Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths

Article *in* Journal of Technology in Human Services · July 2013

DOI: 10.1080/15228835.2013.812512

CITATIONS
50

READS
1,591

4 authors, including:

Javier Boyas
University of Mississippi
49 PUBLICATIONS **421** CITATIONS
SEE PROFILE

Beverly M. Black
University of Texas at Arlington
55 PUBLICATIONS **842** CITATIONS
SEE PROFILE

Nada Elias-Lambert
Texas Christian University
10 PUBLICATIONS **90** CITATIONS
SEE PROFILE

Journal of Technology in Human Services
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/wths20

Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths

Dick Schoech [a] , Javier F. Boyas [b] , Beverly M. Black [a] & Nada Elias-Lambert [c]

[a] University of Texas at Arlington , Arlington , Texas

[b] University of Mississippi, University , Mississippi

[c] Texas Christian University , Fort Worth , Texas

To cite this article: Dick Schoech , Javier F. Boyas , Beverly M. Black & Nada Elias-Lambert (2013) Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths, Journal of Technology in Human Services, 31:3, 197-217, DOI: 10.1080/15228835.2013.812512

To link to this article: http://dx.doi.org/10.1080/15228835.2013.812512

Journal of Technology in Human Services, 30:197–217, 2013

ISSN: 1522-8835 print/1522-8991 online
DOI: 10.1080/15228835.2013.812512

Routledge
Taylor & Francis Group

Gamification for Behavior Change: Lessons from Developing a Social, Multiuser, Web-Tablet Based Prevention Game for Youths

DICK SCHOECH
University of Texas at Arlington, Arlington, Texas

JAVIER F. BOYAS
University of Mississippi, University, Mississippi

BEVERLY M. BLACK
University of Texas at Arlington, Arlington, Texas

NADA ELIAS-LAMBERT
Texas Christian University, Fort Worth, Texas

Interest is growing in gamification, the use of game techniques and mechanics to engage and motivate. Future predictions suggest that this interest will continue to grow especially in the use of games to change individual behavior. However, applying gamification concepts and principles is challenging. Despite the growing interest, few gamification efforts have documented the challenges associated with the game development and application process. This article illustrates how gamification concepts and principles were applied to the development of an online, multiuser, substance abuse, and relationship violence prevention game for youths. We discuss challenges encountered during the efforts to develop and test a prototype version of the game and then present concrete and

Received January 16, 2013; revised May 1, 2013; accepted May 17, 2013.

Address correspondence to Dick Schoech, University of Texas, Arlington, Computer Science & Engineering, 500 UTA Blvd., Box 19015, Arlington, TX 76019. E-mail: dschoech@sbcglobal.net

The authors thank all the participants for their cooperation in this study. We gratefully acknowledge the financial support of the Amon G. Carter Foundation through the Innovative Community Academic Partnership Program at the University of Texas at Arlington School of Social Work. The statements and opinions expressed are solely the responsibility of the authors and do not represent the official views of the foundation.

practical strategies for addressing these challenges. This article provides guidance for other researchers and practitioners who may want to gamify human service processes and use gamification techniques within a behavior change framework.

KEYWORDS adolescents, gamification, healthy games, prevention, relationship violence, substance abuse, youth

Gamification is the application of game design elements into existing processes and services in order to engage and motivate (Deterding, Khaled, Nacke, & Dixon, 2011). It speaks to using game design techniques, game thinking, and game mechanics in nongame contexts, such as social situations (Bunchball, 2010). Gamification has recently become so appealing that many industries are now using it to attract and stimulate their target audience. For example, gamification has been used to improve employee health behavior (Terry, 2012); reward buyers for being repeat customers (Caminal, 2012) and enhance the experience of banking transactions (Iliev-Piselli, Fadjo, & Lee, 2011). Gamification has become so widespread that it is estimated that, by 2015, more than 50% of organizations that manage innovation processes will gamify those processes (Gartner Gamification Report, 2011).

This article illustrates how gamification concepts and principles were applied to the prevention of substance abuse (SA) and relationship violence (RV) among youths. Applying gamification concepts and principles to a prevention program is challenging (Baranowski & Frankel, 2012; Lenihan, 2012). However, these challenges have not been well documented. To enhance future efforts that use gamification techniques within a prevention framework, it is imperative to understand the challenges associated with the development process. Based on our development and proof of concept testing of the prototype version of a human services behavior change game, this article provides guidance for other scholars and practitioners who may also want to gamify human service processes.

GAMIFICATION

People often associate gamification with state lotteries, Las Vegas slot machines, or with console video games such as Super Mario Bros. However, the use of game techniques and mechanics to achieve a goal, such as motivating people to buy a product or encouraging people to change their behavior through reward cards and bonus points, is pervading modern societies in many subtle ways. The internet and smart phones have greatly expanded the ability of game developers to employ strategies and techniques that are in real time, multiuser, and social. Social network based games, such as FarmVille

on Facebook, are among the most popular games (Shin & Shin, 2011). Many schools now use games as part of their curriculum, especially in subjects such as math, where the precise nature of the curriculum makes game development relatively easy (Bragg, 2003, 2007; Lee, 2012).

Human services have been slower to adopt gamification strategies and techniques for reasons such as cost, the lack of available expertise, and the difficulty of developing evidence on the effectiveness of gamification strategies and products. However, one human service activity where game strategies have increased is in fund raising. An example is Kiva, the microfinance website where users make loans to needy people around the world. Kiva instituted the capacity of state-based teams to compete in loaning the most money for needy causes (Hartley, 2010). Teams decide on a person to loan to and then all team members loan at a set time to put that person to the top of the popularity list and attract other lenders in order to get the total amount loaned. Teams relish the challenge of competing to get their needy person's loan request funded.

In one of the most challenging areas of the human services, that is, behavior change, game development is in its infancy. Part of the problem is that behavior change is not typically fun and sometimes not voluntary. Feldman and Dolan's (2011) review of social mobile games suggests that there is a growing clinical trial base of evidence that shows that games can improve players' health behaviors and outcomes in areas such as addiction control, healthy eating, physical activity, physical therapy, cognitive therapy, smoking cessation, cancer treatment adherence, and the self-management of asthma and diabetes. Although behavior change game development is extremely challenging, the power of gamification strategies to attract users and improve motivation is so great that some experts envision "simpler, easier, sustainable, and fun ways to develop healthier habits based on behavior-change psychology, alternative reality games, and quantified self-methods and techniques" (Feldman & Dolan, 2011, p. 43).

Youth are especially attracted to games and virtually all American youths play computer, console, or cell phone games (Kaiser Family Foundation, 2010; Lenhart, Ling, Campbell, & Purcell, 2010; Pew Hispanic Center, 2009). Technology and game based communication patterns are having a major impact on the way in which risky and/or health-related behavior is learned and perceived by youths. There is growing recognition that the use of electronic media-based prevention programming may be a more efficacious and preferred delivery method to reach today's youths (Kahn, Duchame, Rotenberg, & Gonzales-Heydrich, 2013; Paperny, 2004; Schinke, Schwinn, & Fang, 2010). Several well-funded game development efforts suggest that major prevention games targeting youth will be available in the next few years. For example, the Yale School of Medicine (n.d.) received $3.9 million to develop and evaluate a video game that teaches sex, drug, and alcohol negotiation and refusal skills to 9–14 year olds. The initiative, called Play2Prevent, presents an interactive world in which a player's

avatar faces challenges and makes decisions that bring different risks and benefits. Another effort, GET-UP, is a 2-year, $500,000 University of California-Davis computer game that links to body activity monitors to fight childhood obesity by educating teens about personal health (HealthCanal, 2012). Data from the activity monitors will influence game play. For example, players who perform more physical activity may find their game avatar to be faster and stronger the next time they play the game. A four year, $1 million Robert Wood Johnson Foundation funded effort is developing The Real Robots of Robot High, a cartoon style game "designed to teach 11–14 year olds about healthy relationships early on and prevent teen dating violence and abuse" (Borkowski, 2012).

Those desiring more information on gamification and games should check out reviews such as Feldman & Dolan (2011), Gartner Gamification Report (2011), Rahmani and Boren (2012), and Santamaria et al. (2012). Also worth examining are websites like Health Games Research (http://www.healthgamesresearch.org/), Games for Health (http://www.gamesforhealth.org/), Games for Change (http://www.gamesforchange.org/), and the Serious Game Initiative (http://www.seriousgames.org).

GAMIFYING PREVENTION CURRICULUM: THE CHOICES & CONSEQUENCES PROJECT

Several youth SA prevention curricula have been designated by the National Institute on Drug Abuse (NIDA) as being effective based on reliable research (NIDA, n.d.). Similar curricula exist for RV (Foshee et al., 2005; Jaycox et al., 2006; Wolf et al., 2003). These curricula typically use traditional techniques such as group facilitator led discussions based on workbook exercises, videos, and role plays. In spite of this, given the steady rates of SA and increasing rates of RA among youths (United States Centers for Disease Control, 2010), there is a continuing need for identifying innovative prevention approaches, such as games, that may deter youths from engaging in such behaviors.

This section describes a project to gamify prevention curricula for youths. The authors developed Choices & Consequences (*C&C*), a social game designed to help middle school youths reduce their risks associated with SA and RV. Currently, the web-tablet prototype *C&C* game has undergone "proof of concept" testing at a local alternative school that helped with its development.

Targeted Behavior, Audience, and Setting

SA and RV were selected as behaviors to target because their incidence rates remain unacceptably high and they: (a) are interrelated; (b) have immediate and long-term detrimental consequences for youths (Swan, Bossarte, &

Sullivent, 2008; Xue, Zimmerman, & Cunningham, 2009); and (c) are required curricular topics mandated in Texas schools (TX Education Code 37.0831). We thought incorporating two topics into *C&C* was manageable given the resources and time available. With additional resources and expertise, we might have added bullying content, a recently mandated topic in schools in Texas and many other states.

NIDA (2011) suggests that prevention programs can start as early as infancy and should be long-term and repeated through high school. Research suggests that SA & RV behaviors and attitudes are formed in the middle school years or earlier and that it is easier to prevent than to change these once they are formed (Foshee et al., 1996). Our target audience, middle school youths, are typically between ages 11 to14, an age period where youth are experiencing a number of changes. These youths are in their formative years involving physical and hormonal changes and transitioning from parental and family influences to peer influences. This developmental period is also often marked by varying degrees of discovery and experimentation with a number of new prosocial and antisocial behaviors (Boyas, Stauss, & Murphy-Erby, 2012; Morrison-Beedy, Carey, Feng, & Tu, 2008). Middle school youth are often described as experimenting, achievement oriented, highly connected, participative via the internet, and too old for toys yet too young for boys/girls (Aucoin, 2005).

The school environment was selected as the target setting for *C&C* because schools remain the optimal location for prevention programs, and they are currently the primary setting for exemplary SA and RV prevention programs (Weisz & Black, 2009). Moreover, Brand, Felner, Shim, Seitsinger, and Dumas (2003) maintain that the literature consistently corroborates the belief that schools serve as "contexts of socialization" that influence students' developmental outcomes.

School systems want to be innovative with technology and need effective SA and RV curricula, yet want to avoid any controversy over SA and RV content. Terence's (2010) interview with Play2Prevent staff illustrates the controversies that can surface when involving youths and preteens in game scenarios requiring decisions on sex and drugs. Selecting an alternative school as a community partner for the *C&C* project was helpful because many students already had experiences with drugs and RV. In addition, several university staff had established a working relationship with the school and its principal during previous projects. This meant that the alternative school's principal and social workers were openly supportive and attended key meetings to bring school teachers and staff on board for development and testing tasks.

Game Design and Development

Game design, a subset of game development, is the process of designing the content and rules of a game in the preproduction stage. It involves the

design of gameplay, storyline, characters, and settings that guides the game production stage. Game design requires artistic and technical competence as well as writing skills (Game design, n.d.; Rahmani & Boren, 2012). Game design is influenced by the target audience, expertise and research available, funding, and the influence of key partners. Game design decisions often have many implications for development, evaluation, and future marketing.

Developing *C&C* required knowledge of SA & RV prevention curricula, the preferences of middle school youths, game design, mobile technology, server and networking technology, database storage and retrieval technology, game platform and internet server interaction, and project management. For *C&C*, this involved faculties and students from a university school of social work (SSW), a university department of Computer Science and Engineering (CSE), and a local alternative school. SSW staff examined SA and RV research and developed the large majority of the scenarios in the *C&C* curriculum. CSE made decisions on how the game would deliver the scenarios, the computer tablets and software to use as the game platform, the type and location of the server to interact with the tablets given the alternative school's firewalls, and specific programming tasks for the CSE research assistant who wrote the 10,196 lines of *C&C* code. The alternative school's social workers recruited youths who were willing to discuss their experiences with SA and RV. The youths' task was to assure that the ideas and language used in the scenarios were realistic and frequently encountered. Weekly meetings were held of the core SSW and CSE teams, while meetings with alternative school students, staff, and others with specialized expertise were held as needed.

Games require a compelling narrative where rules and goals are clear and challenging, but achievable (Gartner Gamification Report, 2011). Consequently, we chose planning what to do after Friday school and over a weekend because that can be a major struggle for middle school youths (Vandell et al., 2005). We chose the scenario format because scenarios are typically used in prevention programs (Foshee et al., 1996; Gosin, Marsiglia, & Hecht, 2003). The scenarios focused on a nondescript 13 year old to avoid players personalizing the game to their particular circumstances.

To help develop and receive feedback on how youth are exposed to and engaged in SA and RV behaviors, we met with a Chemical Issues group housed within the alternative school with whom we partnered. We selected this group of older youths because they had more direct experience dealing with these complex issues and were willing to openly discuss them. Had we approached our target group of middle school aged youth, they would have been more likely to tell us what they thought we wanted to hear because they had not had the exposure or experience needed to help us develop scenarios that reflect the confusing complexity that youths encounter in real life. Thus, it took the SSW team several months to develop sufficient scenarios to allow teams to play a two-week-long game. However, the input from youths was critical in making the scenarios realistic and *C&C* credible.

For example, when designing the possible actions to respond to a challenge in a scenario, boys' and girls' different views toward opposite sex violence had to be taken into account such as how a boy's response to being forcefully kissed or groped would be different from a girl's response. The literature and our previous experience developing SA and RV curriculum suggest that there are many differences in the way youths view and experience these issues. Gender, regional differences, and parental practices might explain some of these differences. To more fully address these differences in future *C&C* versions, we are looking at the possibility of allowing a school system to deselect some *C&C* scenarios that they find too controversial. However, this solution has implications for fidelity because outcome research must assume youths get the same or a similar intervention.

Ideally, a prevention game would have graphics and animation making it fun and challenging enough for youth to play on their own. However, such a sophisticated game was too difficult given the expertise that our resources could provide. Our budget limited us to text and pictures, which we concluded were sufficient for proof-of-concept testing that could determine whether a prevention game could be more motivating than traditional methods and be perceived to change behavior. Once proof-of-concept was established, graphics and animation could be added in versions 1 or 2.

Playing *C&C*

C&C is designed to get youths to discuss and consider the consequences of SA and RV choices that they may confront in their lives, the possible actions that they can take, and the consequences associated with those actions. Players in a classroom typically are divided into small teams. *C&C* presents curricula content using scenarios of activities that youths typically do after school and over a weekend and with which they can easily identify. From the scenarios of afterschool and weekend activities displayed on the opening screen, players working as individuals or with their teams must construct a fun and risk-free weekend for a 13-year-old girl or boy. Dragging an activity, like going to a movie, from the left side of the screen to the center "work area" records the activity on the weekend schedule and generates options like going with parents or friends. Once an option is selected, players are presented with a challenge, such as being in a movie with a friend who starts kissing and touching without consent. Following each challenge, players are presented with five of the many possible actions from which they must select one, like kissing back or hitting in anger. After selecting an action, the players are asked to rate how much fun they consider their action. The player then receives one of several consequences of the selected action, like being hit back, along with points indicating how successful experts think the selected action is in resolving the challenge. Players may receive bonus or penalty points based on any extenuating events that could occur, for example, being

grounded by parents for getting ejected from the movie for causing a disturbance. Finally, after receiving bonus or penalty points, an educational SA or RV fact is presented such as: "A common excuse for relationship violence is that it just happened once—it won't happen again." Once all subchallenges are addressed in the same manner as a challenge, *C&C* continues with the player selecting another activity. This process continues until the weekend is full of activities and the game round ends. The *C&C* curriculum contains 26 activities (13 for a girl and 13 parallel activities for a boy). These activities contain 54 options, 194 challenges, 1,228 actions (choices), 2,504 consequences, and 253 facts.

Points accumulated throughout the game could be used to buy hints on how to play the game better, or to purchase space on the welcome page for displaying team names, pictures, audios, and so forth to enhance team spirit and increase friendly competition. To encourage individual play, players earned their team 10% of the points accumulated at the end of each solo round. To encourage experimentation, these points were awarded whether the solo player won or lost points. We also incorporated the use of virtual money throughout a game as a motivating technique. We awarded an initial $500 for each team to use throughout the game based on the weekend activities selected, for example, a movie cost $15. In the future, we intend to continue using money as a motivating technique and to allow the conversion of money to points and vice versa.

Key feedback is continuously presented via a score box. A detailed feedback page can be accessed at any time during game play and is automatically presented once the Friday noon to Saturday midnight weekend is full of activities. Several types of feedback are provided, that is, fun scores, risk scores, fun minus risk scores, and points accumulated. Also presented are the game minimum, maximum, and median scores for 9 common prevention skills in the *C&C* curriculum. These skills are: refusal skills, considering consequences, handling emotional situations, expressing yourself clearly, providing support, setting boundaries, being in control, asking for help, and giving help.

During game play, players can discuss game content with team members using a chat-based social network and/or by team discussion lead by a group facilitator. Individuals typically play a game round in 10–15 minutes, while a facilitated team game round may take a full class period, depending on the team discussion. *C&C* ends with a competition round where the teams in the classroom can compete with one another to develop the highest fun minus risk score and win the game. Typically, a mock competition round for increasing team cohesion and competition between teams is held half way through the two weeks of game play.

NIDA and others support the inclusion of the sociocultural environment into prevention curricula (NIDA, 2011; Taylor, Stein, Woods, & Mumford, 2011). This was accomplished in *C&C* by the homework task of players interviewing parents, school teachers, administrators, counselors, and trusted

adults on their views of the risks involved with the activities in the scenarios and bringing these views into the discussion of their choices. As expected, youths found a wide diversity of opinion about the perceived risk of various youth activities. Although youths did not see this solicitation of adult opinion as useful in making less risky choices and winning *C&C*, they did find the discussion enlightening about adult values and expectations. Initially, youth were reluctant to complete these interviews, so we gamified this task by giving raffle tickets to players who returned their interview forms. The longer it took the forms to be returned, the fewer raffle tickets players received. Drawings for prizes were held the first day these forms were due and as needed thereafter to spur motivation. This gamification technique was successful and students even requested additional forms to interview trusted adults in order to increase their chance of winning a prize. Consequently, we found we needed to budget more time for players to discuss this input with their team and to incorporate it into *C&C* decisions.

Given the heightened motivation generated by the mock and final competition rounds, we decided to enhance our win/win environment by providing more ways for teams to win. In addition to the winner with the highest fun minus risk score, we designated the team with the most points during the competition round as the first runner-up. Additional winners could be designated by the facilitators given the number and the ability of the teams, for example, the 2nd runner-up could be the team with the most points accumulated for the total game period, the team that included more opinions of parents, teachers, counselors, and administrators into their discussion, or the team displaying the best team spirit. Part of the benefit of being a web-tablet game is that all game activities can be captured and used to enhance game play.

Game Hardware, Software, and Production

Typically in technology-based projects, the advice is to select software and hardware after project specifications have been developed (Schoech, 1999). In this case, the hardware and software platforms were key to the delivery and future of the project, hence, the platform choice influenced design and content. Because technology projects typically take 2–3 years for development and testing, standard advice is to develop on the most sophisticated platform available. This advice made sense given that youths are typically first adopters and often have the most sophisticated technology available.

Because we wanted *C&C* to be used in and outside the classroom, we selected the Android platform for game delivery rather than a computer DVD or game console platform. Android was selected over iOS because it is was widely popular and allowed more customization. PHP, a server-side scripting language, and the Lua game platform were selected because they were flexible and commonly used. For social networking, a simple, closed, chat platform was used rather than an existing social network such as Facebook,

due to privacy and security issues. The Acer 500 10-inch tablet, which has a screen resolution of 800 × 1280, was selected for *C&C*. Although *C&C* will run on any Android device, switching devices can cause problems because different-sized tablets and smartphones have different screen resolutions that can throw off the graphics.

C&C scenarios were developed in Word and then entered into XML to produce a database type file. Keeping the game curriculum in a separate downloadable server file allowed curriculum changes to immediately show after the 14,838 lines of curriculum were downloaded as *C&C* was started on any Android device.

One issue that surfaced when working with the school system concerned their policies on the use of new technologies like tablets. Personal tablets and smart phones were not allowed to be used at the alternative school and all computers accessed the internet through a network with a firewall that limited outside access to unapproved websites. The *C&C* project had to receive an exception to school district policies so that *C&C* tablets could access the *C&C* provided server through the school's firewalls.

To accommodate multiple teams of players, the server and tablet needed to be in constant communication, but not to the extent that communications slowed down game play. This feature was important, especially in the team version of the game where one player's moves needed to be immediately reflected on the tablet of other team players. In order to eliminate issues with the school's firewalls and slow tablet-server communications, a dedicated server was installed at the alternative school. This allowed *C&C* to have the web security that the school had for all its devices. For example, *C&C* tablets could only access school-approved websites. This server was later moved to the university's campus without any apparent degradation in tablet refresh speed. However, degradation may be an issue as *C&C* is tested with many teams in organizations where internet connections are not robust.

CHALLENGES, CHOICES, AND CONSEQUENCES IN DEVELOPING *C&C*

This section describes what we learned during *C&C* development and initial testing. The discussion in this section follows the *C&C* game format by focusing on the challenges we faced, the choices we made, and the consequences of those choices for our project.

Challenge: Selecting a Conceptual Frameworks to Guide Development

Gamification is much more than a technical process of applying graphics, colors, and animation. Game development involves the application of psychological, social, behavioral, and cognitive science theories and principles from

multiple disciplines. The specific theories, concepts, and research on which a behavior change project is based are quantified in its conceptual framework.

The fields of prevention research, computer science, gamification, and behavior change currently do not provide sufficient guidance for developing a strong conceptual framework to guide game design. Those approaching game design from a behavior change perspective often use the Theory of Planned Behavior, which identifies self-efficacy, attitudes, norms, and sometimes knowledge as important predictors of behavior change (Glanz, Rimer, & National Cancer Institute, 2005). Another common prevention framework is the Transtheoretical Model which is grounded in Stages of Change and Processes of Change (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997). However, those approaching prevention from a game perspective often use somewhat different theories. For example, the Play2Prevent video game "will be built incorporating evidence-based tools for behavior change including message framing, delay discounting, social learning theory, and self-efficacy" (Yale School of Medicine, n.d.). Feldman and Dolan (2011) suggest the Persuasion Technology framework by Fogg and his Stanford team as a systematic way for game designers to think about behavior change.

Although human service professionals understand extrinsic motivators like rewards and reinforcement schedules that encourage repetitive behavior, research suggests that games may motivate and engage due more to intrinsic rather than extrinsic motivation (Raasch & Von Hippel, 2012; Ryan & Deci, 2000). That is, games motivate by providing feelings of competence, mastery, being in control, achievement, autonomy, choice, and relatedness to others (Bozarth, 2011). These concepts are similar to the concept of self-efficacy which is becoming increasingly important in behavioral change research (Peng & Schoech, 2008).

Choices & Consequences

Finding a conceptual framework to guide the design, development, and evaluation of *C&C* was very difficult. NIDA presents 16 research-based principles for the SA prevention. The first principle states that programs should enhance protective factors and reverse or reduce risk factors (NIDA, 2011). This suggests that resilience theory should be part of a SA prevention conceptual framework. *C&C* enhances resilience behavior and knowledge in that players must select actions with low risk and high protective ratings to win.

Because the team designing the most fun, risk-free weekend in the challenge round wins *C&C*, we had to determine the fun and risk of each action taken. Levels of risk were determined by the SSW and the alternative school's social workers who developed the curriculum. Risk determination was often the most time consuming part of creating the scenarios given that little research exists to guide the ratings and there was not

always consensus on the level of risk associated with each available action. Fun was rated on a 1–5 scale by a *C&C* player when a player selected an action to address a challenge. Thus, fun scores reflected the opinions and values of the teams currently playing *C&C*. Observation of *C&C* game play suggests that youths quickly agree on the fun rating of almost all the actions in *C&C*. The fun ratings were maintained on the server and the new median fun score for each action was downloaded each time *C&C* loaded.

C&C's curriculum also draws on recent cognitive science research on perceptual learning, which suggests that the brain unconsciously recognizes and seeks to build pattern maps (Carey, 2011). For example, while driving in a new city, the brain unconsciously begins to build a mental map of the city which is more fully developed the more one drives. Similarly, *C&C* allow players' conscious and subconscious cognitive processing mechanisms to build mental maps or patterns of behavior that are fun, but low risk. Once a behavior pattern is learned, it is often available for life. For example, swimming, riding a bicycle, or speaking a language can quickly be relearned years after the initial learning. We also followed neuroscience principles that recommend enhancing levels of unconscious and conscious learning by using warm, supportive, personal, affirmative statements that validate the player as a person while also validating their choice (Frederickson, 2013).

Although some theories and principles were helpful in game design, they made a formal evaluation more difficult. To increase the likelihood that a formal evaluation will find a program effective, the conceptual framework that guides curriculum development should contain the same concepts and principles as the evaluation measures. This is often difficult with prevention research. For example, the many risk and protective factors of resilience theory were helpful in curriculum design but having many protective and risk factors made it difficult to measure resilience as a game outcome.

Challenge: Making *C&C* Fun and Challenging

In delivering curriculum using technology, the advice is to make the content drive the technology rather than the technology drive the content. A challenge exists because a key gamification principle is that games must be fun and challenging (Gartner Gamification Report, 2011; Rahmani & Boren, 2012), yet fun and challenging activities for youths often involve unsafe behaviors. For example, commercial games like Mortal Kombat, Street Fighter, Doom, and so forth use unhealthy content like violence, sex, and destruction to make the games fun and challenging. Behavior change games must use strategies like win/win, being supportive, saying no, building friendship and community, and so forth to motivate and challenge.

CHOICES & CONSEQUENCES

Given the additional motivation achieved with social games, for example, FarmVille on Facebook, we added the social networking component that enabled chat between team members. The rationale is that youths are heavily influenced by their peers (Brown 1990; L'Engle & Jackson, 2008) and chatting about *C&C* play with peers would motivate game play. Examining chat was assigned to the game facilitators in order to ensure that messages were on topic and void of profanity and destructive content, such as personal attacks. The facilitator could reward teams with points if they used chat to further game goals and penalize them by withdrawing points if the chat feature was misused or abused. Because the social networking component of *C&C* was not robust, the developers and facilitators did not think the social networking chat feature was being used. However, after game play, we discovered that players continually chatted with each other during game play. It seems that chat is a very familiar communication format that youths use if it is available. *C&C* could use additional social networking features to enhance motivation, but we avoided using a commercial social networking site such as Facebook due to privacy issues, especially given the chatting that occurs during discussions of sensitive topics such as SA and RV.

Part of what makes a game challenging is the ability to fail. Winning and losing points was a game technique often used to provide immediate feedback, motivate, and encourage friendly competition between teams playing *C&C*. We debated whether taking away points would contradict the prevention principles of being supportive and affirmative, that is, should we punish players even though they were doing the best they could do. Our conclusion was to award points based on the quality of each action selected as determined by expert opinion and the best available research. Additionally, bonus or penalty points were gained or lost based on events that are beyond the control of the player, for example, getting busted for unknowingly being in an area where drugs were used. Our consequence statements for removing points made it clear that youth's lives are full of events that are unhealthy, but beyond individual control. This allowed us to make *C&C* more game-like while still being affirmative.

Challenge: Establishing and Maintaining a Guiding Team

One of the first tasks of any game development effort is establishing a small multidisciplinary team to guide the project from start to finish. Others may be involved for shorter periods of time, but a guiding team is critical to the success of any change project (Kotter, 1995).

CHOICES & CONSEQUENCES

Working together as a team proved difficult but stimulating at times, because the goals of having an exciting and fun game often conflicted with the goal

of having a game capable of producing behavior change in youth. The teams needed to trust each other's expertise. For example, popular youth games techniques like punishing or annihilating other teams during game play were ruled as unacceptable by the social work team, which required that *C&C* competition result in win/win rather than win/lose. Although the CSE team needed to trust the SSW team with the curriculum content, the reverse was true as the SSW team had to trust the programming, platform, and networking restrictions imposed by the CSE team. Building the game infrastructure including the networking component required considerable time, which was frustrating for the SSW team who for months often saw little tangible progress being made. Although tedious and time consuming, weekly meetings were needed to resolve the very dissimilar opinions on design options and related issues.

Holding the multidisciplinary team together for the several years it takes to develop and test a major prevention game is proving difficult as key research assistants graduate, faculty members change schools, and so forth. As *C&C* game development moves from the prototype stage to Ver. 1.0, our local school needs are changing. For Ver. 1.0., we need to collaborate with a school district that has a large number of middle-school youths who can participate in the formal clinical trials that are needed to assess *C&C*'s effectiveness. Given that teachers are under increased pressure to do more with less, it may be difficult to find school systems willing to participate in efficacy research unless they receive adequate compensation for their involvement.

Challenge: Testing Usability and Evaluating Efficacy and Effectiveness

When developing and testing a prototype for proof-of-concept, decisions must be made with the future goal of eventually evaluating whether game Ver. 1.0 produces the desired outcomes.

Choices & consequences

Prevention efficacy research is difficult especially in sensitive areas such as youth SA and RV. Before a youth reaches the "rebellious stage" of adolescence, their self-reported values and behaviors might reflect the influences of their family. However, during the rebellious stage, values and behaviors more closely match the peer subculture with which they identify (L'Engle & Jackson, 2008; McLeroy, Bibeau, Steckler, & Glanz, 1988). Consequently, it can be difficult to determine the value and behavior changes that are due to maturation rather than to the intervention under study. Another difficulty concerns controlling for the climate of the testing environment in order to ensure that reports of behavior reflect actual behavior change as youths mature into adults. For example, events like arrests of youths for drug

possession, deaths due to SA or RV, local news stories about SA & RV, and so forth, can influence how youths respond on a self-report survey of behavioral intentions. In addition, funding is difficult to obtain for long term studies that follow youths from middle school into adulthood. Samples need to be large in order to control for the extenuating circumstances that lead to attrition following game play and due to the inability to track players' whereabouts as they reach adulthood.

One important issue with prevention curriculum delivery is fidelity, that is, making sure a curriculum is delivered as planned in order to get the results found in the initial efficacy research. In drug abuse prevention research, the few studies that have assessed fidelity of implementation under real world conditions (i.e. with teachers or other nonresearch staff delivering the program) have revealed that there is a noticeable deficit in the fidelity of program delivery that is achieved (Tortu & Botvin, 1989). Rigorous field trials of drug abuse prevention curricula have been done where considerable effort is made to get teachers and others to deliver the curriculum exactly as intended. However, even under these circumstances, there is tremendous variability in how consistently various teachers present program material. For example, Tortu and Botvin's (1989) report that teachers in their studies implemented between 44% and 83% of the curriculum points and objectives, with an average of 65%. Further, a major evaluation of the Life Skills Training program (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990) found that one in four students had teachers who implemented less than 60% of the important points and objectives in the program.

One of the advantages of computer-based prevention games is that curriculum developers have more control over what content and feedback is presented, when, and in what context. *C&C* designers had control over how often challenges and subchallenges appeared within the scenarios. However, games by their nature often allow players to take many different paths through the curriculum. Although games can easily track the exact curriculum components each player receives, the curriculum options are so vast that it can be difficult to research whether players received similar content. One possible way around this dilemma would be to track the content that each player experienced during game play, for example, content classified as help giving, refusal skills building, and so forth. Then, this data could be used to determine whether a correlation exists between the type of content a player was exposed to and the reported behavior change of that player. However, there is likely no way to control for the discussion youth have in their teams which may likely influence their reported changes in values, behavior, and learning.

Other challenges concern measurement and analytic method. Because youths have short attention spans, long instruments, which are good for achieving reliability and validity, may not work as youths quickly become bored, do not read instrument items, and haphazardly or randomly respond.

Another issue concerns the unit of analysis for the efficacy evaluations, for example, the school, classroom, or player. Disentangling the nested and repeated data poses a major challenge when it comes to the data analysis. *C&C* being school-based meant that youths were not only nestled within different groups, but also within different families, classrooms, communities, etc. Analysis is further complicated by repeated measures. Although prevention programs are concerned with the differences they can make at the individual level, a good analytic strategy has to be developed early on to determine how to analyze the complexity of multilevel data structures and repeated measures nested within individuals.

A final challenge involved in testing a computer game is having the technology needed for large samples to play the game. Currently, *C&C* runs on an android tablet and we did not have many tablets given our limited funding. In addition, because *C&C* involves multiple technologies, many technical problems can occur during clinical trials. For examples, someone must make sure the tablet batteries are charged, broken devices replaced, software is updated, networks are running, and so forth. Our experience is that if the technology fails frequently or during key stages of game play, players will not rate the game play as productive.

The goal is for *C&C* to run on multiple common platforms so that *C&C* play could occur in a computer lab using a desktop PC running an Android emulator, or as an app on any smartphone or tablet. However, the technology to make this happen does not yet exist. Because focus groups revealed that team discussions were the most valued part of *C&C*, having one playing device for each group might be satisfactory if the screen could be projected for all players to see.

C&C developers are considering several strategies to make efficacy evaluation easier. One was to closely link the *C&C* curriculum with a workbook curriculum that has undergone rigorous clinical trials. This would allow the game version of the proven curriculum to be compared with the workbook version. One difficulty is that most rigorously evaluated curricula are copyrighted and so contractual agreements would need to occur between the two institutions housing the researchers. Another difficulty is that it is not always easy to translate a workbook into the detailed scenarios required by a computer game.

CONCLUSION

Based on our experience in developing and testing a prototype social, multiuser, web-tablet based prevention game for middle-school youths, we can conclude that gamification has many advantages. However, as outlined above, it comes with some challenges. Nonetheless, we believe that for our project, gamification fostered engagement, motivation, self-disclosure,

colearning, and detailed delivery of a curriculum. Most of our test students preferred the game delivery format to all other prevention formats they had experienced. However, computer games pose additional problems due to the technology needed for game play, the difficulty of development, and the fact that games are a new format where established research, conceptual frameworks, and protocols have not yet been developed.

In sum, the delivery of prevention curricula via computer games is promising. Given that youths increasingly rely on new technologies for learning and living, we anticipate that game-based prevention programs will continue to be developed and will be found effective in reducing youth risky behaviors. The encouraging results from this research suggest that gamification of other human service processes might be a major future task.

REFERENCES

Aucoin, D. (2005). "Too old for toys, too young for boys". *The Boston Globe*. Retrieved from http://www.boston.com/news/globe/living/articles/2005/02/02/too_old_for_toys_too_young_for_boys/

Baranowski, T., & Frankel, L. (2012). Let's get technical! Gaming and technology for weight control and health promotion in children, *Childhood Obesity*, *8*(1), 34–37. doi:10.1089/chi.2011.0103

Borkowski, R. (2012). VIDEO: Woonsocket's Sojourner House video game teaches healthy relationships. Retrieved from http://woonsocket.patch.com/articles/woonsocket-s-sojourner-house-video-game-teaches-healthy-relationships

Botvin, G. J., Baker, E., Dusenbury, L., Tortu, S., & Botvin, E. M. (1990). Preventing adolescent drug abuse through a multimodal cognitive–behavioral approach: Results of a three-year study. *Journal of Consulting & Clinical Psychology*, *58*, 437–446.

Boyas, J. F., Stauss, K. A., & Murphy-Erby, Y. (2012). Predictors of frequency of sexual health communication: Perceptions from early adolescent youth in rural Arkansas. *Child and Adolescent Social Work Journal*, *29*(4), 267–284.

Bozarth, J. (2011). *An Interview with Sebastian Deterding*. Retrieved from http://elearnmag.acm.org/archive.cfm?aid=2008214

Bragg, L. A. (2003). Children's perspectives on mathematics and game playing. In L. Bragg, C. Campbell, G. Herbert & J. Mousley (Eds.), *Mathematics education research: Innovation, networking, opportunity: Proceedings of the 26th Annual Conference of the Mathematics Education Research Group of Australasia*, (Vol. 1, pp. 160–167). Deakin University, Geelong, Australia: MERGA.

Bragg, L. A. (2007). Students' conflicting attitudes towards games as a vehicle for learning mathematics: A methodological dilemma. *Mathematics Education Research Journal*, *19*(1), 29–44.

Brand, S., Felner, R., Shim, M., Seitsinger, A., & Dumas, T. (2003). Middle school improvement and reform: Development and validation of a school-level assessment of climate, cultural pluralism, and school safety. *Journal of Educational Psychology*, *95*(3), 507–588.

Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliot (Eds.), *At the threshold: The developing adolescent* (pp. 171–196). Cambridge, MA: Harvard University Press.

Bunchball.Com. (2010). *Gamification101: An introduction to the use of game dynamics to influence behavior*. Retrieved from: http://www.bunchball.com/gamification/gamification101.pdf

Caminal, R. (2012).The design and efficiency of loyalty rewards. *Journal of Economics & Management Strategy*, *21*(2), 339–371. doi:10.1111/j.1530-9134.2012.00334.x

Carey, B. (2011). *Brain calisthenics for abstract ideas*. Retrieved from http://www.nytimes.com/2011/06/07/health/07learn.html?pagewanted=1&_r=3&nl=health&emc=healthupdateema2

Deterding, S., Khaled, R., Nacke, L., & Dixon, D. (2011) *Gamification: Toward a definition*. Retrieved from http://hci.usask.ca/uploads/219-02-Deterding,-Khaled,Nacke,-Dixon.pdf

Feldman, B., & Dolan, B. (2011). *Mobile social and fun games for health*. Retrieved from http://mobihealthnews.com/15031/mobile-social-fun-games-for-health/

Foshee, V. A., Bauman, K. E., Ennett, S. T., Suchindran, C., Benefield, T., & Linder, G. F. (2005). Assessing the effects of the dating violence prevention program "Safe Dates" using random coefficient regression modeling. *Prevention Science*, *6*(3), 245–258.

Foshee, V. A., Linder, G. F., Bauman, K. E., Langwick, S. A., Arriaga, X. B., Heath, J. L., … Bangdiwala, S. (1996). The safe dates project: Theoretical basis, evaluation design, and selected baseline findings. *American Journal of Preventative Medicine*, *12*, 39–47.

Fredrickson, B. L. (2013). Positive emotions broaden and build. In A. Plant & P. G. Devine (Eds.), *Advances in experimental social psychology*, *Volume 47*. Waltham, MA: Academic Press. Retrieved from http://www.unc.edu/peplab/publications/Fredrickson_AESP_final.pdf

Game design. (n.d.). In *Wikipedia*. Retrieved from http://en.wikipedia.org/wiki/Game_design

Gartner Gamification Report. (2011). Retrieved from http://gamification.org/wiki/Gartner_Gamification_Report_2011

Glanz, K., Rimer, B. K., & National Cancer Institute. (2005). *Theory at a glance: A Guide for health promotion practice* (2nd ed.): US Dept. of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. Retrieved from http://www.cancer.gov/PDF/481f5d53-63df-41bc-bfaf-5aa48ee1da4d/TAAG3.pdf

Gosin, M., Marsiglia, F. F., & Hecht, M. L. 2003. Keepin' It REAL: A drug resistance curriculum tailored to the strengths and needs of pre-adolescents of the Southwest. *Journal of Drug Education*, *33*(2), 119–142.

Hartley, S. E., (2010). Kiva.org: Crowd-sourced microfinance and cooperation in group lending. Retrieved from http://dx.doi.org/10.2139/ssrn.1572182

HealthCanal. (2012). *Couch potatoes no more: Video game will fight obesity*. Retrieved from http://www.healthcanal.com/life-style-fitness/34116-Couch-potatoes-more-Video-game-will-fight-obesity.html

Iliev-Piselli, M. M., Fadjo, C. L., & Lee, J. J. (2011). Bank-It: A mobile financial literacy game. Proceedings of the 7th International Conference on Games+Learning+Society

Conference, 260–262. Retrieved from http://delivery.acm.org/10.1145/2210000/2206410/p260-iliev-piselli.pdf?ip=129.107.13.230&acc=NO%20RULES&CFID=162269162&CFTOKEN=79169078&__acm__=1356616026_1a1cca8036a7a14498a08c4c6972cf0f

Jaycox, L. H., McCaffrey, D., Eiseman, B., Aronoff, J., Shelley, G. A., Collins, R. L., & Marshall, G. N. (2006). Impact of a school-based dating violence prevention program among Latino teens: Randomized controlled effectiveness trial. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *39*(5), 694–704.

Kahn, J., Duchame, P., Rotenberg, A., & Gonzales-Heydrich, J. (2013). RAGE-Control: A game to build emotional strength, *Games for Health Journal*, *2*(1), 53–57. doi:10.1089/g4h.2013.0007

Kaiser Family Foundation. (2010). *Generation M2: Media in the lives of 8- to 18-year-olds*. Retrieved on from http://kff.org/entmedia/upload/8010.pdf

Kotter, J. P. (1995, March/April). Leading change: Why transformation efforts fail. *Harvard Business Review*, 59–67.

L'Engle, K. L., & Jackson, C. (2008). Adolescents' cognitive susceptibility and transition to sexual intercourse. *Journal of Research on Adolescence*, *18*(2), 353–378.

Lee, Y. L. (2012). *Using computer games to learn fractions* (Unpublished doctoral dissertation). University of Otago. Retrieved from: http://hdl.handle.net/10523/2171

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010). Teens and Mobile Phones. *Pew Internet*. Retrieved from http://www.pewinternet.org/Reports/2010/Teens-and-Mobile-Phones.aspx

Lenihan, D. (2012). Health games: A key component for the evolution of wellness programs. *Games for Health Journal*, *1*(3), 233–235. doi:10.1089/g4h.2012.0022

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, *15*(4), 351–377.

Morrison-Beedy, D., Carey, M. P., Feng, C., & Tu, X. M. (2008). Predicting sexual risk behaviors among adolescent and young women using a prospective diary method. *Research in Nursing & Health*, *31*(4), 329–340.

National Institute on Drug Abuse (NIDA). (2011). *Drugfacts: Lessons from prevention research*. Retrieved from http://www.drugabuse.gov/publications/drugfacts/lessons-prevention-research

NIDA. (n.d.). Examples of research-based drug abuse prevention programs. Retrieved from http://www.drugabuse.gov/publications/preventing-drug-abuse-among-children-adolescents/chapter-4-examples-research-based-drug-abuse-prevention-program

Paperny, D. M. (2004). A new model for adolescent preventive services. *The Permanente Journal*, *8*(1), 74–79.

Peng B. W., & Schoech D. (2008). Grounding online prevention interventions in theory: Guidelines from a review of selected theories and research. *Journal of Technology in Human Services*, *26*, 2–4, 376–396.

Pew Hispanic Center. (2009). *Latinos online, 2006–2008: Narrowing the gap*. Retrieved from http://pewhispanic.org/files/reports/119.pdf

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, *51*, 390–395.

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, *12*, 38–48.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behavior. *American Psychologist*, *47*, 1102–1114.

Raasch, C., & Von Hippel, E. A., (2012, October 29). *Amplifying user and producer innovation: The power of participation motives*. Retrieved from http://ssrn.com/abstract=2167948 or http://dx.doi.org/10.2139/ssrn.2167948

Rahmani, E., & Boren, S. A. (2012). Videogames and health improvement: A literature review of randomized controlled trials. *Games for Health Journal*, *1*(5), 331–341

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78.

Santamaria, J., Soto, A., Fernandez-Aranda, F., Krug, I., Forcano, L., Gunnard, K., … Jimenez-Murcia, S. (2012). Serious games as additional psychological support: A review of the literature. *Journal of CyberTherapy & Rehabilitation*, *4*(4), 469–476.

Schinke, S. P., Schwinn, T. M., & Fang, L. (2010). Longitudinal outcomes of an alcohol abuse prevention program for urban adolescents. *Journal of Adolescent Health*, *46*(5), 451–457.

Schoech, D. (1999). *Human services technology: Understanding, designing, and implementing computer and internet applications in the Social Services*. Binghamton, NY: Haworth Press.

Shin, D., & Shin, Y. (2011). Why do people play social network games? *Computers in Human Behavior*, 27/2, 852–861.

Swan, M. H., Bossarte, R. M., & Sullivent, III, E. E. (2008). Age of alcohol use initiation, suicidal behavior, and peer and dating violence victimization and perpetration among high-risk, seventh-grade adolescents. *Pediatrics*, *121*(2), 297–305.

Taylor, B., Stein, N. D., Woods, D., & Mumford, E. (2011). Shifting boundaries: Final report on an experimental evaluation of a youth dating violence prevention program in New York City middle schools. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/grants/236175.pdf

Terence, J. P. (2010). U.S. gives Yale researcher $3.9-million in tax dollars to develop 'avatar' sex-ed video game for kids. Retrieved from http://cnsnews.com/node/61017

Terry, K. (2012). *Gamification boosts employee health behavior, Blue Shield argues*. Retrieved from http://www.informationweek.com/healthcare/patient/gamification-boosts-employee-health-beha/232900572

Texas Education Code 37.0831. Retrieved from http://www.statutes.legis.state.tx.us/Docs/ED/htm/ED.37.htm#37.0831

Tortu, S., & Botvin, G. J. (1989). School-based smoking prevention: The teacher training process. *Preventive Medicine*, *18*, 280–289.

United Stated Centers for Disease Control and Prevention. (2010). Youth risk behavior surveillance-United States, 2009. Surveillance Summaries, June 2010. *Morbidity and Mortality Weekly*, *59*(5), 1–148.

Vandell, D. L., Shernoff, D. J., Pierce, K. M., Bolt, D. M., Dadisman, K., & Brown, B. B. (2005). Activities, engagement, and emotion in after-school programs (and elsewhere). *New Directions for Youth Development*, *105*, 121–129.

Weisz. A. N., & Black, B. M. (2009). *Programs to reduce teen dating violence and sexual assault: Perspectives on what works.* New York, NY: Columbia University Press.

Wolfe, D. A., Wekerle, C., Scott, K., Straatman, A. L., Grasley, C., & Reitzel-Jaffe, D. (2003). Dating violence prevention with at-risk youth: A controlled outcome evaluation. *Journal of Consulting and Clinical Psychology*, *71*(2), 279–291.

Xue, Y., Zimmerman, M. A., & Cunningham, R. (2009). Relationship between alcohol use and violent behavior among urban African American youths from adolescence to emerging adulthood: A longitudinal study. *American Journal of Public Health*, *99*(11), 2041–2048.

Yale School of Medicine. (n.d.). *Play2Prevent*. Retrieved from http://www.play2prevent.org

ABOUT THE AUTHORS

Dick Schoech, PhD, is a Professor Emeritus from the University of Texas Arlington School of Social Work, and currently is a research professor in UT Arlington's Department of Computer Science & Engineering. His specialty area is human services technology. He is the chair of Human Services Information Technology Applications (husITa.org), an international organization dedicated to promoting the ethical and effective use of technology to better serve humanity. Javier F. Boyas, PhD, is an associate professor at the University of Mississippi's Department of Social Work. Dr. Boyas's research interests are positioned in the areas of social determinants of health among minority communities, with a particular focus on Latino global health, social capital and adolescent health-risk behaviors. Beverly M. Black, PhD, MSSW, is the Jillian Michelle Smith Professor in Family Violence Research and Director of the PhD program at the School of Social Work, University of Texas at Arlington. Dr. Black conducts research and publishes on issues related to domestic violence, sexual assault, adolescent dating violence, and prevention programming. Nada Elias-Lambert, PhD, LMSW, is an assistant professor in the Department of Social Work at Texas Christian University. Dr. Elias-Lambert has many years of social work practice experience with a variety of populations. Her research focuses on issues related to sexual violence prevention with high-risk populations, campus sexual violence, and bystander interventions.