STD PONG: An African-Centric Persuasive Game for Risky Sexual Behaviour Change.

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Abstract

This paper presents the design and development of a persuasive game for health aimed at promoting risky sexual behaviour change among African youths called *STD Pong*. The arcade game simulates various sexual risky behaviours that could lead to contracting STDs and HIV and how to avoid them. It also engages players in an interactive manner using various persuasive strategies with the aim of imparting knowledge and skills about safe sexual behaviours/practices and how to avoid risky sexual behaviours. The game uses the addictive concept of the popular ping-pong game and the principles of game-based learning to engage users in the game while subliminally persuading them to refrain from risky sexual behaviours/practices.

Author Keywords

Persuasive systems; Sexually Transmitted Diseases (STDs); design, behaviour change, games, game-based learning

ACM Classification Keywords

K.8.0 [Personal Computing]: General – Games. H.5.m. Information interfaces and presentation (e.g., HCI)

Figure 1: The Player Character.

Figure 2: King AIDS Character, the leader of the invasion on Okpongidi Clan.

Introduction

A statistic conducted by the World Health Organization in 2016, shows that more than 1 million sexually transmitted infections (STIs) are acquired every day worldwide [15]. The same study shows that each year, there are an estimated three hundred and fifty-seven million (3.57 million) new infections with one of these four Sexual Transmitted Infections: Chlamydia, Gonorrhea, Syphilis and Trichomoniasis [15]. This figure is even more alarming in the developing parts of the world. For instance, a recent report by the Joint United Nations Programme on HIV and AIDS (UNAIDS) shows that HIV and AIDS have almost become an epidemic in the Eastern and Southern African with 19.7 million people living HIV, 61% adults and 51 children are currently on antiretroviral treatment. In 2016 only, there were 790,000 new infections [1]. Despite, this alarming spread of both STD and HIV, the African continent has received the least attention from research. Most existing technological interventions targeted at STDs and HIV are focused on people in the western country and are not suitable for people from the African countries due to the uniqueness in their culture, religion, and beliefs especially where it has to do with acceptable sexual practices and approaches for avoiding risky behaviours.

On the other hand, Africa has a high mobile phone penetration and adoption rate. More than half a billion people across Africa now subscribe to mobile services, with the number expected to grow to 725 million by 2020 [4]. For example, 90% of Nigerian adults own at least a mobile phone [3]. Similarly, research has shown that 99% of adolescent boys and 94% of adolescent girls, including all racial/ethnic groups, play video games regularly [9] and Africa is not an exception.

Persuasive games for health are designed as interventions with the primary purpose of changing a user's behavior or attitude in an intended way [11]. Research has shown that persuasive games can be an effective tool for motivating desirable behavior change [5,10,11,13]. Therefore persuasive games could be an important tool for HIV and STD prevention. However, most existing persuasive games for health are not targeted at African audience. To bridge this gap, this paper presents the design and development of a persuasive game for health called *STD Pong* which aims at promoting risky sexual behaviour change among African youths.

Related Work

Playing digital games has become a preferred leisure time activity by most people. According to recent findings, 99% of adolescent boys and 94% of adolescent girls, including all racial/ethnic groups, play video games regularly[9]. As a result, researchers are building on the increasing adaption of digital games to design games that are aimed at purposes other than entertainment. One common example of such games is *persuasive games* which are designed as interventions for promoting desirable behaviour or attitude change [11]. Research has shown that persuasive games can be an effective tool for motivating desirable behaviour change in various health domain including healthy eating [10,12], physical activity [2], smoking cessation [7], and risky sexual behaviour change [6]. This research focuses on persuasive games for promoting risky sexual behaviour change.

Persuasive Games for Risky Sexual Behaviour Change
A number of persuasive games have been developed targeted at promoting risky sexual behaviour change.

Figure 3: This screenshot of the STD Pong Game Panel

A typical example of persuasive games for risky sexual behaviour change is a web-based health game called *Super Nurse: STD Game* [8]. The game helps to educate players about different kind of STDs, their prevention and cures. The game employed several persuasive strategies to facilitate the desired behaviours. For example, players are awarded points for correct choices related to STD, otherwise, points are deducted. Finally, players are provided with descriptive feedbacks informing them about STD prevention, their effects, and dangerous practices that can lead to contraction of the disease. Similarly, *PlayForward: Elm City Stories* is a game aimed at imparting American youths with skills and knowledge on how to avoid risky sexual behaviours that could lead to STDs and HIV [7]. The game allows the players to customize their avatar and travel through time while engaging in various risky behaviour-related activities such as pressure by friends to drink alcohol and dangerous sexual activities. The game simulates the long-term impacts of various activities in player's life. Players also have the ability to go back in time and correct all their 'mistakes' to ensure a better future.

In summary, while designing persuasive games to motivate healthy behaviour change is increasingly attracting attention, most existing persuasive games to date are targeted at people from the Western world. There is a need to African-centric persuasive game intervention that reflects Africanness.

'STD Pong' Persuasive Game Design
STD pong is an interactive two-dimensional arcade game based on a fictional narrative of a small village (clan) called Okpongidi and an invasion by STDs and HIV. The Clan of Okpongidi has been taken captive by King AIDS (Figure 2) and his eight evil henchmen

(other STDs). King AIDS challenges the entire Clan to choose someone to compete with his henchmen in a game of STD Pong. For every Henchman the player defeats, he would be rewarded with an STD Scroll which would enable him to free his entire clan from that particular STD. Each scroll contains knowledge about the strengths, weaknesses of the defeated sexually transmitted disease, and how to prevent, manage or treat the infection if applicable. If the player attains the final level, he engages in a final show-down (battle) with the King of the STDs (King AIDS) to earn a total freedom from his clutches.

The player plays the role of a young warrior that has been elected by the elders of the clan to defeat King AIDS. The overarching objective of the game is to acquire all the nine knowledge scrolls (corresponding to the nine different STDs) that would free the 'Okpongidi' Clan from the shackles of King AIDS and his evil henchmen. The henchmen of the King AIDS are as follows in descending order of rank: *Prince HIV, General Gonorrhea, General Syphilis, General Cancroid, Captain Chlamydia, Captain Trichomoniasis, Captain Herpes,* and *Captain Scabies*. We chose to focus on these nine different STDs because they are the most popular ones especially among our target African population [6].

The game is designed to be played on a variety of platforms including PC and mobiles. The game was developed using Actionscript 3.0 on Adobe Animate.

STD Pong Game Play
The game was developed using some of the principles and mechanisms of game-based learning [14]. Principles like Intrinsic Motivation, Learning through fun

Figure 4: This screenshot of the STD Scroll

and enjoyment and Authenticity were employed in the game. While mechanisms such as Rules, Clear but challenging goals, fictional setting, progressively difficult levels, uncertainty and unpredictability were employed in the game.

The game can be played in any of the two modes: The Story Mode and Arcade Mode. In the story mode, the player accepts the challenge to battle against King AIDS and his henchmen in the game. There are nine game levels with progressive difficulties. Specifically, in each level, the player encounters a tougher henchman with better skills. The reward at the end of each victory is an STD Scroll containing secret details on the strengths and weaknesses of that particular disease. The arcade mode allows the player to select any henchman to play against, but a henchman is accessible in this mode only when he has been defeated in the Story Mode.

Deconstructing the STD Pong Game

The Story and game sounds: The story illustrates a typical African setting, where communities are grouped into clans and tribes led by kings and elders who make decisions for the community. We decided to imbibe this concept to give the game an African feel and hence increase its relatability to the African audience. We also used African Jungle soundtracks to increase the Africanness. The complexion of the player and his attire, as shown in Figure 1, also contributes to give the game an African feel.

The Pong Ball, movement buttons, the health bars and the player, STD Scrolls: A player is associated with a player character as shown in Figure 1. The player character battles against a game character called a henchman which represents a particular STD that the player has to battle with. Each game level presents a unique STD. As shown in Figure 3, the player character is positioned at the left-hand side of the stage while the henchman is positioned at the right-hand side. Both the player and the henchman possess a health bar each, located at the top of the stage. Figure 3 shows a screenshot of the STD pong game panel. A ball, called the pong ball, bounces in a diagonal manner around the stage. This diagonal movement of the ball introduces some levels of uncertainty and unpredictability with regards to the movement of the ball. This is in line with the uncertainty and unpredictability game-based learning mechanism [14].

The game also features an STD ball which represents a particular STD on that game level. The primary task of the player is to move his character up and down using the arrow keys on the screen, to prevent the ball from hitting his defence system (the wall) and to push the STD ball out of his side of the court to the henchman's side of the court. Any time the pong ball hits the player's defence system, he loses 10% of the total health value. Similarly, any time the STD ball hits the henchman's side of the court, the henchman's health bar reduces by 10%.

A level ends whenever any of the two health bars get to 0%. If the player health gets to 0%, he is given an opportunity to either replay that level or end the game. However, if the henchman's health gets to 0%, the player wins and hence gets rewarded with an *STD Scroll. The* STD Scroll contains important details about the defeated STD including how it is transmitted, its symptoms, how to prevent it, how to get tested, and how it could be treated. Figure 4 shows a screenshot of

a sample STD scroll gotten after defeating Captain Scabies.

Player Power-Ups: The player power-ups represent various activities that can be used to control or prevent the spread of STDs. To determine the activities to be represented by these power-ups, we interviewed some stakeholders including various medical personnel who provided some expert opinions regarding the best practices and design choices. Based on their suggestions, the top three best practices for our target audience are; *abstinence from sex, condoms use, and routine blood tests*. Therefore, to integrate this as part of the game, we modeled them as power-ups. The three power-ups appear randomly and the player could use them to defeat the STDs. Using the *abstinence* power-up increases the player health bar by 10% of its original size. The *Condom* power-up makes the player resistant to STD attacks for a certain duration of time (approximately 10 seconds). The *Blood Test* power-up makes the player move two-times faster than his normal speed, enable him to block the pong ball, and avoid STD bullets faster. This metaphor conveys how regular testing and early detection of STD is vital in the effective treatment or control (in the case of HIV) hence persuading the player to imbibe these safety behaviours and practices.

STD Bullets: The STD bullets represent two major behaviours that could lead to STDs common among our target population: unprotected sex and the use of unsterilized sharp objects. During gameplay, henchmen randomly fire STD bullets with the aim of hitting the player and decreasing his health values. The *unprotected sex* object reduces the health of the player by 20% each time it hits him while the *sharp object* causes the player to move slowly for about 10 seconds. Through this technique, the player gets to understand that things like sharp objects and unprotected sex (damages) can ultimately lead to getting any of the STDs.

Conclusion
In this paper, we described the design and development of a Persuasive game aimed at promoting change in risky sexual behaviours targeted at the under-served African populations. Through regular interaction with stakeholders including various medical personnel, we designed an Afrcian-centric persuasive game called STD pong. The underlying game storyline (narratives), the linguistic expressions, the characters, and other game elements were intentionally designed to reflect the Africanness. This makes it easy for the target audience to identify and relate to it, hence increasing the potential of the game to persuade and motivate the desired change from risky sexual behaviours to safe sexual behaviours.

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