Development of an HIV Prevention Videogame Intervention: Lessons Learned

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Abstract

The use of videogames interventions is becoming an increasingly popular and effective strategy in disease prevention and health promotion; however, few health videogame interventions have been scientifically rigorously evaluated for their efficacy. Moreover, few examples of the formative process used to develop and evaluate evidence-based health videogame interventions exist in the scientific literature. The following paper provides valuable insight into the lessons learned during the process of developing the risk reduction and HIV prevention videogame intervention for young adolescents, PlayForward: Elm City Stories.

Keywords: *videogame; intervention, HIV prevention*

1. Introduction

Serious videogames provide engaging, interactive environments for players to role-play and practice skills that can translate into real-world situations. Because of their repetitive nature, videogames are ideal educational tools to enhance learning and reinforce content by providing immediate feedback to the player [1]. Additionally, there is compelling evidence that people who acquire new information, motivation, and behavioral skills in a virtual environment and subsequently practice these behaviors in a virtual reality game are more likely to act in accordance with the new skills in real life [2].

Interest in developing serious videogames, or games used for the purpose other than entertainment, for positive health impact is emerging [3]. Videogame interventions have been shown to affect a variety of health behaviors, such as those associated with the management of diabetes [4] [5], asthma [6] [7] cystic fibrosis [8], depression [9], cancer medication adherence [10], and healthy eating [11]. Together, these studies show that by interacting in a virtual world, players can develop the knowledge and behavioral skills needed to practice healthy behaviors in the real world. Although recent systematic reviews support the potential for videogames as interventions to influence health outcomes, few scientifically rigorous evaluations of videogame interventions exist [1] [12]. In addition, there is a paucity of studies that focus on reducing risk behaviors related to sex, drugs, and alcohol among youth, despite the significant morbidity and mortality due to these causes in this demographic [1].

The goals of the serious game field include using a rigorous development process and reliable tools such as theory-based content, conceptual models, intervention manuals (Game Playbooks [13]), and randomized controlled trials to develop and evaluate videogame interventions3, but despite these goals, limited examples of the formative development process exist. This paper contributes to the literature by highlighting twelve important lessons learned during the process of developing the evidence-based risk reduction and HIV prevention videogame intervention, PlayForward: Elm City Stories (PlayForward), which is currently undergoing rigorous evaluation as part of a large randomized controlled trial [14]. The goal of this paper is to provide valuable information and guidance to researchers interested in developing and evaluating videogame interventions that focus on behavior change.

2. The Videogame

PlayForward is an interactive role-playing videogame designed to provide at-risk young minority adolescents the opportunity to acquire and practice skills to reduce sexual risk behaviors, with the ultimate goal of preventing HIV. In the game, players create their Aspirational Avatar and "travel" through 7th to 12th grades, facing challenges and making decisions that bring different risks and benefits. PlayForward is currently being evaluated in a large randomized controlled trial with 333 teens aged 11-14 years. We are examining a range of outcomes including knowledge, intentions, self-efficacy and actual behaviors with data being collected at baseline, 6 weeks, 3, 6, 12, and 24 months and through the game's software [14] [15].

3. The Formative Research Process

During the two-year formative development of the videogame intervention, we conducted focus groups and interviews with minority teens to explore their perspectives and experiences and to better understand the factors that might impact their HIV risk behavior [16] - [18]. We also conducted an extensive literature review1 and developed a theoretical framework, logic model, and Game Playbook to inform the development of the videogame intervention [13]. Members of our target audience, including teens from the community, playtested the game and provided essential feedback at various stages of the development [14] [17]. This paper describes the critical lessons learned during this formative work that was conducted before the launch of the large, randomized controlled trial.

4. Lessons Learned

Lesson 1: Create a Knowledgeable Team. Two minds are better than one. Five minds are better than two. Creating a serious videogame that focuses on behavior change takes many minds. We formed a multidisciplinary team of experts (www.play2PREVENT.org) to develop and evaluate serious videogames that focus on behavior change, social impact, and education. The team, comprised of individuals with expertise in HIV, health behavior, addiction, pediatrics, community-based participatory research, community psychology, education, clinical psychology, social psychology, and serious and commercial videogame design and development, worked together to develop *PlayForward*. Additionally, and perhaps most importantly, we partnered with over a dozen community schools and after-school programs, involving close to 500 young adolescents, school and after-school program directors, community partners, teachers, and parents in discussions involving the development and subsequent evaluation of the videogame intervention.

Lesson 2: Get to Know Your Audience. *PlayForward* was developed specifically for young, urban, minority adolescents, aged 11-14 years. To create a videogame that was authentic and relatable to our audience, we spent the first year of development conducting interviews and focus groups with minority youth, collecting information on their gaming preferences, including platforms and design characteristics [18]. We asked about their future aspirations and dreams and listened to their stories about their lives, friendships, schools, and families. We had discussions with their school program directors, school nurses, and guidance counselors and with older high school adolescents, asking them to reflect back on their middle school years and tell us what they wish they would have known as young adolescents. For our game to truly resonate with the target population, the game had to be *their* game.

Lesson 3: Get Creative. It is challenging to get 11-14 year old teens to talk about risks in their environment and about their future hopes and dreams. This is not necessarily because they do not want to talk, but rather because they may have difficulty conceptualizing abstract thoughts and expressing their opinions [19]. Our solution was to find creative ways to encourage teens to talk about sensitive topics. To help us create authentic storylines, characters, and artwork for *PlayForward,* we used several strategies to engage teens in the development process [16-18]. For one focus group activity, *Storytelling Using Graphic Illustration* (Figure 1), we used an ambiguous illustration depicting a group of teens engaging in benign activities such as talking to each other and looking at something outside of the frame. To create a discussion we simply asked, "What's

going on here?" The teens told stories that resonated closely with their own lives and involved topics such as unplanned pregnancy, sneaking out of the house, fighting, stealing, drinking, and drug use. The content produced by this activity helped to shape many of the storylines that were built into the videogame. Another activity we used to learn about teens' future aspirations was called *My Life*. For this project, we created a visual timeline that extended out ten years from the teens' current age and asked them to write down any important hopes and dreams they had for themselves. We learned about life goals such as going to college, having money, being successful, and being able to take care of their parents (such as helping them with their bills) in addition to getting a driver's license or the newest *PlayStation* or going to prom. This activity was essential to informing the development of the *Aspirational Avatar* (player's character that was the visual representation of their future hopes and dreams) in the game. Figure 2 is a screenshot from the videogame that provides an example of the creation of the player's *Aspirational Avatar*.

Figure 1: Storytelling Using Graphic Illustration

Figure 2: Creation of the Aspirational Avatar

Lesson 4: Look to the Literature. In the field of serious games research, this lesson is critically important: look to the literature; examine what has already been done and what worked or did not work. Consider what theories or frameworks were used to guide the development and/or evaluation of similar videogames (or interventions), what assessment data were collected and the methods to collect them. Systematic reviews can provide a thorough summary of current literature relevant to a specific research question [20]. For example, as part of the development of *PlayForward*, we conducted a systematic review on electronic media-based interventions that promote behavior

change in youth [1]. Our findings revealed a handful of high quality, rigorously evaluated videogame interventions to use as examples and also provided us with valuable insight into the field of serious games research. For instance, of the five studies that received an excellent quality rating in our systematic review, two studies [21] [22] reported a statistically significant change in sexual risk–related behavior. These two studies provided excellent models for us of electronic media–based interventions that focus on young adolescents. The lesson learned here is to not waste efforts on reinventing the wheel, but instead, aim to improve it. Our goal was to not only create an electronic-media based intervention that was effective in increasing healthy behaviors in young adolescents, but rather to create an immersive, interactive, stand alone videogame intervention that could easily be implemented and disseminated, thereby reducing associated implementation costs and the need for trained facilitators.

Lesson 5: Find the Right Game Developer. In addition to making decisions about what the videogame would target through extensive discussions with our target audience and community stakeholders and reviewing the relevant literature, identifying the game development team to partner with was key. In order to do this, we sent out a Request for Information (RFI) to a dozen game design studios requesting information about their studios, staff, history of work, and game design capabilities with the goal of first evaluating their suitability as a potential developer for this videogame project. From the 10 responses to the RFI we received, we chose five studios to whom we sent a Request for Proposal (RFP), which included a 30-page design document we had created and a request for their proposed creative approaches to our game design idea, as well as an estimated cost and schedule proposal. From the RFP, we received responses from three studios, which were then reviewed by the team including our commercial game consultants. After considerable discussion, we awarded the project to a serious game design and development company located in Pittsburgh, PA. Although this process was successful and we would recommend this approach to others interested in hiring a game design company, it is time and labor intensive and may require having an expert on the development team to help guide the process. Nonetheless, by creating a competitive environment for our game project, we were able to identify the best fit for the project that included consideration to game design capabilities, schedule, and budget.

Lesson 6: Develop a Conceptual Model. Interventions designed from health behavior theory are more successful than those that are not theory-based [23] [24]. Conceptual models, which are guided by health behavior theory, are used to demonstrate the relationships between factors, or concepts, that are believed to impact or lead to a target condition. The development of *PlayForward* was heavily influenced by behavior change theory and includes concepts such as self-efficacy, perceived risks, self-regulation, and future orientation [24]. Considering these concepts, we mapped out how each intervention component of *PlayForward* (the mini-games *Me Power, Refusal Power, Know Power, People Sense,* and *Priority Sense*) impacted the player and their behavior [13]. Conceptual models are also helpful for mapping out game design documents and figuring out how to assess a game for subsequent impact. For example, the mini-game *Know Power* provides youth with information and knowledge related to the consequences of engaging in health risk behaviors. The facts we included in this mini-game were influenced by previous evidence-based interventions for HIV-related risk reduction in young adolescents [21] [25]. Using these facts, we created a 22-item knowledge assessment that was used to assess knowledge retention as part of our randomized controlled trial [26] [27]. We followed the same process for all other parts of the game and the assessments used to measure their associated target outcomes. Creating a conceptual model to guide our intervention development and assessment collection early on allowed us to establish greater confidence in the content validity of our measures. Given how affecting behavior change is very challenging, having a collaborator with expertise in behavioral science that is also well versed in theory on the development team is crucial.

Lesson 7: Create Behavioral Intervention Manuals or "Game Playbooks". Early in the game development process, we discovered that translating behavior change concepts into a videogame intervention was a challenging task. We recognized that we could not expect the game design team to be experts in behavior change or specific content matter. Conversely, the members of the research team were not experts in videogame design. To help us bridge the gap between the game designers and research team, we created "Game Playbooks [13]" that served as intervention manuals that were designed, understood and accepted by all members of the game design and research team. Game Playbooks serve several purposes. First, the Playbooks outline the target

variables, theoretical framework, and mechanisms for behavior change within the videogame intervention. This provides the game developers with a clear description of the essential components and processes to be included in the game. Whereas the Playbooks go through iterations, the fundamental behavioral targets remain intact. Second, the Playbooks allow for the identification and assessment of critical moments within the gameplay that contribute to effective behavior change. This feature helps to ensure that the videogame intervention includes the important components needed to affect behavior change such as skill building and knowledge acquisition. We continue to use the process of creating Game Playbooks for each of our game projects, as they are fundamental to all stages of design, development, and evaluation of videogame interventions.

Lesson 8: Know What to Assess. Creating evidence-based interventions, including serious games interventions, requires using well-established behavioral theories in order to ensure that an intervention is successful at affecting the targeted outcome. Theory consists of constructs, and constructs are paired with validated assessments or measures that can be used to guide both the development and eventually the evaluation of the intervention. For instance, in addition to collecting data on specific behaviors, does the researcher want to know if the game changes attitudes, intentions, or beliefs related to a specific behavior? Do they want to know if it increases knowledge related to certain topic? It is essential to identify the relevant assessments that the development team will use prior to the programming of the game and make sure they are consistent with the individual determinants described in the game's conceptual model that is developed prior to production of the game. Again, it is important to identify what other research teams have used for assessments in the evaluation of their videogame interventions, if the measures they used provided valid and reliable data, and how these assessments might inform the development process of your team's game. The team should be prepared to adapt assessments, and in some cases develop their own, so that they clearly align with the specific videogame's goal(s) [14].

Lesson 9: **The Process is Iterative.** The development of *PlayForward* went through countless iterations of the game's storylines, artwork, and game mechanics before the game was ready for production. However, although the game went through these iterations, the fundamental components of the game remained constant. This continuity was key to keeping the game focused on the targeted behavioral outcomes and game goals in the context of the highly iterative process, as outlined in the Game Playbooks [13]. During this part of the development process, the adolescent focus groups were essential as they provided important feedback on the artwork, storylines, and characters in the game [17] [18]. When the game was created as a digital prototype, we brought it back to our cohort of adolescents for play testing and feedback, on the mechanics and translation of behavior change concepts into the game. Although the iterations were time consuming, they were essential in creating an authentic game experience for the adolescent audience.

Lesson 10: **Be Prepared to Reduce Content.** *PlayForward* is a videogame about reducing risk-taking behaviors in adolescents. In the game, the character "travels" through middle school and high school and is faced with dozens of challenges that have the potential to affect their future. In reality, adolescents are constantly being faced with an array of life challenges they must navigate such as bullying, sex, drug and alcohol use, relationships, peer pressure, and violence. At the beginning of the development process of *PlayForward*, we included most of these adolescent life challenges in the storylines. In the original design of the game, there were six grades (7th through 12th grade), with each grade having four unique story branches. There were six mini-games, and plans to expand the player's ability to develop their game character, or *Aspirational Avatar*. However, time and budget constraints required us to cut approximately 40% of our original game. The final version of *PlayForward* now includes two unique story branches within each of the six grades, five mini-games, and a smaller scope of the player's ability to develop their *Aspirational Avatar*. In retrospect, reducing content and storylines in the game strengthened the game by making it more focused on a dedicated number of adolescent topics as opposed to only slightly addressing many topics. The lesson learned here is that it may be more valuable to do a smaller amount well than a larger amount not as well.

Lesson 11: Back to the Focus Groups. We cannot emphasize enough the importance of involving the target audience in all aspects of the game design and development process. After our team had created theory-based game design documents (Game Playbooks [13]), we continued to actively

involve young adolescents for feedback on the developed artwork, storylines, and characters. One method we employed to ensure the artwork in the game was authentic and relatable to the adolescents was to give them disposable cameras and ask them to take photographs of every important component of their lives [17]. They returned the cameras with images of their neighbourhoods, their homes, and bedrooms. We received photographs of hairstyles, clothes, shoes, family members, friends, cars, and pets. We then sent these photographs to the game development team who used the photographs to directly guide and influence the artwork for the game. Figure 3 provides examples of photographs taken by teens that were translated to artwork found in the game. In addition to conducting focus groups that focused on the artwork for the game, we also held discussions with adolescents regarding the storylines and narratives used in the game. The adolescents were very eager to tell us their impressions of the game's many stories and characters, including the language we used to tell the stories. The game and its many components such as the artwork and narrative went through considerable iteration before they were determined to be relevant and authentic by our cohort of adolescents. Although this step is time consuming, it is a critical component to producing an effective videogame intervention. If the target audience cannot connect to the game, it may become a lost opportunity to create an enduring impact.
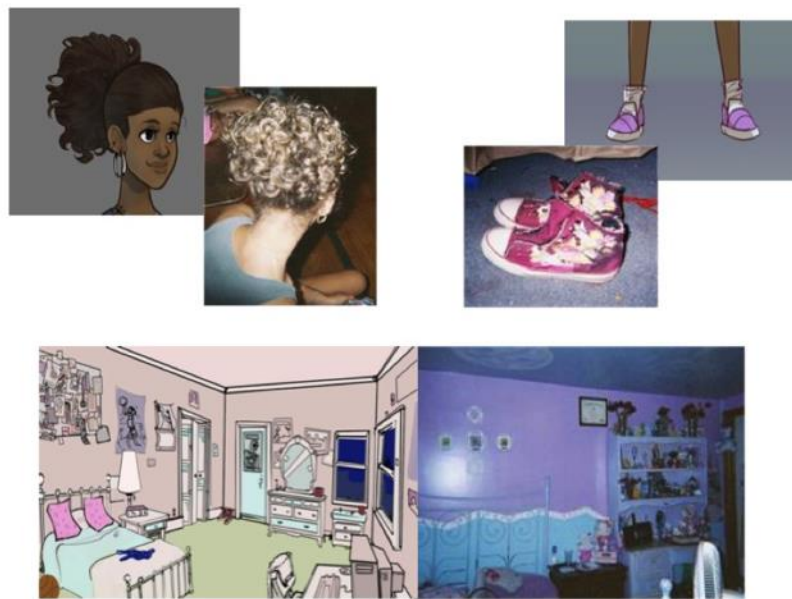

Figure 3: Artwork Translated into *PlayForward*

Lesson 12: Standardized Assessments and In-game Data are Both Important. Serious videogames aim to change a specific behavior, to increase knowledge, or to create social change. A development team has expectations for their game and what they want it to accomplish, but how do they ensure it meets the stated goals? The choice of relevant and appropriate standardized assessments early in the development of a videogame is critical to ensure the game includes specific concepts related to those assessments. For instance, if the goal of the videogame is to increase knowledge related to HIV, then the team must ensure that the information embedded in the game is specific content about HIV that will be tested through the assessments. Considerations to the collection of "in-game data," or data collected through the game's software, should be approached in a similar fashion. In-game data includes information such as the time to complete a level or session, progress within a mini-game or a particular level, points or stars collected, or correct/incorrect answers. Identifying the specific in-game data that will be useful should be decided early in the process and should be considered in relation to the data collected with the standardized assessments. This process will allow for meaningful subsequent data analysis to determine if what a player reports on a standardized assessment relates directly to what they do in the game or whether certain levels or mini-games have a greater impact on skill-building. Together, standardized assessment data and in-game data can create a rich picture of a player's gameplay experience and potential impact of the videogame [15].

5. Discussion

Videogame interventions are becoming an increasingly popular approach to disease prevention and health promotion, and have been shown to affect behaviors related to a variety of health issues. However, few examples exist in the scientific literature describing the process of developing and evaluating these types of interventions using rigorous scientific methods. Specifically, to our knowledge, until the development of *PlayForward: Elm City Stories,* no evidence-based videogame intervention that focused on risk reduction and HIV prevention in young minority teens existed.

The purpose of this paper is to highlight the valuable lessons learned by our team during the two-year formative work and development *PlayForward: Elm City Stories.* Our goal is to provide researchers and other stakeholders who are interested in working in serious games research with examples and models of how rigorous research tools such as theoretical constructs, conceptual models, assessment tools, and focus group input can positively inform the development of a serious videogame intervention for subsequent efficacy evaluation. Additionally, we hope to elicit discussions around the potential for collecting and analyzing in-game data in conjunction with standardized assessments.

PlayForward: Elm City Stories was developed with input from at-risk minority teens from the United States with a concentrated focus on the unique challenges and risk behaviors associated with this population. It should be noted that the relevance and approach of the formative development conducted by this team for the development of this particular videogame intervention may differ in other contexts. For instance, the methods used to engage teens in discussions around sexual risk and HIV prevention in the United States may need to be adapted for teens from a different environment or culture.

As technology continues to permeate our lives, and with the growing interest in using videogames as interventions to affect behaviors and increase knowledge related to a variety of health outcomes, this emerging field is in need of established processes and procedures to develop highly effective, theory-driven videogames.

References

[1]   Hieftje KD, Edelman EJ, Camenga DR, Fiellin LE. Electronic Media-Based Health Interventions for Behavior Change in Youth: A Systematic Review. JAMA pediatrics. 2013;167:574-580. http://dx.doi.org/10.1001/jamapediatrics.2013.1095

[2]   Bainbridge WS. The scientific research potential of virtual worlds. Science (New York, N.Y.). 2007;317:472-476. http://dx.doi.org/10.1126/science.1146930

[3]   Fiellin LE, Hieftje KD, Duncan LR. Videogames, here for good. Pediatrics. 2014;134:849-851. http://dx.doi.org/10.1542/peds.2014-0941

[4]   Brown SJ, Lieberman DA, Germeny BA, Fan YC, Wilson DM, Pasta DJ. Educational video game for juvenile diabetes: results of a controlled trial. Medical informatics = Medecine et informatique. 1997; 22:77-89. http://dx.doi.org/10.3109/14639239709089835

[5]   Horan PP, Yarborough MC, Besigel G, Carlson DR. Computer-assisted self-control of diabetes by adolescents. The Diabetes educator. 1990;16:205-211. http://dx.doi.org/10.1177/014572179001600311

[6]   Krishna S, Francisco B, Balas E, Konig P, Graff G, Madsen R. Internet-enabled interactive multimedia asthma education program: a randomized trial. Pediatrics. 2003;111:501-510. http://dx.doi.org/10.1542/peds.111.3.503

[7]   Lieberman DA. Management of chronic pediatric diseases with interactive health games: theory and research findings. The Journal of ambulatory care management. 2001;24:26-38. http://dx.doi.org/10.1097/00004479-200101000-00004

[8]   Davis MA, Quittner AL, Stack CM, Yang MC. Controlled evaluation of the STARBRIGHT CD-ROM program for children and adolescents with Cystic Fibrosis. Journal of pediatric psychology. 2004;29:259-267. http://dx.doi.org/10.1093/jpepsy/jsh026

[9]   Merry S, Stasiak K, Shepherd M, Frampton C, Fleming T, Lucassen M. The effectiveness of SPARX: a computerised self-help intervention for adolescents seeking help for depression: randomised controlled non-inferiority trial. British Medical Journal. 2012;344. http://dx.doi.org/10.1136/bmj.e2598

[10]   Kato PM, Cole SW, Bradlyn AS, Pollock BH. A video game improves behavioral outcomes in adolescents and young adults with cancer: a randomized trial. Pediatrics. 2008;122:e305-317. http://dx.doi.org/10.1542/peds.2007-3134

[11]   Peng W. Design and evaluation of a computer game to promote a healthy diet for young adults. Health communication. 2009;24:115-127. http://dx.doi.org/10.1080/10410230802676490

[12]   Primack BA, Carroll MV, McNamara M, et al. Role of video games in improving health-related outcomes: a systematic review. American journal of preventive medicine. 2012;42:630-638. http://dx.doi.org/10.1016/j.amepre.2012.02.023

[13]   Duncan LR, Hieftje KD, Culyba S, Fiellin LE. Game playbooks: tools to guide multidisciplinary teams in developing videogame-based behavior change interventions. Translational behavioral medicine. 2014;4:108-116. http://dx.doi.org/10.1007/s13142-013-0246-8

[14]   Fiellin LE, Kyriakides TC, Hieftje KD, et al. The design and implementation of a randomized controlled trial of a risk reduction and human immunodeficiency virus prevention videogame intervention in minority adolescents: PlayForward: Elm City Stories. Clinical trials (London, England). 2016.

[15]   Montanaro E, Fiellin LE, Fakhouri T, Kyriakides TC, Duncan LR. Using Videogame Apps to Assess Gains in Adolescents' Substance Use Knowledge: New Opportunities for Evaluating Intervention Exposure and Content Mastery. Journal of medical Internet research. 2015;17:e245. http://dx.doi.org/10.2196/jmir.4377

[16]   Camenga DR, Hieftje KD, Fiellin LE, Edelman EJ, Rosenthal MS, Duncan LR. The use of message framing to promote sexual risk reduction in young adolescents: a pilot exploratory study. Health education research. 2014;29:360-366. http://dx.doi.org/10.1093/her/cyt156

[17]   Hieftje K, Duncan LR, Fiellin LE. Novel methods to collect meaningful data from adolescents for the development of health interventions. Health promotion practice. 2014;15:714-722. http://dx.doi.org/10.1177/1524839914521211

[18]   Hieftje K, Rosenthal MS, Camenga DR, Edelman EJ, Fiellin LE. A qualitative study to inform the development of a video game for adolescent HIV prevention. Games for health journal. 2012;1:294-298. http://dx.doi.org/10.1089/g4h.2012.0025

[19]   Drew SE, Duncan RE, Sawyer SM. Visual storytelling: a beneficial but challenging method for health research with young people. Qualitative health research. 2010;20:1677-1688. http://dx.doi.org/10.1177/1049732310377455

[20]   Mulrow C. Rationale for systematic reviews. London: BMJ; 1995.

[21]   Tortolero SR, Markham CM, Peskin MF, et al. It's Your Game: Keep It Real: delaying sexual behavior with an effective middle school program. The Journal of adolescent health : official publication of the Society for Adolescent Medicine. 2010;46:169-179. http://dx.doi.org/10.1016/j.jadohealth.2009.06.008

[22]   Downs JS, Murray PJ, Bruine de Bruin W, Penrose J, Palmgren C, Fischhoff B. Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. Social science & medicine (1982). 2004;59:1561-1572. http://dx.doi.org/10.1016/j.socscimed.2004.01.032

[23]   Glanz K, Bishop DB. The role of behavioral science theory in development and implementation of public health interventions. Annual review of public health. 2010;31:399-418. http://dx.doi.org/10.1016/j.socscimed.2004.01.032

[24]   Noar SM. Behavioral interventions to reduce HIV-related sexual risk behavior: review and synthesis of meta-analytic evidence. AIDS and behavior. 2008;12:335-353. http://dx.doi.org/10.1007/s10461-007-9313-9

[25]   Jemmott L, Jemmott J, McCaffrey K. Making a Difference!: An Abstinence Approach to HIV/STD and Teen Pregnancy Prevention. New York: Select Media; 2002.

[26]   Fiellin LE, Hieftje KD, Fakhouri T, Duncan LR, Kyriakides TC. A videogame increases HIV risk-related knowledge in adolescents. AIDS 2014: 20th International AIDS Conference. Melbourne, Australia2014.

[27]   Fiellin LE, Hieftje KD, Fakhouri T, Duncan LR, Sawyer BG, Fiellin DA. PlayForward: A videogame that increases drug, alcohol and sexual risk knowledge in teens. Drug and Alcohol Dependence. 2015:e277-e278. http://dx.doi.org/10.1016/j.drugalcdep.2014.09.221