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Original Article

If We Build It, Will They Come? A Qualitative Study of Key Stakeholder Opinions on the Implementation of a Videogame Intervention for Risk Reduction in Adolescents

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Abstract

Objective: Serious games are emerging as important tools that offer an innovative approach to teach adolescents behavioral skills to avoid risky situations. *PlayForward: Elm City Stories,* an interactive videogame targeting risk reduction, is currently undergoing evaluation. Collecting stakeholder data on its acceptability and real-life implementation strategies is critical for successful dissemination.
Materials and Methods: We collected interview data from four stakeholder groups regarding incorporating *PlayForward* into settings with adolescents. Transcripts were coded, creating a comprehensive code structure for each stakeholder group.
Results: We conducted 40 semi-structured interviews that included 14 adolescents (aged 12–15 years; 10 boys), eight parents/guardians (all women), 12 after-school/school coordinators (nine women), and 14 community partners (13 women). We identified four themes that reflected stakeholders' perceptions about how the videogame might be implemented in real-world settings. (1) Stakeholder groups expressed that the topics of sex, alcohol, and drugs were not being taught in an educational setting. (2) Stakeholder groups saw a videogame as a viable option to teach about sex, alcohol, and drugs. (3) Stakeholder groups thought that the videogame would fit well into other settings, such as after-school programs or community organizations. (4) Some stakeholder groups highlighted additional tools that could help with implementation, such as manuals, homework assignments, and group discussion questions.
Conclusion: Stakeholder groups supported the game as a delivery vehicle for targeted content, indicating high acceptability but highlighting additional tools that would aid in implementation.

Introduction

Sexual risk behaviors and alcohol and drug use increase substantially during adolescence and remain major public health problems.[1,2] Early adolescence is a window of opportunity to intervene with primary prevention efforts, to reduce the prevalence of these behaviors and consequences associated with them. Although effective prevention programs for adolescents exist, they have limited reach, highlighting the need for innovative approaches that provide opportunities to acquire and practice behavioral skills that help reduce risk behaviors.

The use of videogames has emerged as a potentially effective method of successful dissemination of behavioral skill building and health content.[3,4] With 94%–99% of boys and girls playing videogames,[5] and 63% of adolescents playing on any given day, videogames are increasingly being used as vehicles to deliver knowledge and skills.[4] *PlayForward: Elm City Stories* (*PlayForward*), a videogame developed to target risk behavior change with a particular focus on HIV-related risk,[1,6–8] is currently being evaluated.

Based on the technology acceptance model, for this intervention to be effective in ''real-world'' settings, there must be strong perceptions of usefulness and ease of use among key stakeholders[9]; therefore, it is vital to collect data from stakeholders to design viable implementation strategies.[10,11] Thus, the purpose of the current study was to collect and examine feedback from key stakeholders to:

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(1) assess attitudes toward technology use and the usefulness and ease of use of *PlayForward* and (2) gauge perceptions regarding the implementation of a serious videogame intervention into settings, such as after-school programs, youth programs, and classroom settings.

Materials and Methods

The PlayForward intervention

PlayForward is a novel videogame intervention developed for adolescents (11–14 years old) with input from adolescents, researchers, educators, videogame designers, and community organizations[1,6–8] (Table 1). A randomized controlled trial (RCT) to evaluate the efficacy of the intervention's impact on risk behaviors and their mediators is being completed.

Stakeholder participants

We identified four stakeholder groups: adolescents who played *PlayForward* in the RCT, their parents/guardians, after-school/school program coordinators involved with the RCT, and community leadership partners who worked for organizations such as mental health or school health clinics that focused on adolescents' health-related issues (Table 2). We recruited participants via telephone, emails, and in person.

Interviews

An interview guide for each group was developed (Table 3). Interviews ranged between 30 and 90 minutes and were conducted by the lead research assistant (TMP). Interviews were conducted at convenient locations for the

Table 1. Characteristics of a Videogame for Health: *PlayForward: Elm City Stories*

Health topic(s)	HIV/AIDS, drug use, alcohol use, peer pressure, pregnancy prevention, sexual intercourse, healthy decision making
Targeted age group(s)	10–15 years old
Short description of game idea	PlayForward is an interactive world in which the player, using an Avatar, ''travels'' through life, facing challenges and making decisions that bring different risks and benefits.
Target player(s)	Individual
Guiding knowledge or behavior change theory(ies), models, or conceptual framework(s)	Behavior change theory, including self-efficacy, social norms, message framing, prospect theory, and delay discounting
Intended health behavior changes	Through the game, by receiving negotiation and refusal skills, it is intended that players will have lower rates of initiation of sexual activity and also an increase in HIV risk knowledge.
Knowledge element(s) to be learned	Sexual risk behaviors, drug and alcohol use and consequences, peer pressure
Clinical or parental support needed	No
Data shared with parent or clinician	No
Type of game	Educational, role-playing
Story (if any)	
Synopsis (including story arc)	The player (using their avatar) progresses from 7th to 12th grade, encountering various situations related to sex, alcohol, and drugs. The player is required to make decisions and see how those decisions impact their avatar's life. Additionally, four minigames that focus on social skills that are needed to avoid risky situations are interwoven into the main story lines.
How the story relates to targeted behavior change	Narrative storylines and recurring characters give the game realism and relatable experiences, making the outcomes and consequences more meaningful for the player, and transferable to real-life surrounding issues of sex, alcohol, and drugs.
Game components	
Player's game goal/objective(s)	To make good decisions regarding sex, alcohol, and drugs, so their avatar can have the best life possible (as reflected in the avatar's epilogue).
Rules: Game mechanic(s)	Through their avatars, players have the ability to see how their choices affect their lives and, subsequently, are able to move back in time to see how different actions might have led to different outcomes.
Procedures to generalize or transfer what's learned in the game to outside the game	By negotiating challenges in a highly repetitive and meaningful way, players learn skills that translate to real life, equipping them to avoid situations that increase their risk for HIV and other negative health outcomes.
Avatar	
Characteristics	2D, static
Game platform(s) needed to play the game	iPad, PC, Android, IOS
Estimated play time	Approximately 16 hours of game play time

Table 2. Demographics of Stakeholder Interviewees

Demographic	*Frequency*
Gender	
Female	33
Male	15
Race	
African American	22
White	15
Hispanic	7
Other	4
Age	
Adolescent stakeholders	
11–12	1
13–14	12
15–16	1
Adult stakeholders	
20–29	9
30–39	9
40–49	10
50–59	2
60–69	3

interviewees, such as after-school sites, schools, libraries, and work offices. Adolescent and parental interviews were done individually, whereas after-school/school coordinator interviews and community partner interviews were conducted either individually or communally (up to three individuals).

Interviewees who had not interacted with *PlayForward* were given a brief overview of the game and were allowed to interact with the first level. Interviews were audiotaped, transcribed, and reviewed to ensure accuracy. Participants were compensated with $20 gift cards. The Yale Human Investigation Committee approved all procedures.

Data analysis

A three-person interdisciplinary research team—composed of individuals with expertise in adolescent research, community-partnered research, and health behavior—conducted the analysis of the interviews, developing codes in a step-wise fashion[12] that were independently reviewed by each team member. Transcripts were coded until a comprehensive code structure was created that captured all data concepts. To reach a consensus, the team met regularly to confer on code structure and discuss themes that emerged.

Table 3. Examples of Stakeholder Interview Questions

Adolescent participants	*Parents/guardians*	*After-school/school program coordinators*	*Community leadership*
What does your school teach you about sexually transmitted infections, HIV, and pregnancy prevention? Drug and alcohol prevention? What does your after-school program teach you about sexually transmitted infections, HIV, and pregnancy prevention? Drug and alcohol prevention?	What kind of classes or programs about sexually transmitted infections, HIV, or pregnancy prevention does your child's school currently offer?	How do you decide what is incorporated into your after-school curriculum? Where do you get ideas for your after-school curriculum content?	How familiar are you with the current sex education curriculum for local public schools?
What type of information did you learn from the game?	If there were an option for you to choose how your child learned about topics such as sexually transmitted infections, HIV, or pregnancy prevention, would you consider a video game to be a viable option? Why or why not? For drugs and alcohol?	Why did your site decide to partner with Play2Prevent to have your young people play our video game *PlayForward: Elm City Stories*?	What kind of value do you think an intervention such as this would have in a school setting?
If you had the option of choosing to learn about STD, HIV, pregnancy prevention, and drug and alcohol use from a game or a regular class, which would you choose and why?	What additional tools, if any, do you think would be needed along with the game to make it as informative as traditional classes about sexually transmitted infections, HIV, pregnancy prevention, and drug and alcohol use?	What additional tools do you think would be needed to successfully implement *PlayForward:Elm City Stories* into your school/ after-school curriculum?	If *PlayForward: Elm City Stories* were integrated into after-school/school curricula, what additional tools do you think would be needed along with the game to successfully implement its integration into these programs?

Results

Demographic data

We conducted 40 semi-structured interviews: 14 adolescents (12–15 years; 10 boys), eight parents/guardians (35–60 years, all women), 12 after-school/school coordinators (23–63 years, nine women), and 14 community partners (20–64 years, 13 women).

Sample size

The sample size of participants in a qualitative study is dependent on thematic saturation. The reaching of saturation depends on several factors, including the quality of data, scope of the study, nature of the topic, and the amount of useful information obtained from each participant.[13] Since our research study was highly focused and contained rich, meaningful data, we were able to reach saturation with a small number of participants within each homogeneous group of stakeholders.

Themes

We identified four themes that reflected stakeholders' perceptions of *PlayForward* and how it might be implemented in real-world settings: (1) Topics of sex, alcohol, and drugs are not being taught in a traditional educational setting. (2) A videogame intervention is a useful and effective mechanism to teach about sex, alcohol, and drugs. (3) The videogame is a viable option for other settings, such as after-school programs, community organizations, and counseling sessions. (4) Additional tools could help with implementation, such as manuals, homework assignments, group discussion questions, and a parent version of the game.

Adolescent exposure to sex, alcohol, and drugs in a school setting

During the interviews, all stakeholder groups were asked about adolescents' exposure to the topics of sex, alcohol, and drugs in a school setting. Most adolescents reported that they were not currently being taught this information in school, whereas the majority of the parents/guardians who were interviewed indicated that either they were unaware of any programs or they could definitely say that their child was not exposed to these topics in school.

> … That actually has not been a topic … Unless they're going to do something later on. Maybe their assumption is that they've already had health education in their elementary in middle school years and they don't. (Female, African-American, 45, mother of 14-year-old male participant)

The majority of the community partners interviewed were not specifically aware of local school-sponsored curricula addressing sex, alcohol, and drugs for adolescents. However, one community partner did have extensive knowledge of the sex education program in the public school system:

> … There are guidelines from the Board of Education for Comprehensive Sexuality Education, but there isn't a mandate. Each school district can decide what they want to do … but there isn't something universal across the board. (Female, White, 35, Regional Manager for Education and Training at Planned Parenthood)

Usefulness and effectiveness of a videogame to teach adolescents about sex, alcohol, and drugs

Adolescents were asked whether they would prefer *PlayForward* or taking a traditional class in school about sex, alcohol, and drugs; nearly all adolescents were in favor of the videogame. Reasons for choosing the videogame included greater privacy, it being more appealing than a traditional class, having fun while learning, and it being more interactive than listening to a teacher. One adolescent described their preference for *PlayForward*:

> It's more entertaining … teenagers don't want to just stand there and get lectured all of the time. They want to have something that they can interact with, like that's more fun. (Male, African-American, 13 years old, 9th grade)

When asked to provide examples of information they learned from the game, adolescents identified facts about sex, alcohol, and drugs. For example, one participant described their learning experience:

> The game taught me some stuff I didn't know … I never knew the first time having sex with a girl, could get pregnant. I thought it was like the first time you have sex, you're okay …. (Male, Hispanic, 12 years old, 7th grade)

Adolescents also discussed how the game allowed them to learn about topics that they otherwise might be uncomfortable talking about in person, including with their parents. One adolescent expressed:

> PlayForward really teaches you more than what an average person will, because most of the times, teenagers like my age, wouldn't want to hear that from adults. Especially their parents … (Male, Other, 13 years old, 7th grade)

Parents/guardians viewed *PlayForward* as a way for their children to learn about the difficult topics addressed in the game, viewing the game as a potential catalyst to foster discussions with their children. Interestingly, parents/guardians expressed that they would either like to play the game themselves or have a parent version to assist with talking to their kids about these topics. One parent articulated:

> We all need help … We all need reinforcement … so, yeah, that would be a tool for us, too … (Female, African-American, 43, mother of 13-year-old male participant)

All community partners saw value in using a videogame intervention as a tool to teach adolescents about risk behaviors. Reasons given for supporting the intervention were adolescents' ability to relate to technology, an innovative approach, and individualized learning.

Use of a videogame in after-school and other settings

After-school coordinators were asked about the content and structure of their curricula. All reported that they try to incorporate new and innovative components into the curricula. One coordinator explained their thoughts on incorporating a videogame:

> Sometimes you have to switch it up … to keep their attention, keep them engaged … because it's different and a lot of kids are into it, I think it could definitely work. (Female, African-American, 29, Site Coordinator for after-school program)

When asked about incorporating *PlayForward* into their curriculum, coordinators reported that the youth they served needed exposure to programs that addressed risk issues and decision making; they felt that *PlayForward* fit well into their programs and provided a greatly needed and novel component to their curriculum. One after-school coordinator stated:

> It presents life skills … and responsibility … when it comes to drugs and alcohol, and sex it's a huge responsibility … these kids need to be educated, and the visual is best … (Male, Hispanic, 35, Curriculum Program Coordinator for after-school program)

Community partners viewed *PlayForward* as a valuable resource in a different context. Many community partners highlighted the usability of the game, citing that they could use it in their respective organizations for youth at risk for poor health outcomes. One community partner explained:

> … As a school social worker we're always looking for resources to help hone in on the skills that we're trying to teach … just kind of making it real for them because we talk about it in an office, but they don't have any opportunity to practice that or see where that decision would take them. (Female, African-American, 44, school social worker)

Additional findings

Although after-school/school coordinators were excited about having *PlayForward* as a part of their program, they also described issues regarding future implementation and indicated that personnel training, instruction and game manuals, pamphlets, and lesson plans were possible solutions to assist in implementation. Additionally, all of the program coordinators stated that the costs (i.e., for materials or purchasing the game) associated with implementing the program would be an important factor, but they also mentioned that it seemed worthwhile. One curriculum coordinator expressed:

> Although the freer the better, we still have to pay for resource providers and something quality like this … it'll just be worth it … it will be sort of like a curriculum piece … because we want to invest (in what) we are going to use, and I think it's worth investing in it. (Male, Hispanic, 35, After-school Curriculum Coordinator)

Moreover, some community partners suggested that counseling sessions and group discussions facilitating interaction outside of the game would be helpful to have, in addition to *PlayForward*.

Discussion

PlayForward is a large-scale serious game that was developed and evaluated through a research study, using highly rigorous scientific methods. An important question remained of how it could best be implemented in the real world so that it would have the greatest and most sustainable impact. Our study adds to the current body of literature, by providing critical and diverse stakeholder perceptions as they relate to not only *PlayForward* but also serious videogames used in ''real-world'' settings in general. Our findings highlight the key aspects that are important to the involved stakeholders, and use of these findings will increase the likelihood of successful implementation and dissemination.[14,15]

Adolescent exposure to sex, alcohol, and drugs in a school setting

The lack of adolescent exposure to the topics of sex, alcohol, and drugs, as reflected by stakeholder feedback and previous studies,[16,17] accentuates the current imperative that exists for this age group to be exposed to these important topics in some educational capacity. The lack of exposure also highlights the potential value of an innovative videogame such as *PlayForward* to formally expose adolescents to these topics.

Usefulness and effectiveness of a videogame to teach adolescents about sex, alcohol, and drugs

One systematic review explored the components that are necessary for successful implementation of this type of intervention and categorized them as follows: attitudes and beliefs, institutions, resources, knowledge and skills, and assessment and subject culture.[14] Our study explored and received valuable feedback on a majority of these components.

Attitudes and beliefs and institutions. Stakeholder groups were very positive about the videogame intervention as a delivery vehicle for targeted content. Feedback about *PlayForward* from adolescents demonstrated their acceptance of a videogame as a learning tool, stating that the game taught them content that they felt they would not be exposed to otherwise; it gave them a better understanding of healthy decision making and addressed topics that they might be uncomfortable to discuss; and overall, they favored it over a traditional class, because it was more engaging and afforded more privacy. This feedback reflects a number of the components that enhance adolescent acceptance of this type of intervention, such as the perception that the game was useful and easy to use, opportunities for learning were able to be identified, and the value of a student-centered learning environment was recognized.[18–20] Demonstrated acceptance from our targeted population ultimately increases the chances of successful implementation.

A previous study reported that parental responses were a perceived area of concern when teaching sexual education through a traditional curriculum,[21] whereas our study demonstrated that our parent/guardian stakeholders strongly supported the videogame intervention and found the game to be valuable in teaching their children about the topics of sex, alcohol, and drugs. Additionally, site coordinators and community partners embraced the use of technology in their respective settings, viewing it as a beneficial tool.

Resources. As in previous studies,[14,15,21] after-school/school coordinators who were interviewed for this project identified the need of cost consideration for this type of intervention, reflecting the essential nature of this component in any full-scale intervention implementation and dissemination. Programs have limited budgets, and for successful implementation, those that directly influence the budgets must recognize the cost–benefit of the initial monetary investment and potential learning outcomes for adolescents. Ultimately, exploring ways to reduce implementation costs

for programs would increase the likelihood of successful implementation. The play2PREVENT Lab has already modified *PlayForward* to be compatible with multiple platforms, allowing organizations to more easily incorporate the game into their respective settings and curricula. This game modification significantly reduces material costs for programs and organizations.

Knowledge and skills. Personnel training was highlighted as an important element in both the current study and previous studies[18,22] that would aid in successful implementation. In our study, program and community stakeholders expressed that personnel training for how to use the technology and familiarization of the content of the videogame intervention and the creation of a manual were essential elements for effective and sustainable implementation.

Assessment and subject culture. The suggestion of discussion questions, journal prompts, pamphlets, lesson plans, and assignments by the site coordinators and community partners highlights the possible need for ancillary resources to aid in the successful implementation of a videogame that addresses the topics of sex, alcohol, and drugs in real-world settings. The development of these resources could essentially serve as reinforcement for the videogame as well as forms of assessments to gauge whether learning and behavior change have occurred. The development of some or all of these ancillary resources is a sensible next step for the play2PREVENT Lab to ensure successful implementation.

Use of a videogame in after-school and other settings

After-school/school coordinators recognized the need for the youth whom they served to be exposed to these important topics, and they saw this type of intervention to be consistent with innovative methods that they supported to deliver content. Community leadership partners also supported this use of technology to reach adolescents. The ability of stakeholders to see the videogame being used in myriad settings underscores the idea that successful implementation may not have a one-size-fits-all approach, emphasizing the need to be flexible and responsive to individual organizations' needs.[23]

Additional findings

An interesting finding from this study—that presents a highly unexplored avenue for primary prevention efforts of risk behaviors and possible next steps in the implementation phase—was that parents/guardians wanted to play the videogame or have a parent version, as a way to potentially enhance discussions with their children about difficult topics. The development of a parental companion game presents an exciting and a unique opportunity to engage two influential and integral components of risk behavior reduction in both adolescents and parents.

The current study has several limitations. Given that our research study was highly focused, we were able to reach saturation with fewer participants within each homogeneous group of stakeholders, ultimately yielding a small sample size and possibly limiting the ability of the findings to be generalized to other populations. This study was conducted within an urban community with a focus on minority youth, which may present unique issues regarding implementation and dissemination. Also, all the parents/guardians interviewed in this study were women and responses from men may differ. Finally, the majority of after-school/school program coordinators interviewed were not actual teachers in schools, and their responses may not include the perceptions of teachers in classrooms.

Ultimately, there is compelling evidence that risk behaviors increase during adolescence and access to education and prevention interventions is limited. Videogame interventions can be effective and engaging delivery models for targeted content. The critical question of how this type of intervention will work best in real-world settings must be answered. The findings from the current study offer the important next step in bringing this videogame from the evaluation phase into the implementation and dissemination phase, with the goal of being not only effective but also successful, efficient, and sustainable, allowing for the greatest reach and impact.

As game developers and researchers develop and evaluate serious games for their impact as interventions, they must consider the ''players'' at the table and include their input when considering implementation. Our study highlights the critical need for the table to be expanded to include community stakeholders who can provide valuable input on the acceptability and feasibility of a serious game's integration into different settings. Furthermore, integration of stakeholders into the process bolsters support for a game and significantly increases the likelihood of implementation with the greatest chance for success and sustainability.

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Author Disclosure Statement

L.E.F and K.H. are affiliated with KnackTime Interactive, a small commercial venture that focuses on the distribution of evidence-based videogames for risk reduction and prevention in youth and young adults; this relationship is extensively managed by L.E.F. and K.H. and their academic institution. T.M.P. and L.E.F., Principal Investigator, had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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