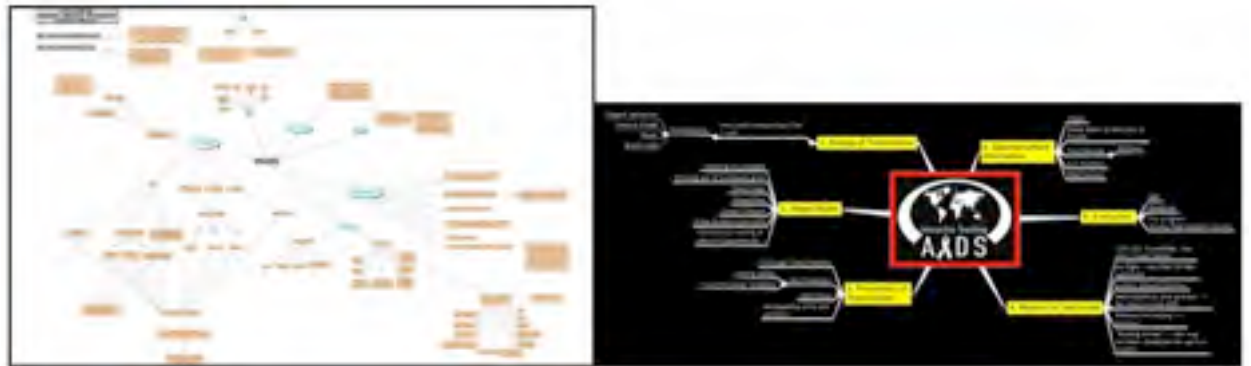
Low-fidelity paper storyboards were tested with target populations. The storyboards went through an extensive iterative design process (from 50 to 200 slides). Below are selected pictures at various stages.

The design team experimented several interfaces with users, which included a few below.

Several sets of characters were specially developed for our application. For the Indian research version, a set of male and female characters were designed by a famous Indian cartoonist. The custom characters were based upon the results of an IRB-approved study conducted on 200 students in India, to promote figures that maximized comfort and efficacy.

The Asian characters were developed by Medical Research Information Center in South Korea. The characters were designed in a generic fashion to accommodate all groups of people.
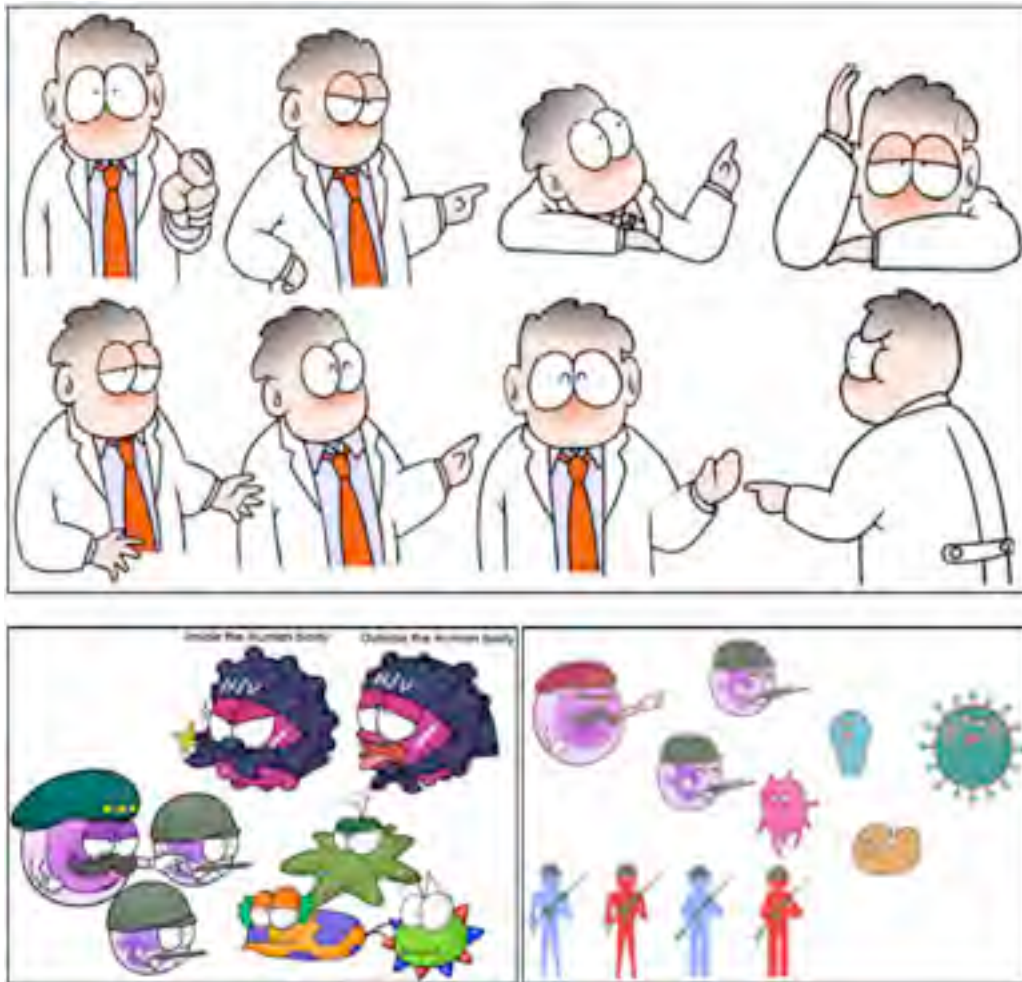
Below are some of the scenes from the latest version of the curriculum.

In-depth user testing was conducted on several first-generation young adults from India, who recently moved to the United States.
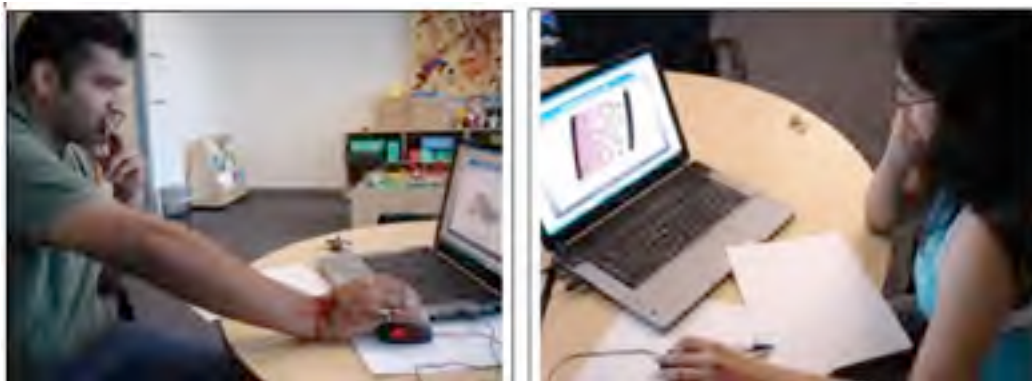
Appendix H: Curriculum and Outreach Team

Note: This is only a partial list. The full list is available at TeachAIDS.org.

Piya Sorcar   Founder and Executive Director
Ph.D. candidate, Stanford University

Dr. Terrance Blaschke   Medical Advisor
Professor Emeritus of Medicine
Clinical Pharmacology, Stanford University

Dr. Dipankar Chakravarti   Marketing Research Advisor
Professor and Vice Dean for Programs
School of Business, Johns Hopkins

Ashwini Doshi   Program Director
Senior Consultant
Deloitte

Dr. Rafiq Dossani   India Expert/Outreach Efforts
Executive Director, South Asia Initiative
Stanford University

Dr. Shelley Goldman   Education Advisor
Professor of Education
Stanford University

Dr. Seble Kassaye   Medical Advisor
Instructor
Medical School, Stanford University

Dr. David Katzenstein   Medical Advisor
Professor of Medicine
Infectious Diseases and Geographic Medicine, Stanford University

Dr. Paul Kim   Education Advisor
Assistant Dean and CTO
School of Education, Stanford University

Cheryl Koopman   Research Advisor
Professor (Research) of Psychiatry and Behavioral Sciences
Stanford University

Dr. Clifford Nass   Communications/HCI Advisor
Professor of Communication
Humanities and Science, Stanford University

Dr. Tomiko Nguyen-Trung   Storyboard Consultant
Former Emergency Medicine Physician

Dr. Doug K. Owens   Outreach/Research Advisor
Prof. of Medicine and Health Research and Policy (by courtesy)
Center for Health Policy/Primary Care and Outcomes Research, Stanford
University

Dr. Roy Pea   Education Advisor
Professor of Education
School of Education, Stanford University

Dr. Syed Shariq   Outreach/Research Advisor
Co-chair for Kozmetsky Global Collaboratory
Stanford University

Dr. Randall Stafford   Medical Advisor
Director for Program on Prevention Outcomes and Practices,
Stanford University

Payal Sutton   Storyboard Advisor
Clinical Research Associate
Paraxel International

Dr. Lucy Thairu   Medical/Nutrition Advisor
Interim Associate Director
Center for African Studies, Stanford University

Dr. Swati Tole   Medical Advisor
Center for Health Policy/Center for Primary Care and Outcomes Research
Stanford University

Dr. Decker Walker   Education Advisor
Professor Emeritus, School of Education,
Stanford University

Donnovan Yisrael   Storyboard Advisor
Supervisor for HIV Peer Anonymous Counseling & Testing
Stanford University

Appendix I: Initially Approved India Baseline Survey

This is a general **Health Education Survey** and is completely anonymous. Please answer honestly and to the best of your ability. Do not talk to anyone until after you have completed the survey. Thank you!

1) What are your favorite television categories?
_____Action/Adventure
_____Animation/Cartoon
_____Family serials
_____Serials for young people
_____Comedy
_____Horror
_____Other (please describe)_____

2) What are your favorite movie categories?
_____Bollywood movies
_____Family movies
_____Movies for young people
_____American/Western movies
_____Art films
_____Other (please describe)_____

3) Do you have a mobile phone?   Yes_____   No_____

From 1 to 7, rank how often you use your mobile phone for each of the following activities:
_____Talking with friends
_____Talking to your family
_____Games
_____SMS
_____Web Access
_____MMS
_____Other (please describe)_____

What kind of mobile phone you have? (Answer with brand name, if possible)
_____

How often do you use your mobile phone each week?
_____Never
_____Less than 30 minutes a week
_____30 minutes to 1 hour a week
_____1-5 hours a week
_____ more than 5 hours a week

Who pays for your mobile phone? Me _____ Parents _____ Brother/Sister _____ Other _____

How many mobile phones do you have in your immediate family?_____

4) How often do you use a computer?
_____Never
_____Less than 30 minutes a week
_____30 minutes to 1 hour a week
_____1-5 hours a week
_____ more than 5 hours a week

If yes, which types of websites do you visit most often?
_____Blogs
_____Informational
_____Adult/Sex websites
_____Online sellers
_____Music/Movies
_____News
_____Other (please describe)_____

5) How do you spend your free time?_____
_____
_____

6) In which ways do you learn about personal/sensitive issues (e.g. sex education)?
_____Books
_____Internet
_____Hospital
_____School textbooks
_____Family
_____Friends
_____Television
_____Movies
_____Other (please describe)_____
_____

7) Who do you talk to about personal/sensitive issues (e.g. sex education etc.)? Tick as many as apply to you.
_____Male friends
_____Female friends
_____Brothers/sisters
_____Parents
_____Other (please describe)_____
_____

Next are general biology/health questions about HIV/AIDS transmission. Answer to the best of your ability.

1) What is a Virus?_____
_____

2) What is a Bacteria? _____
_____

3) What is HIV? _____
_____

4) What is AIDS? _____
_____

5) What is the difference (if any) between HIV and AIDS? _____
_____
_____

6) How does someone get HIV/AIDS?_____
_____
_____

7) Is HIV/AIDS a problem in India? If so, how many people would you estimate this problem in India?
_____

8) Can you get HIV/AIDS from the following activities? (please tick in one column)

Getting bitten by a mosquito	Yes_____	No_____	Not sure_____
Touching a toilet seat	Yes_____	No_____	Not sure_____
Having sex with someone who is infected	Yes_____	No_____	Not sure_____
Kissing someone who is infected	Yes_____	No_____	Not sure_____
Hugging someone who is infected	Yes_____	No_____	Not sure_____
Infected person sneezing on you	Yes_____	No_____	Not sure_____
Infected person coughing on you	Yes_____	No_____	Not sure_____
Talking to infected person	Yes_____	No_____	Not sure_____
Drinking contaminated water	Yes_____	No_____	Not sure_____
Blood transfusion (mother with HIV passing to baby)	Yes_____	No_____	Not sure_____
Breast milk (mother with HIV feeding baby)	Yes_____	No_____	Not sure_____
Can you tell if a person has HIV/AIDS by looking at them	Yes_____	No_____	Not sure_____
An HIV infected person (without symptoms) looks weak	Yes_____	No_____	Not sure_____
A person infected with HIV dies within two years	Yes_____	No_____	Not sure_____
An HIV infected person can get other disease like TB	Yes_____	No_____	Not sure_____
HIV can be transmitted by drinking in common cups/glasses	Yes_____	No_____	Not sure_____
HIV can be transmitted through living with an infected person	Yes_____	No_____	Not sure_____
Once infected with HIV, the person has HIV for life	Yes_____	No_____	Not sure_____
Can HIV be cured by going to the doctor and taking medicine	Yes_____	No_____	Not sure_____

Do you think you are safe from getting HIV   Yes_____   No_____   Not sure_____
Do you feel like you know enough about HIV/AIDS   Yes_____   No_____   Not sure_____

9)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

      Does this picture make you uncomfortable?

      (Tick your answer)

      1 = Very Comfortable, 5 = Very Uncomfortable

      1 ____   2 ____   3 ____   4 ____   5 ____

      What action do you think the picture above showing?_____

10)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

      Does this picture make you uncomfortable?

      (Tick your answer)

      1 = Very Comfortable, 5 = Very Uncomfortable

      1 ____   2 ____   3 ____   4 ____   5 ____

      What action do you think the picture above showing?_____

11)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

      Does this picture make you uncomfortable?

      (Tick your answer)

      1 = Very Comfortable, 5 = Very Uncomfortable

      1 ____   2 ____   3 ____   4 ____   5 ____

      What action do you think the picture above showing?_____

12)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

      Does this picture make you uncomfortable?

      (Tick your answer)

      1 = Very Comfortable, 5 = Very Uncomfortable

      1 ____   2 ____   3 ____   4 ____   5 ____

      What action do you think the picture above showing?_____

13) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

14) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

15) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

16) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

17) Can the baby get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?   _____

18) Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?   _____

19) Were any of the pictures difficult to understand? If so, which ones (write the numbers located on the pictures)?_____
_____
_____

20) What questions do you have about HIV/AIDS? _____
_____
_____
_____
_____
_____

21) Can you talk about HIV/AIDS with your parents or teachers? _____
_____
_____

22) In your opinion, what is the best way to learn about HIV/AIDS?_____
_____
_____
_____
_____

23) Where have you heard about HIV/AIDS? _____
_____
_____

22) Do you wish you knew more about HIV/AIDS? Why or why not?_____
_____
_____
_____
_____

206

About Yourself

1)   Gender: Female____   Male ____

2)   What year were you born? _____

3)   Current college _____

4)   Your program in college (please select one)
     _____ Junior college
     _____ Bachelor's degree

5)   Year in Program (please tick one)   1   2   3   4

6)   Your area (please tick one)   Arts   Commerce   Science   Other_____

7)   What state is your mother's family from _____

8)   What state is your father's family from _____

9)   Language(s) that you speak at home _____

10) Your religion _____

11) Your mother's occupation (please be specific) _____
     _____

12) Your father's occupation (please be specific) _____
     _____

13) What is the highest education that your mother completed (please select one)
     _____Elementary school (1st to 8th grade)
     _____High school (9th to 12th grade)
     _____Incomplete college
     _____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)
     _____Four year Bachelor's degree (e.g., BE, BTech, BEd)
     _____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)
     _____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)
     _____Other (please describe)_____

14) What is the highest education that your father completed (please select one)
     _____Elementary school (1st to 8th grade)
     _____High school (9th to 12th grade)
     _____Incomplete college
     _____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)
     _____Four year Bachelor's degree (e.g., BE, BTech, BEd)
     _____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)
     _____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)
     _____Other (please describe)_____

Pictures from: International Training and Education Center on HIV, Rural Education and Development, Global Strategies for HIV Prevention, Sahaya International, Live in Focus

Appendix J: India Baseline Survey Conducted on College Students

This is a general health education survey and is completely anonymous. Please answer honestly and to the best of your ability. Do not talk to anyone until after you have completed the survey. Thank you!

1) What are your favorite television categories?
    _____Action/Adventure
    _____Animation/Cartoon
    _____Family serials
    _____Serials for young people
    _____Comedy
    _____Horror
    _____Other (please describe)_____

2) What are your favorite movie categories?
    _____Bollywood movies
    _____Family movies
    _____Movies for young people
    _____American/Western movies
    _____Art films
    _____Other (please describe)_____

3) Do you have a mobile phone?   Yes_____   No_____

    From 1 to 7, rank how often you use your mobile phone for each of the following activities:
    _____Talking with friends
    _____Talking to your family
    _____Games
    _____SMS
    _____Web Access
    _____MMS
    _____Other (please describe)_____

    What kind of mobile phone you have? (Answer with brand name, if possible)
    _____

    How often do you use your mobile phone each week?
    _____Never
    _____Less than 30 minutes a week
    _____30 minutes to 1 hour a week
    _____1-5 hours a week
    _____ more than 5 hours a week

    Who pays for your mobile phone? Me _____ Parents _____ Brother/Sister _____ Other _____

    How many mobile phones do you have in your immediate family?_____

4) How often do you use a computer?
    _____Never
    _____Less than 30 minutes a week
    _____30 minutes to 1 hour a week
    _____1-5 hours a week
    _____ more than 5 hours a week

    If yes, which types of websites do you visit most often?
    _____Blogs
    _____Informational
    _____Adult/Sex websites
    _____Online sellers
    _____Music/Movies
    _____News
    _____Other (please describe)_____

5) How do you spend your free time?_____

6)   In which ways do you learn about personal/sensitive issues (e.g. sex education)?

_____Books
_____Internet
_____Hospital
_____School textbooks
_____Family
_____Friends
_____Television
_____Movies
_____Other (please describe)_____
_____

7)   Who do you talk to about personal/sensitive issues (e.g. sex education etc.)? Tick as many as apply to you.

_____Male friends
_____Female friends
_____Brothers/sisters
_____Parents
_____Other (please describe)_____
_____

Next are general biology/health questions about HIV/AIDS transmission. Answer to the best of your ability.

1)   What is a Virus?_____
_____

2)   What is a Bacteria? _____
_____

3)   What is HIV? _____
_____

4)   What is AIDS? _____
_____

5)   What is the difference (if any) between HIV and AIDS? _____
_____
_____

6)   How does someone get HIV/AIDS?_____
_____
_____

7)   Can you get HIV/AIDS from the following activities? (please tick in one column)

Getting bitten by a mosquito	Yes_____	No_____	Not sure_____
Touching a toilet seat	Yes_____	No_____	Not sure_____
Having sex with someone who is infected	Yes_____	No_____	Not sure_____
Kissing someone who is infected	Yes_____	No_____	Not sure_____
Hugging someone who is infected	Yes_____	No_____	Not sure_____
Infected person sneezing on you	Yes_____	No_____	Not sure_____
Infected person coughing on you	Yes_____	No_____	Not sure_____
Talking to infected person	Yes_____	No_____	Not sure_____
Drinking contaminated water	Yes_____	No_____	Not sure_____
Blood transfusion (mother with HIV passing to baby)	Yes_____	No_____	Not sure_____
Breast milk (mother with HIV feeding baby)	Yes_____	No_____	Not sure_____

8)   Can you get HIV/AIDS from the following activity?   Yes_____   No_____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

9)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

10)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

11)   Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

12) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

13) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

14) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

15) Can you get HIV/AIDS from the following activity?   Yes_____ No_____ Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

What action do you think the picture above showing?_____

211

16) Can you get HIV/AIDS from the following activity?   Yes_____   No_____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

17) Can you get HIV/AIDS from the following activity?   Yes_____   No_____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?_____

18) Can the baby get HIV/AIDS from the following activity?   Yes_____   No_____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?   _____

19) Can you get HIV/AIDS from the following activity?   Yes_____   No_____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?   _____

20) Can you get HIV/AIDS from the following activity?   Yes_____   No____   Not sure_____

Does this picture make you uncomfortable?

(Tick your answer)

1 = Very Comfortable, 5 = Very Uncomfortable

1 ____   2 ____   3 ____   4 ____   5 ____

What action do you think the picture above showing?   _____

21) Were any of the pictures difficult to understand? If so, which ones (write the numbers located on the pictures)?_____
_____

22) What questions do you have about HIV/AIDS? _____
_____
_____
_____

About Yourself

1) Gender: Female____   Male ____

2) What year were you born? _____

3) Current college _____

4) Your program in college (please select one)
   _____ Junior college
   _____ Bachelor's degree

5) Year in Program (please tick one)   1   2   3   4

6) Your area (please tick one)   Arts   Commerce   Science   Other_____

7) What state is your mother's family from _____

8) What state is your father's family from _____

9) Language(s) that you speak at home _____

10) Your religion _____

11) Your mother's occupation (please be specific) _____
_____

12) Your father's occupation (please be specific) _____
_____

13) What is the highest education that your mother completed (please select one)

_____Elementary school (1st to 8th grade)

_____High school (9th to 12th grade)

_____Incomplete college

_____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)

_____Four year Bachelor's degree (e.g., BE, BTech, BEd)

_____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)

_____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)

_____Other (please describe)_____

14) What is the highest education that your father completed (please select one)

_____Elementary school (1st to 8th grade)

_____High school (9th to 12th grade)

_____Incomplete college

_____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)

_____Four year Bachelor's degree (e.g., BE, BTech, BEd)

_____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)

_____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)

_____Other (please describe)_____

Appendix K: India Research Methodology Design

		INDIA STUDY DESIGN		
Institute Name	**XXX in New Delhi** **(control condition)**	**XXX in New Delhi** **(experimental condition)**	**XXX in Haryana** **(experimental condition)**	**XXX in Punjab** **(experimental condition)**
Institute Type	High School (11th and 12th grade)	High School (11th and 12th grade)	High School (11th and 12th grade)	College Students
Research Design **(Pre-test & Post-test)**	1) Teacher reads directions (provided by Piya Sorcar) 2) Teacher asks students to take paper-based Pretest (passed out in class) 3) Paper-based Pretest -- 10-15 minutes (students CANNOT talk or share answers with each other) 4) Teacher collects Pretest as soon as students are done 5) **Control Group** -- 30 minutes (students CANNOT talk during the session) 6) Teacher asks students to take paper-based Posttest 7) Posttest -- 20-25 minutes (Students CANNOT talk or share answers with each other) Turn in answers when complete. 8) Teachers tell students not to discuss session with anyone until end of the day	1) Teacher reads directions (provided by Piya Sorcar) 2) Teacher asks students to log on survey website to take Pretest 3) Online Pretest -- 10-15 minutes (students CANNOT talk or share answers with each other) 4) Teacher asks students to log off of website after completion 5) **Online Intervention** -- 30 minutes (students CANNOT talk during the session) Log-off when complete. 6) Teacher asks students to take online Posttest 7) Posttest -- 20-25 minutes (Students CANNOT talk or share answers with each other) Log-off when complete. 8) Teachers tell students not to discuss session with anyone until end of the day	1) Teacher reads directions (provided by Piya Sorcar) 2) Teacher asks students to log on survey website to take Pretest 3) Online Pretest -- 10-15 minutes (students CANNOT talk or share answers with each other) 4) Teacher asks students to log off of website after completion 5) **Online Intervention** -- 30 minutes (students CANNOT talk during the session) Log-off when complete. 6) Teacher asks students to take online Posttest 7) Posttest -- 20-25 minutes (Students CANNOT talk or share answers with each other) Log-off when complete. 8) Teachers tell students not to discuss session with anyone until end of the day	1) Teacher reads directions (provided by Piya Sorcar) 2) Teacher asks students to log on survey website to take Pretest 3) Online Pretest -- 10-15 minutes (students CANNOT talk or share answers with each other) 4) Teacher asks students to log off of website after completion 5) **Online Intervention** -- 30 minutes (students CANNOT talk during the session) Log-off when complete. 6) Teacher asks students to take online Posttest 7) Posttest -- 20-25 minutes (Students CANNOT talk or share answers with each other) Log-off when complete. 8) Teachers tell students not to discuss session with anyone until end of the day
Research Design **(Retention Test - one month later)**	1) Teacher gathers same students to take retention test 2) Retention (one month later) -- 20-25 minutes (Students CANNOT talk or share answers with each other). Log off of survey website.	1) Teacher gathers same students to take retention test 2) Retention (one month later) -- 20-25 minutes (Students CANNOT talk or share answers with each other). Log off of survey website.	1) Teacher gathers same students to take retention test 2) Retention (one month later) -- 20-25 minutes (Students CANNOT talk or share answers with each other). Log off of survey website.	1) Teacher gathers same students to take retention test 2) Retention (one month later) -- 20-25 minutes (Students CANNOT talk or share answers with each other). Log off of survey website.
Types of Students	**Randomly select students (boys and girls) from predetermined grades from each institute.**			

Appendix L: Sample Letter to Indian Institutes for Study Design

Dear Teachers of XXX

Thank you so much for all your help with this study. Here are the directions to read the students.

BEFORE STUDY -- READ TO STUDENTS

You are invited to participate in a research study on people's knowledge of infectious diseases. You will be asked to participate in a pre-survey for 10-15 minutes. Please close the survey program once you have completed it. Next, you will interact with an animated computer program that will give you some public health information. You will have about 30 minutes to go through the program. Please go through the animation in order – but you are welcome to watch the chapters again, if you wish to review the concepts. After you have completed the program, please close the webpage. Lastly, you will participate in a post-survey and answer some more questions about what you learnt from the program.

Please note, your identity is completely anonymous. There is no way to connect you with your responses and the computer does not record any personally identifiable information about you. Please **do not** sign the consent form if you wish to remain anonymous.

It's very important that you are honest while answering the questions and do not talk with others during the study. Please raise your hand only if you are having technical difficulties with the procedures. We are trying to develop a program to help people all over India learn more about public health issues.

ONLINE PRE-SURVEY (10-15 minutes)

The online pre-survey should take between 10-15 minutes to complete. Please remember <u>DO NOT TALK</u> to anyone. It is important that you are honest while answering these questions. If you do not know an answer, please mark "not sure" on the survey. Close the website when you are done answering the questions.

Open the following link XXX on the computer in front of you. You may begin.

ONLINE INTERVENTION (Indian version) (30 minutes)

Now you will interact with an animated tutorial. Please go through the chapters in order. You are welcome to watch the chapters again, if you'd like. Please close the program and take off your headphones once you are done.

You may open your program. Put your headphones on and begin the program now.

ONLINE POST-SURVEY INTERVENTION (20-25 minutes)

Open the following link XXX on your computer. This post-survey should take between 10-15 minutes to complete. Please remember not to talk with anyone. Please be honest while answering these questions. Close the website when you are done answering the questions.

You may begin.

AFTER STUDY -- READ TO STUDENTS

Thank you again for all your help. We are hoping to use your comments to develop a health animation tutorial for students in India. Please do not discuss this project with anyone until school is over today. We are running the program with other students and want them to be able to answer as honestly as you did. You have done a great service to your country today in helping us build better health educational content for people all over India.

Appendix M: India Pretest Assessment

This is a general health education survey. Your answers are completely anonymous; therefore please answer each question as honestly as you can. Do not talk to anyone while you are taking the survey. Thank you!

1) How many people do you have in your household (including yourself)?
   _____ 1-4 people
   _____ 5-9 people
   _____ 10 or more

2) Do you have a mobile phone?   Yes_____   No_____

   How often do you use your mobile phone each week (tick answer)?
   _____ Never
   _____ Less than 30 minutes a week
   _____ 30 minutes to 1 hour a week
   _____ 1-5 hours a week
   _____ more than 5 hours a week

   How many mobile phones do you have in your household?
   _____ 0
   _____ 1
   _____ 2-3
   _____ 4 or more

3) Do you have access to a computer at home?   Yes_____   No_____   Sometimes_____

   How often do you use the Internet (at school, work, home, Internet café etc.)?
   _____ Never
   _____ 1-30 minutes a week
   _____ 30 minutes to 1 hour per week
   _____ 1-5 hours per week
   _____ More than 5 hours per week

   Which types of websites do you visit most often? Tick as many as apply to you.
   _____ Blogs
   _____ Informational
   _____ Adult websites
   _____ Online sellers
   _____ Music/movies
   _____ News
   _____ Other (please describe)_____

4) In which ways do you learn about personal/sensitive issues (e.g. sex education)? Tick as many as apply to you.
   _____ Books (not from school)
   _____ Internet
   _____ Hospital
   _____ School textbooks
   _____ Adult Family Members (parents, aunts, uncles, etc.)
   _____ Older Siblings/Cousins
   _____ Friends
   _____ Television
   _____ Movies
   _____ None
   _____ Other (please explain)_____

5) Who do you talk to about personal/sensitive issues (e.g. sex education)? Tick as many as apply to you.
_____Hospital staff
_____Adult Family Members (parents, aunts, uncles etc.)
_____Older Siblings/Cousins
_____Anonymous people on Internet
_____Female Friends
_____Male Friends
_____Other (please describe)_____

6) Do you feel more comfortable discussing personal/sensitive issues with a male or female doctor?
_____Male
_____Female

7) Please rate your knowledge of HIV/AIDS? (Tick one answer only).
_____Little of no knowledge
_____Some knowledge
_____Fair knowledge
_____I feel I know enough
_____Excellent knowledge

Next are general health questions about virus transmission. Please answer every question.

1) Other questions. (Please tick only one answer)

- Has a vaccine been recently developed that prevents people from getting HIV infection?   Yes_____   No_____   Not sure_____

- Will a mother with HIV always pass the virus to her baby during childbirth?   Yes_____   No_____   Not sure_____

- Particular homeopathic medicines can cure HIV, if treated early?   Yes_____   No_____   Not sure_____

- Are there treatments which can help HIV-positive mothers deliver healthy babies?   Yes_____   No_____   Not sure_____

- Can you tell by looking at someone if he/she has HIV/AIDS?   Yes_____   No_____   Not sure_____

- If you are highly religious, are you less likely to get HIV/AIDS?   Yes_____   No_____   Not sure_____

- If you eat healthy food and take vitamins, are you less likely to get HIV?   Yes_____   No_____   Not sure_____

- If you are of a particular caste, are you more likely to get HIV?   Yes_____   No_____   Not sure_____

- Is there a cure for HIV/AIDS?   Yes_____   No_____   Not sure_____

- Are cold, cough and fever symptoms of HIV?   Yes_____   No_____   Not sure_____

- Will exercise and staying fit prevent getting HIV?   Yes_____   No_____   Not sure_____

- If you do regular pranayam/yoga are you less likely to get HIV/AIDS?   Yes_____   No_____   Not sure_____

- Can bed/mosquito nets prevent someone from getting infected with HIV?   Yes_____   No_____   Not sure_____

- Can a religious leader (e.g. Guru) prevent someone from getting infected with HIV?   Yes_____   No_____   Not sure_____

- Can HIV be cured, if discovered early?   Yes_____   No_____   Not sure_____

2) Can you get HIV from the following activities? (please tick only one answer)

- Touching a public toilet seat   Yes_____   No_____   Not sure_____

- Kissing someone (on the mouth) who is infected   Yes_____   No_____   Not sure_____

- Hugging someone who is infected   Yes_____   No_____   Not sure_____

- Infected person sneezing on you   Yes_____   No_____   Not sure_____

- Talking to infected person   Yes_____   No_____   Not sure_____

- Drinking contaminated water   Yes_____   No_____   Not sure_____

- Blood transfusion   Yes_____   No_____   Not sure_____

- Infected person coughing on you   Yes_____   No_____   Not sure_____

- Breast milk (mother with HIV feeding baby)   Yes_____   No_____   Not sure_____

- Getting bitten by a mosquito   Yes_____   No_____   Not sure_____

- Sharing needles and syringes   Yes_____   No_____   Not sure_____

- Sharing plates, forks or glasses with someone with HIV/AIDS   Yes_____   No_____   Not sure_____

- Having sex with someone who is infected   Yes_____   No_____   Not sure_____

- Living with a person (with no sexual involvement)   Yes_____   No_____   Not sure_____

- Touching infected blood   Yes_____   No_____   Not sure_____

- Eating food prepared by HIV-infected person   Yes_____   No_____   Not sure_____

- Donating blood   Yes_____   No_____   Not sure_____

3) Can you get HIV from the following body fluids? (Please tick only one answer)

- Saliva (liquid in mouth)   Yes_____   No_____   Not sure_____

- Sexual fluids (vaginal secretions or semen)   Yes_____   No_____   Not sure_____

- Blood   Yes_____   No_____   Not sure_____

- Tears   Yes_____   No_____   Not sure_____

- Urine   Yes_____   No_____   Not sure_____

- Sweat   Yes_____   No_____   Not sure_____

- Breast milk   Yes_____   No_____   Not sure_____

- Stool   Yes_____   No_____   Not sure_____

The items below refer to people's beliefs about HIV/AIDS. We are interested in whether you agree or disagree with these statements. To indicate your reactions to these statements, use the following scale:

1) What do you think ?

- I believe I have enough information about HIV/AIDS
  to protect myself against it.   Agree___ Disagree___ Not sure___

- People with HIV/AIDS should not be allowed to work/study in public schools. Agree___ Disagree___ Not sure___

- I won't talk to or interact with anyone with HIV/AIDS.   Agree___ Disagree___ Not sure___

- We have a social obligation to help those with HIV/AIDS.   Agree___ Disagree___ Not sure___

- People who describe HIV/AIDS as an epidemic are exaggerating its true nature. Agree___ Disagree___ Not sure___

- Science will eventually find a cure for AIDS.   Agree___ Disagree___ Not sure___

- HIV/AIDS is really not my problem; it's somebody else's.   Agree___ Disagree___ Not sure___

- HIV/AIDS is not a threat to me.   Agree___ Disagree___ Not sure___

- People who die from AIDS are being punished for their past wrongs.   Agree___ Disagree___ Not sure___

- People should get themselves tested for HIV/AIDS.   Agree___ Disagree___ Not sure___

- People who get HIV/AIDS can only blame themselves.   Agree___ Disagree___ Not sure___

- People with HIV/AIDS should not be allowed to handle food in restaurants. Agree___ Disagree___ Not sure___

- HIV/AIDS is not as big a problem as the media suggests.   Agree___ Disagree___ Not sure___

- I am not the kind of person who is likely to get HIV/AIDS.   Agree___ Disagree___ Not sure___

- I've heard enough about HIV/AIDS, and I don't want to hear any more about it. Agree___ Disagree___ Not sure___

- Parents are responsible if their children get HIV/AIDS   Agree___ Disagree___ Not sure___

- If a free confidential blood test at a municipal hospital were available to
  see if you have the AIDS virus, I would take it.   Agree___ Disagree___ Not sure___

- HIV/AIDS is God's punishment for immorality.   Agree___ Disagree___ Not sure___

- If I found out that someone I knew had AIDS, it would be hard for me
  to continue the relationship.   Agree___ Disagree___ Not sure___

- I am less likely than most people to get HIV/AIDS.   Agree___ Disagree___ Not sure___

- Depleted environmental resources are causing the spread of HIV.   Agree___ Disagree___ Not sure___

- Anyone can be infected with HIV.   Agree___ Disagree___ Not sure___

- It's likely that I know someone infected with HIV/AIDS.   Agree___ Disagree___ Not sure___

- I would like to learn more about HIV/AIDS.   Agree___ Disagree___ Not sure___

- Schools and colleges should teach general HIV prevention practices.   Agree___ Disagree___ Not sure___

- I am comfortable going to school with someone with HIV/AIDS.   Agree___ Disagree___ Not sure___

- It's okay to be friends with someone who is HIV-positive.   Agree___ Disagree___ Not sure___

- People should know more about HIV/AIDS.   Agree___ Disagree___ Not sure___

- I am scared to have casual contact with someone who has HIV/AIDS.   Agree___ Disagree___ Not sure___

- Poor people are more likely to get HIV infection.   Agree____ Disagree____ Not sure____

- Having cancer causes HIV.   Agree____ Disagree____ Not sure____

- People should get tested for HIV before marriage.   Agree____ Disagree____ Not sure____

- Parents should feel responsible if their children get HIV/AIDS.   Agree____ Disagree____ Not sure____

- People with HIV/AIDS deserve what they get.   Agree____ Disagree____ Not sure____

- I would like to help educate people about HIV/AIDS   Agree____ Disagree____ Not sure____

2)   What questions do you have about HIV/AIDS?

_____

_____

_____

_____

_____

_____

_____

Other (please fill-out fully)

1)   Your Gender: Female____   Male ____

2) What is your date of birth (e.g. day / month / year)   Day_____ / Month _____ / Year _____
   For instance: October 25, 1985 would be 25/10/85

3) Current school/college? (Please tick one)

        _____XXXXX
        _____ XXXXX
        _____ XXXXX
        _____ XXXXX
        _____ XXXXX
        _____ XXXXX
        _____ XXXXX
        _____ XXXXX

4)   Which class are you in (tick one):   Class 11th_____   Class 12th_____   College_____

5)   Your area (please tick one)   Arts   Commerce   Science   Other_____

....

Congratulations! You have completed the Pre-Survey.

It is crucial that you do not talk to anyone around you. We will explain why at the end of the survey.

Please hand this answer sheet to your instructor.

....

Appendix N: India Posttest Assessment

Congratulations! You have finished the Animated Tutorial. We want to know what you thought of it!

Please answer the following questions as detailed as possible. It will help us further design the animation tutorial.

Your answers are completely anonymous; therefore please answer each question as honestly as you can. Do not talk to anyone while you are taking the survey. Thank you!

Animation Interface (Please answer as detailed as possible. Your thoughts will help us design the program)

1) Did you like the tutorial?   Yes_____   No_____

Please explain your answer

_____
_____
_____
_____
_____
_____

2) Was it more comfortable learning about these sensitive subjects from an anonymous animated tutorial?

_____Yes, I feel more comfortable learning about sensitive topics from an anonymous tutorial.

_____No, I feel more comfortable learning about sensitive subjects from my class teacher
_____I feel equally comfortable learning about sensitive subjects from either an online tutorial or from my class teacher.

Please explain your answer

_____
_____
_____
_____
_____
_____

3) What did you learn that you did not know before?

Please explain your answer

_____
_____
_____
_____
_____
_____

1) What did you think of the animated tutorial?

- Did you learn more about HIV/AIDS prevention through this animated tutorial than other communication methods (e.g. television, school)?   Yes_____   No_____   Not sure_____

- Do you feel other young adults would learn from this program?   Yes_____   No_____   Not sure_____

- Were most of your questions about HIV/AIDS answered in the tutorial?   Yes_____   No_____   Not sure_____

- Did you feel that you learned from the animated tutorial?   Yes_____   No_____   Not sure_____

- Would you be willing to forward this tutorial to others you care about?   Yes_____   No_____   Not sure_____

- After watching the tutorial, do you want to learn more about HIV/AIDS?   Yes_____   No_____   Not sure_____

- Have you seen similar HIV/AIDS tutorials like this before?   Yes_____   No_____   Not sure_____

2) Were you comfortable with the overall animated tutorial?   Yes_____   No_____   Not sure_____

Please tell us why. _____
_____
_____
_____

3) Did you like the characters in the animation?   Yes_____   No_____   Not sure_____

Please tell us why. _____
_____
_____
_____

4) What were you feeling while interacting with the animation tutorial?

Happy	Yes_____	No_____	Not sure_____
Curious	Yes_____	No_____	Not sure_____
Uneasy	Yes_____	No_____	Not sure_____
Excited	Yes_____	No_____	Not sure_____
Nervous	Yes_____	No_____	Not sure_____
Guilty	Yes_____	No_____	Not sure_____
Uncomfortable	Yes_____	No_____	Not sure_____
Entertaining	Yes_____	No_____	Not sure_____
Sad	Yes_____	No_____	Not sure_____
Relaxed	Yes_____	No_____	Not sure_____
Informed	Yes_____	No_____	Not sure_____

5) After watching this program, do you want to learn more about HIV/AIDS?   Yes_____   No_____   Not sure_____

What remaining questions do you have? _____
_____
_____
_____

6) Would you like to join our team and help stop the spread of HIV/AIDS?   Yes_____   No_____   Not sure_____

Anything else you want to tell us? _____ _____
_____
_____
_____

2

223

Below are general questions about virus transmission. Please answer to the best of your ability.

1) Other questions. (Please tick only one answer)

- Has a vaccine been recently developed that prevents people
  from getting HIV infection?   Yes_____   No_____   Not sure_____

- Will a mother with HIV always pass the virus to her baby
  during childbirth?   Yes_____   No_____   Not sure_____

- Particular homeopathic medicines can cure HIV,
  if treated early?   Yes_____   No_____   Not sure_____

- Are there treatments which can help HIV-positive
  mothers deliver healthy babies?   Yes_____   No_____   Not sure_____

- Can you tell by looking at someone if he/she has HIV/AIDS?   Yes_____   No_____   Not sure_____

- If you are highly religious, are you less likely to get HIV/AIDS?   Yes_____   No_____   Not sure_____

- If you eat healthy food and take vitamins,
  are you less likely to get HIV?   Yes_____   No_____   Not sure_____

- If you are of a particular caste, are you more likely to get HIV   Yes_____   No_____   Not sure_____

- Is there a cure for HIV/AIDS?   Yes_____   No_____   Not sure_____

- Are cold, cough and fever symptoms of HIV?   Yes_____   No_____   Not sure_____

- Will exercise and staying fit prevent getting HIV?   Yes_____   No_____   Not sure_____

- If you do regular pranayam/yoga are you less likely
  to get HIV/AIDS?   Yes_____   No_____   Not sure_____

- Can bed/mosquito nets prevent someone from
  getting infected with HIV?   Yes_____   No_____   Not sure_____

- Can a religious leader (e.g. Guru) prevent someone from
  getting infected with HIV?   Yes_____   No_____   Not sure_____

- Can HIV be cured, if discovered early?   Yes_____   No_____   Not sure_____

3

2)   Can you get HIV from the following activities? (please tick only one answer)

- Touching a public toilet seat   Yes_____   No_____   Not sure_____

- Kissing someone (on the mouth) who is infected   Yes_____   No_____   Not sure_____

- Hugging someone who is infected   Yes_____   No_____   Not sure_____

- Infected person sneezing on you   Yes_____   No_____   Not sure_____

- Talking to infected person   Yes_____   No_____   Not sure_____

- Drinking contaminated water   Yes_____   No_____   Not sure_____

- Blood transfusion   Yes_____   No_____   Not sure_____

- Infected person coughing on you   Yes_____   No_____   Not sure_____

- Breast milk (mother with HIV feeding baby)   Yes_____   No_____   Not sure_____

- Getting bitten by a mosquito   Yes_____   No_____   Not sure_____

- Sharing needles and syringes   Yes_____   No_____   Not sure_____

- Sharing plates, forks or glasses with someone with HIV/AIDS   Yes_____   No_____   Not sure_____

- Having sex with someone who is infected   Yes_____   No_____   Not sure_____

- Living with a person (with no sexual involvement)   Yes_____   No_____   Not sure_____

- Touching infected blood   Yes_____   No_____   Not sure_____

- Eating food prepared by HIV-infected person   Yes_____   No_____   Not sure_____

- Donating blood   Yes_____   No_____   Not sure_____

Any questions?

_____

_____

_____

3)   Can you get HIV from the following body fluids? (Please tick only one answer)

- Saliva (liquid in mouth)   Yes_____   No_____   Not sure_____

- Sexual fluids (vaginal secretions or semen)   Yes_____   No_____   Not sure_____

- Blood   Yes_____   No_____   Not sure_____

- Tears   Yes_____   No_____   Not sure_____

- Urine   Yes_____   No_____   Not sure_____

- Sweat   Yes_____   No_____   Not sure_____

- Breast milk   Yes_____   No_____   Not sure_____

- Stool   Yes_____   No_____   Not sure_____

4

The items below refer to people's beliefs about HIV/AIDS. We are interested in whether you agree or disagree with these statements. To indicate your reactions to these statements, use the following scale:

1) What do you think ?

- I believe I have enough information about HIV/AIDS
  to protect myself against it.   Agree____ Disagree____ Not sure____

- People with HIV/AIDS should not be allowed to work/study in public schools. Agree____ Disagree____ Not sure____

- I won't talk to or interact with anyone with HIV/AIDS.   Agree____ Disagree____ Not sure____

- We have a social obligation to help those with HIV/AIDS.   Agree____ Disagree____ Not sure____

- People who describe HIV/AIDS as an epidemic are exaggerating its true nature. Agree____ Disagree____ Not sure____

- Science will eventually find a cure for AIDS.   Agree____ Disagree____ Not sure____

- HIV/AIDS is really not my problem: it's somebody else's.   Agree____ Disagree____ Not sure____

- HIV/AIDS is not a threat to me.   Agree____ Disagree____ Not sure____

- People who die from AIDS are being punished for their past wrongs.   Agree____ Disagree____ Not sure____

- People should get themselves tested for HIV/AIDS.   Agree____ Disagree____ Not sure____

- People who get HIV/AIDS can only blame themselves.   Agree____ Disagree____ Not sure____

- People with HIV/AIDS should not be allowed to handle food in restaurants.   Agree____ Disagree____ Not sure____

- HIV/AIDS is not as big a problem as the media suggests.   Agree____ Disagree____ Not sure____

- I am not the kind of person who is likely to get HIV/AIDS.   Agree____ Disagree____ Not sure____

- I've heard enough about HIV/AIDS, and I don't want to hear any more about it. Agree____ Disagree____ Not sure____

- Parents are responsible if their children get HIV/AIDS   Agree____ Disagree____ Not sure____

- If a free confidential blood test at a municipal hospital were available to
  see if you have the AIDS virus, I would take it.   Agree____ Disagree____ Not sure____

5

226

- HIV/AIDS is God's punishment for immorality.	Agree___	Disagree___	Not sure___
- If I found out that someone I knew had AIDS, it would be hard for me to continue the relationship.	Agree___	Disagree___	Not sure___
- I am less likely than most people to get HIV/AIDS.	Agree___	Disagree___	Not sure___
- Depleted environmental resources are causing the spread of HIV.	Agree___	Disagree___	Not sure___
- Anyone can be infected with HIV.	Agree___	Disagree___	Not sure___
- It's likely that I know someone infected with HIV/AIDS.	Agree___	Disagree___	Not sure___
- I would like to learn more about HIV/AIDS.	Agree___	Disagree___	Not sure___
- Schools and colleges should teach general HIV prevention practices.	Agree___	Disagree___	Not sure___
- I am comfortable going to school with someone with HIV/AIDS.	Agree___	Disagree___	Not sure___
- It's okay to be friends with someone who is HIV-positive.	Agree___	Disagree___	Not sure___
- People should know more about HIV/AIDS.	Agree___	Disagree___	Not sure___
- I am scared to have casual contact with someone who has HIV/AIDS.	Agree___	Disagree___	Not sure___
- Poor people are more likely to get HIV infection.	Agree___	Disagree___	Not sure___
- Having cancer causes HIV.	Agree___	Disagree___	Not sure___
- People should get tested for HIV before marriage.	Agree___	Disagree___	Not sure___
- Parents should feel responsible if their children get HIV/AIDS.	Agree___	Disagree___	Not sure___
- People with HIV/AIDS deserve what they get.	Agree___	Disagree___	Not sure___
- I would like to help educate people about HIV/AIDS	Agree___	Disagree___	Not sure___

Other (please specify)?

_____

_____

_____

_____

_____

2)   What questions do you have about HIV/AIDS?

_____

_____

_____

_____

_____

_____

6

227

About Yourself (please fill out fully)

1) Your Gender: Female____ Male ____

2) What is your date of birth (e.g. day / month / year)   Day_____ / Month _____ / Year _____
   For instance: October 25, 1985 would be 25/10/85

3) Current school/college? (Please tick one)

   _____XXXXX
   _____ XXXXX
   _____ XXXXX
   _____ XXXXX
   _____ XXXXX
   _____ XXXXX
   _____ XXXXX
   _____ XXXXX

4) Which class are you in (tick one):   Class 11th_____   Class 12th_____   College_____

5) Your area (please tick one)   Arts   Commerce   Science   Other_____

6) What state/territory is your mother's (or female guardian) family from? (select best answer)

_____Andhra Pradesh	_____Arunachal Pradesh	_____Assam
_____Bihar	_____Chhattisgarh	_____Goa
_____Gujarat	_____Haryana	_____Himachal Pradesh
_____Jammu and Kashmir	_____Jharkhand	_____Karnataka
_____Kerala	_____Madhya Pradesh	_____Maharashtra
_____Manipur	_____Meghalaya	_____Mizoram
_____Nagaland	_____Orissa	_____Punjab
_____Rajasthan	_____Sikkim	_____Tamil Nadu
_____Tripura	_____Uttar Pradesh	_____Uttarakhand
_____West Bengal	_____Andaman and Nicobar Islands	_____Chandigarh
_____Dadra and Nagar Haveli	_____Daman and Diu	_____Lakshadweep
_____Capital Territory of Delhi	_____Puducherry	_____Jammu & Kashmir

Other, please specify_____

7) What state is your father's (or male guardian) family from? (select best answer).

_____Andhra Pradesh	_____Arunachal Pradesh	_____Assam
_____Bihar	_____Chhattisgarh	_____Goa
_____Gujarat	_____Haryana	_____Himachal Pradesh
_____Jammu and Kashmir	_____Jharkhand	_____Karnataka
_____Kerala	_____Madhya Pradesh	_____Maharashtra
_____Manipur	_____Meghalaya	_____Mizoram
_____Nagaland	_____Orissa	_____Punjab
_____Rajasthan	_____Sikkim	_____Tamil Nadu
_____Tripura	_____Uttar Pradesh	_____Uttarakhand
_____West Bengal	_____Andaman and Nicobar Islands	_____Chandigarh
_____Dadra and Nagar Haveli	_____Daman and Diu	_____Lakshadweep
_____Capital Territory of Delhi	_____Puducherry	_____Jammu & Kashmir

Other, please specify_____

7

8) Which languages are you most comfortable communicating in? (Tick all that apply)
_____Hindi   _____English

_____Other, (please describe)_____

9) Your religion
_____Christian   _____Hindu   _____Jain
_____Muslim   _____Sikh   _____Buddhist
_____None (not religious)

_____Other, (please describe)_____

10) Your mother's (or female guardian) occupation? (Please tick most appropriate answer)

_____Computers/IT   _____Sales/Marketing   _____Engineering
_____Technical   _____Financial Services   _____Academic
_____Call Center/Medical Transcription _____Human Resources   _____Medical
_____Top Management/Office Staff   _____Legal Services   _____Hotel/Travel
_____Property/Construction   _____Government Service   _____Insurance
_____Journalism/Media/Publishing   _____Military   _____Self-employed
_____Unemployed   _____ Full time homemaker   _____Other, please specify
_____Does not apply

11) Your father's (or male guardian) occupation? (Please tick most appropriate answer)

_____Computers/IT   _____Sales/Marketing   _____Engineering
_____Technical   _____Financial Services   _____Academic
_____Call Center/Medical Transcription _____Human Resources   _____Medical
_____Top Management/Office Staff   _____Legal Services   _____Hotel/Travel
_____Property/Construction   _____Government Service   _____Insurance
_____Journalism/Media/Publishing   _____Military   _____Self-employed
_____Unemployed   _____ Full time homemaker   _____Other, please specify
_____Does not apply

12) What is the highest education that your mother (or female guardian) completed (please select one)
_____Elementary school (1st to 8th grade)
_____High school (9th to 12th grade)
_____Incomplete college
_____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)
_____Four year Bachelor's degree (e.g., BE, BTech, BEd)
_____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)
_____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)
_____Other (please describe)_____

8

229

13)   What is the highest education that your father (or male guardian) completed (please select one)
        _____Elementary school (1st to 8th grade)
        _____High school (9th to 12th grade)
        _____Incomplete college
        _____Three year Bachelor's degree (e.g., BA, BCom, BSc, BMM)
        _____Four year Bachelor's degree (e.g., BE, BTech, BEd)
        _____Master's degree (e.g., MA, MCom, MSc, ME, MTech, MBA)
        _____Doctoral degree (e.g., PhD, LLB, MBBS, DEd)
        _____Other (please describe)_____

14)   Which of these do you have in your household? (tick all that apply).
        _____Air Conditioning
        _____Motorcycle/Scooter
        _____Washing Machine
        _____Television
        _____Car
        _____Desert Cooler
        _____Video Camera/Handycam
        _____DVD/CD Player/VCR

****
Congratulations! You have completed the Post-Survey.

Thank you so much for your help! We will use your feedback to design a tutorial for young adults. We really appreciate your efforts. Please know that your feedback is valuable to us and will help your country.

Please hand this answer sheet to your instructor.

Best wishes.
****

9

230

Appendix O: India Retention Test Assessment

Hello again! Thank you for all your help with the development of the animated tutorial a few weeks ago. We want to see what you remember and whether you had any further thoughts you wanted to share with us.

This is the last survey you will fill-out. Your answers are completely anonymous; therefore please answer each question as honestly as you can. Do not talk to anyone while you are taking the survey. Thank you!

1) Since watching the animation tutorial, where (if anywhere) have you noticed other HIV/AIDS education messages?
   (Please tick all that apply.)

        _____Television
        _____Radio
        _____Billboards/hoardings
        _____Posters
        _____Books
        _____Magazines
        _____Internet
        _____SMS
        _____School
        _____No, I haven't seen any HIV/AIDS messages
        _____Other, please specify_____

2) After watching the animated tutorial, whom (if anyone) did you mention it to?
   (Please tick all that apply.)

        _____Mother
        _____Father
        _____Older brother(s)
        _____Younger brother(s)
        _____Older sister(s)
        _____Younger sister(s)
        _____Uncles
        _____Aunts
        _____Female friend(s)
        _____Male friend(s)
        _____Boyfriend or girlfriend
        _____Teacher(s)
        _____No, I did not tell anyone about it.
        _____Other, please specify_____

3) After watching the animated tutorial, with whom (if anyone) did you discuss what you learnt?
   (Please tick all that apply.)

        _____Mother
        _____Father
        _____Older Brother(s)
        _____Younger Brother(s)
        _____Older Sister(s)
        _____Younger Sister(s)
        _____Uncles
        _____Aunts
        _____Female Friend(s)
        _____Male Friend(s)
        _____Boyfriend or girlfriend
        _____Teacher(s)
        _____No, I did not tell anyone about it.
        _____Other, please specify_____

4) If you mentioned or discussed any information about this tutorial with anyone – what part did you discuss?

_____
_____
_____
_____
_____

5) Since watching the animated tutorial, where (if anywhere) did you look for HIV/AIDS information?
(Please tick all that apply.)

_____ Yes, I looked in books
_____ Yes, I looked in magazines
_____ Yes, I searched on the Internet
_____ Yes, I talked to my friend(s)
_____ Yes, I talked to my family
_____ Yes, I talked to a doctor(s)/nurse(s)
_____ Yes, I talked to teacher(s)/administrator(s)
_____ No, I did not inquire about HIV/AIDS on my own

6) After watching the tutorial, if you had more questions about HIV/AIDS, were you able to find answers to your questions?

_____ The animated tutorial answered all my questions
_____ Yes, I searched and found answers to all my questions
_____ I searched but only found some answers to my questions
_____ I searched for answers, but did not find them
_____ No, I did not search for answers to my questions
_____ I plan to search for answers to my questions later
_____ Other (please specify below)

7) How well do you think you remember the information you learned a few weeks ago?
(Tick ONLY ONE answer below)

_____ I remember almost nothing
_____ I remember a little amount of information
_____ I remember a moderate amount of information
_____ I remember most of the information

9) After watching this tutorial, are you less afraid of interacting with HIV-infected people?

_____ I was never afraid of interacting with HIV-infected people
_____ I am less afraid of interacting with HIV-infected people
_____ I am equally afraid of interacting with HIV-infected people
_____ I am more afraid of interacting with HIV-infected people

8) After watching this tutorial, are you less afraid of being infected by HIV?
(Tick ONLY ONE answer below)

_____ I never was afraid of being infected
_____ I am less afraid of being infected, after watching the tutorial
_____ I am equally afraid of being infected, after watching the tutorial
_____ I am more afraid of being infected, after watching the tutorial

2

232

Have any of your answers changed? Please answer the following questions honestly and carefully. Take your time to answer properly.

1) Below are general questions about virus transmission. Please answer to the best of your ability.

- Is there a cure for HIV/AIDS?   Yes_____   No_____   Not sure_____

- Can you tell by looking at someone if he/she has HIV/AIDS?   Yes_____   No_____   Not sure_____

- Has a vaccine been recently developed that prevents people
  from getting HIV infection?   Yes_____   No_____   Not sure_____

- If you do regular pranayam/yoga are you less likely
  to get HIV/AIDS?   Yes_____   No_____   Not sure_____

- Particular homeopathic medicines can cure HIV,
  if treated early?   Yes_____   No_____   Not sure_____

- Can bed/mosquito nets prevent someone from
  getting infected with HIV?   Yes_____   No_____   Not sure_____

- Are there treatments which can help HIV-positive
  mothers deliver healthy babies?   Yes_____   No_____   Not sure_____

- If you eat healthy food and take vitamins,
  are you less likely to get HIV?   Yes_____   No_____   Not sure_____

- Can HIV be cured, if discovered early?   Yes_____   No_____   Not sure_____

- Are cold, cough and fever symptoms of HIV?   Yes_____   No_____   Not sure_____

- Will exercise and staying fit prevent getting HIV?   Yes_____   No_____   Not sure_____

- If you are of a particular caste, are you more likely to get HIV   Yes_____   No_____   Not sure_____

- Can a religious leader (e.g. Guru) prevent someone from
  getting infected with HIV?   Yes_____   No_____   Not sure_____

- Will a mother with HIV always pass the virus to her baby
  during childbirth?   Yes_____   No_____   Not sure_____

- If you are highly religious, are you less likely to get HIV/AIDS?   Yes_____   No_____   Not sure_____

2) Can you get HIV from the following activities? (please tick only one answer)

- Eating food prepared by HIV-infected person   Yes_____ No_____ Not sure_____

- Kissing someone (on the mouth) who is infected   Yes_____ No_____ Not sure_____

- Breast milk (mother with HIV feeding baby)   Yes_____ No_____ Not sure_____

- Infected person sneezing on you   Yes_____ No_____ Not sure_____

- Sharing needles and syringes   Yes_____ No_____ Not sure_____

- Drinking contaminated water   Yes_____ No_____ Not sure_____

- Blood transfusion where only clean needles and
  HIV-tested blood are used   Yes_____ No_____ Not sure_____

- Infected person coughing on you   Yes_____ No_____ Not sure_____

- Talking to infected person   Yes_____ No_____ Not sure_____

- Living with a person (with no sexual involvement)   Yes_____ No_____ Not sure_____

- Getting bitten by a mosquito   Yes_____ No_____ Not sure_____

- Hugging someone who is infected   Yes_____ No_____ Not sure_____

- Sharing plates, forks or glasses with someone with HIV/AIDS   Yes_____ No_____ Not sure_____

- Touching infected blood with your finger   Yes_____ No_____ Not sure_____

- Donating blood at blood banks (donation camps
  which use sterilized equipment   Yes_____ No_____ Not sure_____

- Having sex with someone who is infected   Yes_____ No_____ Not sure_____

- Touching a public toilet seat   Yes_____ No_____ Not sure_____

3) Can you get HIV from the following body fluids? (Please tick only one answer)

- Urine   Yes_____ No_____ Not sure_____

- Saliva (liquid in mouth)   Yes_____ No_____ Not sure_____

- Breast milk   Yes_____ No_____ Not sure_____

- Blood   Yes_____ No_____ Not sure_____

- Sexual fluids (vaginal secretions or semen)   Yes_____ No_____ Not sure_____

- Sweat   Yes_____ No_____ Not sure_____

- Stool   Yes_____ No_____ Not sure_____

- Tears   Yes_____ No_____ Not sure_____

4

The items below refer to people's beliefs about HIV/AIDS. We are interested in whether you agree or disagree with these statements. To indicate your reactions to these statements, use the following scale:

1)   What do you think ? (Please tick only one answer)

- I believe I have enough information about HIV/AIDS to protect myself against it.	Agree___	Disagree___	Not sure___
- HIV/AIDS is really not my problem; it's somebody else's.	Agree___	Disagree___	Not sure___
- People who get HIV/AIDS can only blame themselves.	Agree___	Disagree___	Not sure___
- I am not the kind of person who is likely to get HIV/AIDS.	Agree___	Disagree___	Not sure___
- Parents are responsible if their children get HIV/AIDS	Agree___	Disagree___	Not sure___
- Regular pranayam/yoga can cure HIV, only if treated early.	Agree___	Disagree___	Not sure___
- People who describe HIV/AIDS as an epidemic are exaggerating its true nature.	Agree___	Disagree___	Not sure___
- People should get themselves tested for HIV/AIDS.	Agree___	Disagree___	Not sure___
- HIV/AIDS is not as big a problem as the media suggests.	Agree___	Disagree___	Not sure___
- We have a social obligation to help those with HIV/AIDS.	Agree___	Disagree___	Not sure___
- People who die from AIDS are being punished for their past wrongs.	Agree___	Disagree___	Not sure___
- People with HIV/AIDS should not be allowed to work/study in public schools.	Agree___	Disagree___	Not sure___
- I won't talk to or interact with anyone with HIV/AIDS.	Agree___	Disagree___	Not sure___
- Science will eventually find a cure for AIDS.	Agree___	Disagree___	Not sure___
- HIV/AIDS is not a threat to me.	Agree___	Disagree___	Not sure___
- People with HIV/AIDS should not be allowed to handle food in restaurants.	Agree___	Disagree___	Not sure___
- I've heard enough about HIV/AIDS, and I don't want to hear any more about it.	Agree___	Disagree___	Not sure___
- If a free confidential blood test at a municipal hospital were available to see if you have the AIDS virus, I would take it.	Agree___	Disagree___	Not sure___

5

- HIV/AIDS is God's punishment for immorality.	Agree____	Disagree____	Not sure____
- Depleted environmental resources are causing the spread of HIV.	Agree____	Disagree____	Not sure____
- I would like to learn more about HIV/AIDS.	Agree____	Disagree____	Not sure____
- I am comfortable going to school with someone with HIV/AIDS.	Agree____	Disagree____	Not sure____
- I am scared to have casual contact with someone who has HIV/AIDS.	Agree____	Disagree____	Not sure____
- Parents should feel responsible if their children get HIV/AIDS.	Agree____	Disagree____	Not sure____
- I am less likely than most people to get HIV/AIDS.	Agree____	Disagree____	Not sure____
- People should know more about HIV/AIDS.	Agree____	Disagree____	Not sure____
- People should get tested for HIV before marriage.	Agree____	Disagree____	Not sure____
- Anyone can be infected with HIV.	Agree____	Disagree____	Not sure____
- It's okay to be friends with someone who is HIV-positive.	Agree____	Disagree____	Not sure____
- Having cancer causes HIV.	Agree____	Disagree____	Not sure____
- Schools and colleges should teach general HIV prevention practices.	Agree____	Disagree____	Not sure____
- If I found out that someone I knew had AIDS, it would be hard for me to continue the relationship.	Agree____	Disagree____	Not sure____
- It's likely that I know someone infected with HIV/AIDS.	Agree____	Disagree____	Not sure____
- Poor people are more likely to get HIV infection.	Agree____	Disagree____	Not sure____
- People with HIV/AIDS deserve what they get.	Agree____	Disagree____	Not sure____
- I would like to help educate people about HIV/AIDS	Agree____	Disagree____	Not sure____

2)   What questions do you still have about HIV/AIDS?

_____

_____

_____

_____

_____

3)   Is there anything you would like to share with us?

_____

_____

_____

_____

_____

6

You are almost done! Thank you for your patience.
We value your feedback and hope to design an even better tutorial with your thoughts. Thank you.

1) Your Gender: Female____   Male ____

2) Please provide your date of birth   Day____   Month____   Year____

3) Current school/college? (Tick one answer)

    ____XXXXX
    ____ XXXXX
    ____ XXXXX
    ____ XXXXX
    ____ XXXXX
    ____ XXXXX
    ____ XXXXX
    ____ XXXXX

3) Which class are you in (tick one):   Class 11th_____   Class 12th_____   College_____

6) Your area (please tick one)   Arts____ Commerce____ Science____ Other_____

. . . .

Congratulations! You have completed the last survey.

Thank you again for your help! We will use your feedback to re-design the tutorial and let you know how it goes. We really appreciate all your efforts. Please know that your thoughts are valuable to us and will help India as well as other countries.

Please close out of this survey.

Best wishes.

7

Appendix P: Knowledge Items in Analysis

	KNOWLEDGE QUESTIONS = 40 ITEMS
1	Has a vaccine been recently developed that prevents people from getting HIV infection?
2	Will a mother with HIV always pass the virus to her baby during childbirth?
3	Particular homeopathic medicines can cure HIV, if treated early?
4	Can bed/mosquito nets prevent someone from getting infected with HIV?
5	Are there treatments which can help HIV-positive mothers deliver healthy babies?
6	Can you tell by looking at someone if he/she has HIV/AIDS?
7	If you are highly religious, are you less likely to get HIV/AIDS?
8	If you eat healthy food and take vitamins, are you less likely to get HIV?
9	If you are of a particular caste, are you more likely to get HIV?
10	Is there a cure for HIV/AIDS?
11	Are cold, cough and fever symptoms of HIV?
12	Will exercise and staying fit prevent getting HIV?
13	If you do regular pranayam/yoga are you less likely to get HIV/AIDS?
14	Can a religious leader (e.g. Guru) prevent someone from getting infected with HIV?
15	Can HIV be cured, if discovered early?
16	Can you get HIV from the following activities: Hugging someone who is infected?
17	Can you get HIV from the following activities: Touching a public toilet seat?
18	Can you get HIV from the following activities: Kissing someone (on the mouth) who is infected?
19	Can you get HIV from the following activities: Infected person sneezing on you?
20	Can you get HIV from the following activities: Talking to an infected person?
21	Can you get HIV from the following activities: Drinking contaminated water?
22	Can you get HIV from the following activities: Blood transfusion?
23	Can you get HIV from the following activities: Infected person coughing on you?
24	Can you get HIV from the following activities: Getting bitten by a mosquito?
25	Can you get HIV from the following activities: Sharing needles and syringes?
26	Can you get HIV from the following activities: Breast milk (mother with HIV feeding baby)?
27	Can you get HIV from the following activities: Sharing plates, forks or glasses with someone with HIV/AIDS?
28	Can you get HIV from the following activities: Having sex with someone who is infected?
29	Can you get HIV from the following activities: Living with a person (with no sexual involvement)?
30	Can you get HIV from the following activities: Touching infected blood?
31	Can you get HIV from the following activities: Eating food prepared by HIV-infected person?
32	Can you get HIV from the following activities: Donating blood?
33	Can you get HIV from the following body fluids: Sexual fluids (vaginal secretions or semen)?
34	Can you get HIV from the following body fluids: Saliva (liquid in mouth)?
35	Can you get HIV from the following body fluids: Blood?
36	Can you get HIV from the following body fluids: Tears?
37	Can you get HIV from the following body fluids: Urine?
38	Can you get HIV from the following body fluids: Sweat?
39	Can you get HIV from the following body fluids: Breast Milk?
40	Can you get HIV from the following body fluids: Stool?

1. No; 2. No; 3. No 4. No; 5. Yes; 6. No; 7. No; 8. No; 9. No; 10. No; 11. Yes; 12. No; 13. No; 14. No; 15. No; 16. No; 17. No; 18. No; 19. No; 20. No; 21. No; 22. Yes; 23. No; 24. No; 25. Yes; 26. Yes; 27. No; 28. Yes; 29. No; 30. No; 31. No; 32. Yes; 33. Yes; 34. No; 35. Yes; 36. No; 37. No; 38. No; 39. Yes; 40. No

Appendix Q: Attitude Items in Analysis

	ATTITUDINAL QUESTIONS = 17 ITEMS
1	People with HIV/AIDS should not be allowed to work/study in public schools.
2	People should get themselves tested for HIV/AIDS.
3	People who die from AIDS are being punished for their past wrongs.
4	HIV/AIDS is God's punishment for immorality.
5	It's okay to be friends with someone who is HIV-positive.
6	If I found out that someone I knew had AIDS, it would be hard for me to continue the relationship.
7	I would like to help educate people about HIV/AIDS
8	I am comfortable going to school with someone with HIV/AIDS.
9	I am scared to have casual contact with someone who has HIV/AIDS.
10	People with HIV/AIDS deserve what they get.
11	We have a social obligation to help those with HIV/AIDS
12	Anyone can be infected with HIV.
13	Schools and colleges should teach general HIV prevention practices.
14	I won't talk to or interact with anyone with HIV/AIDS.
15	People should know more about HIV/AIDS.
16	People should get tested for HIV before marriage.
17	People with HIV/AIDS should not be allowed to handle food in restaurants.
	1. Disagree; 2. Agree; 3. Disagree; 4. Disagree; 5. Agree; 6. Disagree; 7. Agree; 8. Agree; 9. Disagree; 10. Disagree; 11. Agree; 12. Agree; 13. Agree; 14. Disagree; 15. Agree; 16. Agree; 17. Disagree

Appendix R: Comfort Level Items in Analysis

COMFORT LEVEL ITEMS = 6 ITEMS	
1	Were you comfortable with the overall animated tutorial?
	Answer Choices: Yes, No, Not Sure
2	What were you feeling while interacting with the animation tutorial?
	Answer Choices: Informed, Relaxed, Happy, Curious, Entertained, Guilty, Uneasy, Sad, Nervous
3	Was it more comfortable learning about these sensitive subjects from an anonymous animated tutorial?
	Answer Choices: Yes, I feel more comfortable learning about sensitive topics from an anonymous tutorial; No, I feel more comfortable learning about sensitive subjects from my class teacher; I feel equally comfortable learning about sensitive subjects from either an online tutorial or from my class teacher.
4	Would you be willing to forward this tutorial to others you care about?
	Answer Choices: Yes, No, Not Sure
5	Would you like to join our team and help stop the spread of HIV/AIDS?
	Answer Choices: Yes, No, Not Sure
6	After watching the animated tutorial, whom (if anyone) did you mention it to?
	Answer Choices: Parents (mother, father), Other Family (brothers, sisters, uncles, aunts), Fmeale Friends, Male Friends, Teacher, Other

Please note that the questions and answers above are summarized for illustrative purposes only. The actual surveys, including order of questions and answers, can be found in Appendix M, N and O.

Appendix S: Other Outcome Items in Analysis

	OTHER OUTCOME ITEMS = 11 ITEMS
1	Did you like the tutorial?
	Answer Choices: Yes, No
2	Did you like the characters in the animation?
	Answer Choices: Yes, No, Not Sure
3	Did you learn more about HIV/AIDS prevention through this animated tutorial than other communication methods (e.g. television, school)?
	Answer Choices: Yes, No, Not Sure
4	Do you feel other young adults would learn from this program?
	Answer Choices: Yes, No, Not Sure
5	Have you seen similar HIV/AIDS tutorials like this before?
	Answer Choices: Yes, No, Not Sure
6	Were most of your questions about HIV/AIDS answered in the tutorial?
	Answer Choices: Yes, No, Not Sure
7	After watching the tutorial, do you want to learn more about HIV/AIDS?
	Answer Choices: Yes, No, Not Sure
8	Since watching the animated tutorial, where (if anywhere) did you look for HIV/AIDS information?
	Answer Choices: Yes (books, magazines, Internet, friend(s), family, doctor(s)/nurse(s), teacher(s)/administrator(s), No (I did not inquire about HIV/AIDS on my own)
9	Since watching the animated tutorial, where (if anywhere) did you look for HIV/AIDS information?
	Answer Choices: I looked in books, I looked in magazines, I searched on the Internet, I talked to my friend(s), I talked to my family, I talked to a doctor(s)/nurse(s), I talked to teacher(s)/administrator(s)
10	After watching this tutorial, are you less afraid of interacting with HIV-infected people?
	Answer Choices: I was never afraid of interacting with HIV-infected people, I am less afraid of interacting with HIV-infected people, I am equally afraid of interacting with HIV-infected people, I am more afraid of interacting with HIV-infected people
11	After watching this tutorial, are you less afraid of being infected by HIV?
	Answer Choices: I never was afraid of being infected, I am less afraid of being infected, after watching the tutorial, I am equally afraid of being infected, after watching the tutorial, I am more afraid of being infected, after watching the tutorial

Please note that the questions and answers above are summarized for illustrative purposes only. The actual surveys, including order of questions and answers, can be found in Appendix M, N and O.

Appendix T: TeachAIDS.org Partners, Sponsors and Supporters

Partial List:

🇨🇳	AIDS Prevention Education Project For Chinese Youth China
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🇮🇳	Cents of Relief West Bengal, India
🇨🇳	China AIDS Inititative Beijing, China
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Tsinghua University, Beijing, China

Dynamic Reflection
San Francisco, California, USA

Fuyang AIDS Orphan Salvation Association
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243

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Vietnam

Stanford Prevention Research Center, School of Medicine
Stanford, California, United States

Stanford Program on International and Cross-Cultural Education
Stanford, California, United States

Stanford University School of Education
Stanford, California, United States

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Support for International Change
Arusha, Tanzania

Swasti Health Resource Center
Karnataka, India

WAD Up! Singapore
Singapore

XRI Research Institute
California, United States

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