Chapter 9
Communities and Technology: Enhancements in HIV-Prevention Research and Practice Among Adolescents and Young Adults

Sheana Bull, Tarik Walker and Deb Levine

What are Virtual Communities?

Howard Rheingold coined the term "virtual communities" in a 1993 book identifying opportunities for individuals to remain connected in an increasingly digitized world [1]. His suggestion was that geography is not a necessary element for community, but relationships and desire for connection are fundamental for community. A virtual community is a social network of individuals who interact through social media. These individuals are not bound by geography; rather, they usually share an interest or reason to communicate. Virtual communities resemble other types of communities because members provide one another information, friendship, and other types of social support.

Virtual communities take multiple forms that have evolved rapidly over the past two decades. Given ongoing advances in technology, these communities and the methods they use to interact will continue to evolve rapidly. With this ongoing development and evolution, virtual communities have become more common and their reach has expanded; they have become more universally accepted and, in many cases, integrated into nonvirtual communities. Virtual communities include social networks in which individuals can interact with one another online through sites such as Facebook, MySpace, Ning, FourSquare, and Tumblr. Additionally, virtual

S. Bull (✉)
Department of Community and Behavioral Health, Colorado School of Public Health, University of Colorado Denver, 13001 E. 17th Place, B119, Bldg 500, Room E3345A, Aurora, CO 80045, USA
e-mail: Sheana.Bull@ucdenver.edu

T. Walker
Department of Family Medicine and Colorado Area Health Education Center, University of Colorado, Education II South, Room 5108, Aurora, CO 80045, USA
e-mail: tarik.walker@ucdenver.edu

D. Levine
Youth Tech Health (YTH), 409 13th Street, 14th Floor, Oakland, CA 94612-2607, USA
e-mail: deb@yth.org

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communities have expanded to the microblogging environment through sites such as Twitter, where users can share brief communications through posts of messages of 140 characters, and Instagram, where users can share photographs and videos.

Many examples exist that underscore the popularity and desire for individuals to connect using social media around a variety of topics, including health. Early examples include online social support groups that helped women address issues related to a breast cancer diagnosis [2] and assisted individuals in managing diabetes [3]. Similarly, existing online chat rooms designed to facilitate social and sexual networking among men who have sex with men (MSM) have been used to facilitate HIV prevention, specifically through moderated question-and-answer sessions designed for educational purposes [4–6]. Another type of online community is a virtual world such as Second Life, where users create avatars and have them interact in multiplayer simulations of various scenarios [7]. An avatar is usually a two- or three-dimensional graphic representation of an Internet user's online character [8–11].

Virtual communities offer the advantage of instant exchange of information, which is not always possible in geographically focused communities. However, debates exist over the potential benefits or harms related to participation in virtual communities. Although virtual communities can share substantive support and work effectively across time, space, and geographic boundaries [4, 12, 13], there are concerns about so-called virtual isolation that can lead to depression or other negative health outcomes [14]; an alteration of personalities online that can lead to misrepresentation [15]; and a potential disintegration of socially appropriate behaviors [16].

Who are Members of Virtual Communities?

Nevertheless, there is overwhelming evidence that virtual communities are popular particularly among adolescents and young adults. In fact, social media use is nearly ubiquitous among adolescents and young adults in the USA. As of May 2012, almost 80% of adolescents and young adults who are online use a social network website, and 81% of youth (12–17-years old) use some sort of social media at least once a month. Nearly all (98%) of 18–24-years-old adolescents and young adults who are online use social media each month, and 81% of them use social networking sites for e-mail access, online chat, and news [17, 18]. By contrast, older adults have not kept pace with this use; about 40% of adults 30-years old and over use social media.

Although social media sites regularly compete for users, sites where adolescents and young adults currently spend the greatest time include Facebook, Twitter, LinkedIn, MySpace, and Google+. Experian Hitwise (http://www.experian.com/hitwise/), a resource in digital marketing intelligence, reports that visits to Facebook now account for more than 65% of all visits to social networking and forums-classified websites in the USA. Over 70% of teenage youth actively maintain a Facebook profile. Nearly two-thirds (59%) of youth 13–19-years old have only one social

media account, which is Facebook for 89 % of them. Among those who have more than one social media account, 99 % report having a profile on Facebook, compared with 29 % who report using Twitter [7]. Nearly three-quarters (73 %) of adolescents and young adults 18–34-years old who are online visit Facebook monthly, the highest of any adult age group [19].

Most adolescents and young adults use social media to stay connected with their friends, post and share photographs, comment on one another's posts and photographs, and share links within their personal networks [20–22]. Because of the broad and frequent use of social media by certain demographic groups, including adolescents and young adults, many larger organizations use social media as promotion platforms. Social media does much more than connect individuals within virtual communities; social media provides companies, brands, and causes a personalized way to connect with and engage members of virtual communities; at the same time, it provides users with a personalized way to connect with and engage companies, brands, and causes. Thus, social media can be a complex communication channel.

How Can We Capitalize on the Popularity of Virtual Communities and Online Social Media for HIV Prevention?

The latest estimates from the Centers for Disease Control and Prevention (CDC) indicate that approximately 56,300 Americans become infected with HIV annually, and about 16,000 persons with AIDS died in 2008 [23]. A significant proportion of HIV and other sexually transmitted infections (STIs) in the USA occur in adolescents and young adults. Between 2006 and 2009, estimated rates of HIV infection increased 25 % among youth 15–19-years old, and 31 % among youth 20–24-years old; these statistics are disheartening, given that our toolkit for prevention has improved considerably over the course of the HIV epidemic. We know more about health behavior and have made considerable advances in behavioral theory; we have reduced infection rates among some populations, including some subgroups of racial/ethnicity minorities and among injection-drug users, as examples.

However, some subgroups of adolescents and young adults are disproportionately affected by HIV and STIs. For example, African-American/black adolescents represent approximately 17 % of all adolescents, yet they account for about 72 % of HIV infections. Between 2006 and 2009, the rate of new infections among African-American/black young adults increased by 35 %. This rate of new infections was more than five times the rate for Hispanics/Latino young adults and nearly 23 times the rate for white young adults.

As with HIV, there also are profound disparities in the rates of other STIs among racial/ethnic minority adolescents and young adults. In 2007, for example, the rates of gonorrhea among African-American/black females 15–19-years old was 14.7 times greater than those for white females in the same age-group, and the rate for African-American/black males 15–19-years old was 38.7 times higher than that for white males in the same age-group.

Researchers and practitioners have shown that using the Internet to deliver prevention messages can have significant effects on behaviors that reduce HIV risk [6, 13, 21, 24–26] and increase adherence to HIV medication [27–29]. Given the remarkable and unprecedented increase in the number and types of virtual communities and the use of social media in the past decade, it is intriguing, and in fact crucial, to think of ways to capitalize on social media to facilitate HIV prevention. In this section, we discuss our approach to reduce HIV risk among adolescents and young adults through the use of Facebook, clearly one of the most popular and established social networking sites.

Research on Harnessing Social Media to Prevent HIV

The FaceSpace Project was among the first examples of health promotion delivered using social media. This innovative pilot intervention was implemented and evaluated in 2009 and 2010. The project included the delivery of sexual health promotion via social networking sites to key groups at increased risk—adolescents and young adults 16–29-years old and subsequently MSM—through an intervention that was separately branded as Queer As F**K. The interventions used fictional characters to interact and post content (primarily videos known as webisodes) on various social networking sites, with sexual health promotion messages embedded within some of these postings.

Results from both interventions have been published [26, 30–32]; briefly, the pilot of The FaceSpace Project resulted in significant increases in sexual health knowledge among participants between baseline and follow-up using a pretest-posttest design ($p<0.01$). Thirty-three percent of all participants reported that the project prompted them to discuss or seek more information about HIV and STIs, 22% reported the project made them more conscious about safer sex practices, and 35% reported the project led them to seek advice from a health professional or get an HIV and/or STI test [31].

A mixed-methods process evaluation of Queer As F**K indicated that the 32 webisodes that were posted on the project's Facebook and YouTube pages attracted more than 30,000 views; ranging from 124–3,092 views per individual episode. By April 2011, the Queer As F**K Facebook page had 2,929 fans, who were predominantly male. Interview and focus group participants supported the balance of education and entertainment and reported that the narrative soap opera format successfully delivered sexual health messages in an engaging, informative, and accessible manner that encouraged online peer discussion of sexual health and promoted community engagement [32].

Other researchers have similarly shown the potential viability and impact of using social media as an intervention mode. In a pilot study, youth 18–20-years old who disclosed engaging in risky behaviors on their MySpace profile were sent e-mail messages about the potential for harm in doing so; the intervention led to a substantial reduction in mention of sexual behavior and in the removal of public access to profiles [25].

Several other pilot and larger scale studies using the Internet for HIV prevention have produced either evidence of positive effects or promising findings (Table 9.1). These initiatives have reached diverse populations and settings through a variety of technology-based approaches, including the Internet [33], social media [21], chat rooms [4–6], cell phone/text messaging [34–36], and unique websites [37, 38], as well as hybrid interventions [39–42]. Populations reached by these interventions include MSM from diverse racial groups and geographic settings; young adults; and adolescents, including African-American/black male adolescents and homeless adolescents. Although this book focuses on innovations in engagement within the USA, we note an important intervention that was developed, implemented, and evaluated in Mbarara, Uganda [43, 44]. This intervention is particularly relevant, given that the intervention delayed sexual initiation among high-school students. Delaying sexual initiation among adolescents is an important goal, particularly with the broad use of the Internet among preadolescents and adolescents.

Although the potential of social media continues to be advocated within public health and HIV prevention specifically, evaluation of the variety of strategies that can be used is limited; much research is needed. As social media encourages relationships between individuals and content, and the organizations that provide that content, measuring the quality of these relationships is key to quantifying success regarding health behavior change. A deeper understanding and analysis of the demographics of the visitors, length of time spent on the site, referral sources, and measurement of the overall quality of interactions and experiences are necessary. Community engagement provides a vehicle to identify and develop health communication approaches and messages that are meaningful for a target audience.

Furthermore, the success of social media to change knowledge, attitudes, and behaviors depends on our ability to create experiences that raise awareness; educate and inform; earn participant and audience loyalty; and, ideally, connect online experiences with offline behavior change. As a result, in addition to website hits and number of so-called friends (connections within a social network), measures of engagement of virtual community members include the number of times a visitor returns to a website, the number of comments on a blog, and the number of retweets on Twitter (i.e., the number of times a tweet [text message] is forwarded from a recipient to someone else). These examples represent some of many measures of engagement; given the rapidly evolving technology and the ongoing development of social media outlets, there is no exhaustive list of ways to conceptualize engagement.

Just/Us Facebook Page Intervention

Given that Facebook is one of the most popular social networking sites online, we sought to uncover specific strategies to engage adolescents and young adults effectively through this social media site. We focused on adolescents and young adults both because of their prolific use of social media and because of their elevated risk for HIV and other STIs.

Table 9.1 Selected evidence-based and promising technology-based HIV-prevention initiatives. (This list is not exhaustive and studies were selected to represent the variety of technology-based approaches to reach diverse populations)

Authors (reference)	Program name and brief description	Study design	Key findings
Bowen et al. [33]	Wyoming Rural AIDS Prevention Project (WRAPP), an Internet-based HIV prevention initiative for rural white MSM	Randomized controlled trial	The Internet provides a useful and low-cost approach to recruit and assess rural white MSM and to reduce their sexual risks for HIV
Bull et al. [21]	Just/Us, a social media HIV-prevention intervention for adolescents and young adults	Randomized controlled trial	Facebook can be an effective tool to promote and sustain condom use among adolescents and young adults at least in the short-term
Rosser et al. [67, 68]	MiNTs (Men's Internet Study), an Internet-based HIV-prevention program for MSM	Randomized controlled trial	Internet-based HIV-prevention research is possible even with geographically dispersed minority populations. Efficiency appears to be a primary risk associated with meeting partners online
Bull et al. [69, 70]	Youthnet, an Internet-based HIV-prevention initiative for adolescents	Randomized controlled trial with two samples: online and clinic	In the Internet sample, participants exposed to the Internet-based intervention had slight increases in condom norms. There were no intervention effects in the clinic sample
Noar et al. [71]		Systematic review and meta-analysis of existing published and unpublished studies testing computer-based interventions	Statistically significant effect sizes were found for increased condom use, decreased number of partners, and decreased incident STIs. Computer technology-based HIV-prevention interventions have similar efficacy to more traditional human-delivered interventions and are less expensive to deliver, intervention content is easy to customize, and dissemination is flexible

Table 9.1 (continued)

Authors (reference)	Program name and brief description	Study design	Key findings
Fortune et al. [34, 35]	411 for Safe Text, a cell-phone text messaging HIV-prevention intervention for young African-American/black male adolescents	Pilot to test the feasibility of recruiting and enrolling participants 16–20-years old in a text message initiative	Delivering HIV-prevention messages through cell-phone text messages is feasible and acceptable for American/black male adolescents
Rhodes et al. [6]	CyBER/testing, a chat room-based intervention designed to increase HIV testing among online MSM	A quasi-experimental, single-group pilot study design, using cross-sectional pretest and posttest data	Results included increased self-reported HIV testing among "chatters" overall; chatters who reported having both male and female sexual partners concurrently had nearly 6 times the odds of reporting HIV testing at posttest. Internet-based HIV-testing interventions may increase testing among MSM who may be difficult to reach in traditional physical spaces
Levine et al. [36]	SEXINFO, a text messaging intervention in which users text keywords to a central program for STI-prevention information	Pilot; included focus groups to assess feasibility and banner ads for young adults 18–24-years old	Those who saw the campaign were more likely to be concerned about STIs; approximately 10% sent a text message to the SEXINFO service. Participants reported that the use of cell phones and text messaging caught their attention
Hightow-Weidman et al. [37, 38]	HealthMpowerment.org, a social media site for young African-American/black MSM	Pilot	A targeted social media site is acceptable to African-American/black MSM and feasible to use for delivering HIV-prevention information

Table 9.1 (continued)

Authors (reference)	Program name and brief description	Study design	Key findings
Rice et al. [39–41]	Social network analysis to examine the acceptability of a youth-led, hybrid face-to-face and online social networking HIV-prevention program for homeless adolescents	Pilot intervention used social identity theory to guide the augmentation of prosocial identities among homeless adolescents	Online adolescents were among the most central in their social networks. Younger adolescents were disproportionately connected to those like themselves. The program appears highly acceptable to homeless adolescents
Young et al. [42]	Evaluation of associations between online social networking and sexual health behaviors among homeless adolescents in Los Angeles	Analysis of survey data gathered from 201 homeless adolescents	Results suggest that online social networks usage can be associated with both potential increases and decreases in HIV/STI risk behaviors in homeless adolescents and that using online social networks for partner seeking (compared with not using the networks for seeking partners) can be associated with an increase sexual risk behaviors. Results also suggest that online social network usage is associated with increased knowledge and HIV/STI-prevention behaviors among homeless adolescents
Ybarra et al. [43, 44]	CyberSenga, a 6-session HIV-prevention initiative delivered via the Internet for high school students in Mbarara, Uganda	Randomized controlled trial	Students exposed to CyberSenga were more likely to delay initiation of sex; however, there were no effects on condom use

MSM men who have sex with men, *STI* sexually transmitted infection

Methods

The overarching goal of our research was to determine whether adolescents and young adults exposed to content on the Just/Us Facebook page, which focused on sexual health promotion and the prevention of HIV and STI exposure and transmission, would be more likely to adopt healthy sexual behaviors compared with those who were not exposed to the Just/Us Facebook page and instead only viewed other Facebook pages with other types of content. We used multiple unique approaches to engage racial/ethnic minority adolescents and young adults 16–24-years old. All procedures were approved by institutional review boards at the University of Colorado School of Public Health, Columbia Mailman School of Public Health, and Rutgers University.

Our intended audience was primarily African-American/black and Latino adolescents and young adults because of the disproportionate burden of HIV and STIs within these populations. We engaged these adolescents and young adults to contribute to the development of a Facebook page related to sexual health (Phase 1), to facilitate enrollment of social networks of adolescents as participants in a research study (Phase 2), and to interact with content on the study's Facebook page (Phase 3).

Phase 1 Adolescents and young people were approached online to facilitate development of site content. We conducted synchronous and asynchronous focus groups on MySpace. Participants offered reactions to content ideas, presentation, and wording for the site. Detailed methods for data collection and results from this engagement effort have been published elsewhere [45]. In brief, participants described the social media environment as one in which they engaged in both public and private sharing—similar to hanging out at the mall and keeping a diary. They used the medium to keep in touch with their real-world friends and to share about themselves. On their own pages, they posted links to online content and discussions about content they identified with. They also reported that they enjoyed taking simple online polls and quizzes and seeing the results.

We used feedback from this first phase to develop our Facebook content. A key outcome of this formative work was the naming of our Facebook page. Adolescents wanted a virtual space where they could meet online without "much" adult interference. They also wanted the site to focus on the social justice and human rights aspects of reproductive health (i.e., reproductive justice). To this end, we named our Facebook page Just/Us, a play on words to indicate a space "just for us" (adolescents) and "social justice."

Phase 2 We designed a cluster randomized controlled trial. Inclusion criteria for participation in the trial included an age of 16–24-years old, a Facebook account and informed consent. As in Phase 1, we focused on African-American/black and Latino adolescents and young adults, although no one was excluded from participation because of their race/ethnicity. To recruit participants into the study, we employed a modified respondent driven sampling (RDS) approach. RDS is a systematic approach to identify and recruit members of communities and populations that some community outsiders (e.g., researchers, providers, and practitioners) may

label as hard-to-reach. It is not difficult for members of these communities and populations to reach one another; clearly, members of virtual communities are likely to be able to reach one another. Thus, RDS relies on peer-to-peer referrals; an initial "seed" or index participant who is recruited, screened, found eligible, consented, and enrolled identifies and recruits others within his or her social network to participate [46–48]. Community settings were chosen as ideal recruitment sites with anticipation of encountering racial/ethnic minority adolescents and young adults. These settings included community colleges, malls, community-based organizations, and community and street fairs and festivals. We also recruited participants from online sites and through newspaper advertising.

In accordance with RDS methods, we further engaged adolescents and young adults during this phase by asking them to identify and recruit up to three friends in their Facebook network to participate. We conducted three waves of RDS recruitment; this chain-referral process continued until the desired a priori sample size was obtained. Participants received a $ 5 gift card per person recruited for up to three people (possible total of $ 15) for their recruitment effort. All eligible participants, including seeds and all those referred through their social networks, completed informed consent and a baseline behavioral survey of sexual risk via an online tool generated and delivered through Zoomerang, a commercial online survey software program that allows users to easily create and publish surveys online. Zoomerang served as a third-party host for our data, and its hosting agreements comply with our institutional review board requirements related to privacy and data security [49].

All participants were sent a link via e-mail on their Facebook news feed page that would take them to the informed consent and online survey, which they could self-administer on their own computer. The survey took approximately 15 min to complete and included several questions about Facebook use and engagement with our intervention content. Participants were given a $ 15 gift card for completion of the baseline survey. More specific details on how we conducted recruitment and on results from the recruitment have been published elsewhere [21].

After participants enrolled, our intention was to use Facebook in an organic and dynamic manner. This meant we could not simply post static information onto our Just/Us Facebook page that would then be pushed out through a rich site summary feed, commonly known as an RSS feed, to participants' Facebook news feed pages. RSS includes a variety of web-feed formats used to publish in a standardized format online, for example, blogs, news headlines, audio, and video. Instead, we had to post information that addressed topics we believed were important in a way that would encourage response and interaction from participants.

Phase 3 We posted initial content in the form of polls and RSS feeds, on sexual health topics over an 8-week period. Adolescent and young adult moderators were hired and trained to serve as the "face" of Just/Us and facilitate online engagement with the content. Given administrative access to the Just/Us Facebook page, they posted content, engaged participants, encouraged participants to respond with their own postings, and posted their reactions to posted content. These moderators were carefully trained in order to ensure that they posted correct and consistent information. We also established norms for posting and responding to posts on the Just/Us Facebook page.

The content of the Just/Us Facebook page was intended to address specific theoretical constructs and took the form of polls, RSS feed, links, etc. (Table 92). The content identified in Table 9.2 is not exhaustive and is intended to provide insight into the intervention only. Furthermore, participants in our formative research indicated that it was important for the Just/Us Facebook page to be dynamic and regularly updated. We were flexible and agile, posting news items and relevant stories that emerged from the popular media and allowing for participants to engage with the content in a very organic manner and at their own pace. We thought this approach was essential both to adhere to expectations that the Just/Us Facebook page not differ in its operation from other pages on Facebook and also to meet participant expectations that the content be both authentic and up-to-date.

The moderators were encouraged to respond to content daily, and they often posted multiple times each day. This process differs substantially from traditional health promotion programs, which are generally delivered in group or classroom settings at specific times of the day during given days of the week. Each time a moderator posted something on the Just/Us Facebook page, it would automatically be pushed through an RSS feed to participants. All intervention-group participants were required to "like" the Just/Us Facebook page. Thus, they could see all Just/Us Facebook intervention content simply by going to their own Facebook page or their news feed page. If they wanted to, they could click on the RSS feed and go directly to the Just/Us Facebook page, where they could view and engage in greater depth with any of the content over the course of the project (Fig. 9.1).

Results

Of the 36 adolescents who participated in the Phase 1 focus groups, 58% were female and 60% were white, although we had participation from Latinos (14%) and African-Americans/blacks (8%). Participants were recruited using multiple strategies. Some were recruited from chat room invitations that were sent to 2,354 chatters who subsequently joined a forum created on MySpace. The forum generated about 738 friends, and an initial focus group comprising seven participants was held as a synchronous chat; we held subsequent discussions asynchronously, obtaining input from an additional 29 participants. We learned through this phase that participants take the asynchronous nature of social media seriously and appreciate the ability to exert control over when and where they access information and interact online [12].

For Phase 2, in which we focused on engagement with the content of the intervention, we enrolled 636 participants in the control condition and 942 in the intervention condition. Overall, more than half of those enrolled were female (56%), 35% were African-American/black (35%), and 14% identified as Latino. This enrollment of Latino participants was lower than expected. The highest proportion of the sample was from the southern part of the USA (39%), followed by the western part of the country (35%), with the greatest number of participants coming from Colorado, Georgia, and Louisiana.

Table 9.2 Detailed week-by-week topics covered on the Just/Us Facebook page

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
HIV risk behaviors	*Week 2* *Polls:* "Have you ever been tested for HIV?"; "How many sex partners have you had? Comment + see how you compare"; "How do you know if ur new love is HIV+ or neg? Talk about it." *RSS feed:* "Want to decrease ur risk for HIV: Fewer partners, testing + talking" *Week 3* *Poll:* "Number of sex partners" *RSS feed:* "Pass it back and forth but not around! If u and ur partner both get tested 4 STDs and only have sex w/each other, ur golden." *Week 5* *Video link: Star Squadron: HIV,* available at http://www.youtube.com/watch?v=7Swp5-dVOik *Week 6* *RSS feed:* "Social media linked to rise in syphilis" *Links:* HIV Awareness Day for Women and Girls; Australian STD Campaign for Tourists *Week 7* *Poll:* "What do you think about anal sex?" *Link:* Abstinence education in health care reform *RSS feed:* "1 in 6 have herpes in US" *Blog link:* "'The backdoor': Anal sex" *Week 8* *RSS feeds:* HIV risks; condom use percentages; rates of HIV/AIDS in Washington, DC Detailed information Factors that increase risk for HIV exposure and transmission: Early age at first sex Increased number of sex partners Concurrent partners Unprotected vaginal or anal sex among men and between heterosexual couples Alcohol or drug use and influence on inhibitions and decision making History of STD diagnosis HIV testing as routine every 6 months if you are sexually active but not monogamous Sexual coercion: What constitutes coercion?	Health Belief Model Perceived susceptibility Perceived severity Perceived benefits Perceived barriers (where and how to get tested) Integrated Behavioral Model Attitude Perceived norm (both other's expectations, other's behavior) Personal agency Intention to perform behavior Knowledge & skills to perform the behavior Habit Information, Motivation, Behavior HIV-prevention information/ knowledge HIV-prevention motivation Elicitation of existing levels of HIV-prevention information, motivation, behavioral skills, and behavior Elicitation research

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
	How to resist pressure Rape or incest (as risk alone, but also as risk for early sexual debut among those abused as children) Casual sex (with someone now known well) Age difference between partners (where risk is increased for women with partners ages≥5-years older Supplemental material Condom man cartoon to demonstrate proper use of a condom; Youthnet role model stories; animation drama series; and: Abstinence norms: Content promoting abstinence as normative among MySpace and Facebook users Planning for sex as an important step Taking time Becoming well educated about pregnancy, STDs, and HIV before becoming sexually active How to talk to partners about staying abstinent Monogamy norms: Content promoting monogamy as normative among MySpace and Facebook users "Once you decide to have sex, how to talk to your partner about being faithful" Testing for STD and HIV and then staying monogamous	
Forum topics for site: Peer questions and postings on a variety of topics	Week 1 *Poll:* "Why don't you like condoms?"	
	Week 2 *Poll:* "How many partners have you had?" *RSS feeds:* "Got 1++sex partners at same time? Ur at risk 4 HIV+STD"; "Have you eva cheated on your bf or gf? Comment+see what it brings u." Week 4 *RSS feeds:* "Being with only one person at a time keeps you safer from HIV and other STDs"; "Condoms in space"; "Condom design in NYC"; and "Condom machines in Italy" Week 6 *Links:* Australian STD Campaign for Tourists; the Brazilian sustainable rubber condom *Blog link:* "Getting together, getting it on, getting it online"	

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
	Week 8 *RSS feed:* Condom use percentages Detailed information Age at first sex Benefits of waiting for sex Benefits of being with one person or only dating one person if having sex Disadvantages of one night stands Disadvantages of having multiple sex partners Disadvantages of having concurrent partners Advantages of condom use	
"How to" from experts and/or peers	Week 1 Poll: "Have you ever talked to your partner about protection b4 u have sex?"	
	Week 2 Poll: "How many partners have you had?" RSS feeds: "Got ideas 4 how to talk to ur partners abt safe sex, Tell us"; "Qs about sex? Answers from experts at www.justus411.org" and general information about quality and history of condoms. Video link: *A Condom for Everyone,* available athttp://www.youtube.com/watch?v=7d6oqRB79ws	
	Week 3 Polls and RSS feeds: "How to use condom" "What's your favorite kind of condom?" "How often do you use condoms during sex?" "Wanna know how often other people use condoms? Find out www.justus411.org" "7 perfect condoms" "Two condoms are not better than one" "Need a bigger condom–size does matter?" "Who puts on the condom in ur relationship?" "Do you never use a condom w/your bf/gf but always with others? OMG-problem"	

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
	"Ever been pressured to have sex without a condom? What do you do" "Anyone tried the female condom? Hear it's good for anal" "Does size matter?" Blog link: Condoms and contraception Video link: *Safe in the City,* available at http://www.stdcentral.org/SitC/about/ Video link: *Star Squadron 200X: What is Sex*, available at http://www.youtube.com/watch?v=V_v_Skk6rL8 Week 4 Article link: Condoms in porn industry Polls and RSS feeds: "Did you know you can put a condom on your partner with your tongue? S-E-X-Y" "Condoms can break when u don't put them on correctly Watch 1–1/2 min video now*:* [link]" "Two condoms are NOT better than one Two rubbing + friction = tearing. Just one, all the time" "So far xx% of people say they have NOT had a condom break on them. Have you? Take a poll*:* [link]" "Do u know where to go if ur condom breaks? Text Hookup to 61827" "Do you know what to do if ur condom breaks. U may be at risk for STDs + unplanned pregnancy. Call 8002307526 for srvcs near you." "Can put a condom on using your tongue" "Condoms need to fit right" Video link: *Star Squadron 200X: Condoms,* available at http://www.youtube.com/watch?v=b-5qeYoDhH0 Article link: About Roy Ashburn: DUI after leaving gay club Week 5 Links: Condoms in a Rome school; Condoms in space; and Female condoms distributed in DC area with high HIV rates RSS feeds: "Anyone have info on the female condom?"; "Britain sending condoms to South Africa for world cup"; "Endangered species condoms"; and "Sex talk during sex play" Week 6 RSS feeds: "Arrested for carrying too many condoms" "Condomania store"; and "Pawn shop with condoms in NYC"	

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
	Week 8 RSS feeds: Condom use, percentage, Anti-rape condom Detailed information Negotiate safe sex with a partner (from peers—what was your best experience?) Avoid pressure to have sex—conversations about coercion Avoid pressure to have sex without a condom How to use a condom–use of Safe in the City condom man cartoon on how to use a condom Use of Youthnet role model series Coming out Getting help if sexually assaulted Getting help if in an abusive relationship Coping with HIV related stigma	
Support	Week 1 *Status updates:* "Is solo sex still sex?"; "Contest: Craziest advice an adult has given you"; "Do you trust advice from adults about sex?"; and "Afraid of unplanned pregnancy" *Blog link:* You can learn from friends and trusted adults Week 2 *RSS feeds:* "Who gave you the 'talk'?"; "Getting any, Getting lots? Ur at risk 4 HIV + STDs"; "Do u know how often u shud get tested for HIV? Every 6 months if ur sexually active" Week 4 *RSS feeds:* "Masturbation + Safe Sex"; "101 ways to get sexy without having intercourse-add yours"; "Finish the sentence: I felt really close to my sex partner when s/he…"; "Best safer sex experience: When I masturbated w/my partner. Tell us your best safer sex experience…"; "Having sex w/boyz and girlz is fun but isn't safe unless u use a condom (Lesbians can get pregnant from gay friends)" Week 5 *Links:* "Start talking about sex in middle school"; "Sex ed from a teacher's perspective"; "Facebook and Syphilis" Week 6 *Link:* Australian STD Campaign for Tourists	

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
	Week 7 *Links:* "April is STD Awareness Month: Facts you should know"; "Is sex education is a crime?"; "Bristol Palin Delayed Pregnancy Campaign"; "The Onion Pokes fun at Abstinence Pledges"; "Sex education on global scale" Week 8 *Links:* "Men explaining birth control"; "Sex Education is not about pleasure" *Blog link:* Emergency Contraception vs. Birth Control	
HIV statistics (from CDC fact sheets)	Week 1 *Blog link:* HIV not a blast from the past Week 2 *RSS feed:* Statistics about HIV and STDs among African-Americans and Latinos Week 7 *RSS feed:* April is STD Awareness Month: Facts you should know Week 8 *RSS feed:* Percentages of condom use Detailed Information HIV is the virus that causes AIDS In the US, most men get HIV from other men In 2006, an estimated 1,332 new cases of HIV/AIDS were diagnosed in youth 15–19, and 3,886 cases in young adults 20–24 Youth of color are at particular risk for contracting HIV/AIDS and other STDs African-American/black adults and adolescents accounted for 49% of all HIV/AIDS cases diagnosed in 2005 Rates of HIV/AIDS cases were 72.8 per 100,000 among African-Americans/blacks older than 13 years, compared with 28.5 per 100,000 and 9.0 per 100,000 among Latinos and whites of the same age-group The rates of Chlamydia and gonorrhea infections are highest among youth. Chlamydia infections rose in 2007 by 7.7% for youth 15–19 years old and rose 6.6% for young adults 20–24 years old Chlamydia disproportionately affects African-Americans/blacks, representing 48% of Chlamydia cases. The rate of Chlamydia infection is 3 times higher in Latinos than in whites African-Americans/blacks make up only 12% of the population but represent 70% of the reported cases of gonorrhea The rate of syphilis is 2 times higher for Latinos than for whites	

Table 9.2 (continued)

Topic and detailed information	Sample content	Theories, theoretical constructs, & relevant outcomes
Information on puberty and reproduction	Week 3 RSS feed: Every penis and vagina are different Week 5 Links: The Onion article on "Being a woman now"; Canadian sex-ed Super hero Week 6 Link: Health Care Reform—Reproductive Health Week 7 Link: Talking to kids about sex: When did you first have birds and bees talk Week 8 Link: Sex education on a global scale Detailed Information Physical development in males and females Male reproductive system Female reproductive system Pregnancy	

[a] The content noted here is not exhaustive and is intended only to provide insight into the intervention
CDC Centers for Disease Control and Prevention, *STD* sexually transmitted diseases

Fig. 9.1 The *Just/Us* Facebook page, with examples of content and elements

We screened 1,017 individuals for the study, and 828 eligible individuals were randomly assigned to the control group ($n=312$) or the intervention group ($n=340$), and additional participants were enrolled through referrals (Fig. 9.2). The original sample consisted of 1,578 participants, and 1,092 (69%) completed the 2-month follow-up survey. We had additional attrition at the 6-month follow-up, with 52% of the original sample completing this second follow-up; 59% of participants in the control arm completed the 6-month follow-up compared with 45% in the intervention arm, a statistically significant difference. Additionally, 106 participants completed the 6-month follow-up who had not completed the first follow-up, therefore increasing the proportion of participants with any follow-up data to 75.5%.

Analytic data from Phase 3, during intervention implementation, indicated that the Just/Us Facebook page had an average of 43 unique visitors per week and a high of unique 101 visitors during the week when the content focused on multiple sex partners. The average time spent on the page was 3.16 min, with a high of 7.3 min. There also were 93 loyal visitors (10% of those enrolled in the intervention) who regularly returned to view and post on the Just/Us Facebook page.

During the 8-week intervention, participants were most engaged the week we posted the blog titled, "*Boyfriend? Girlfriend? Or Just Friends with Benefits?*" The

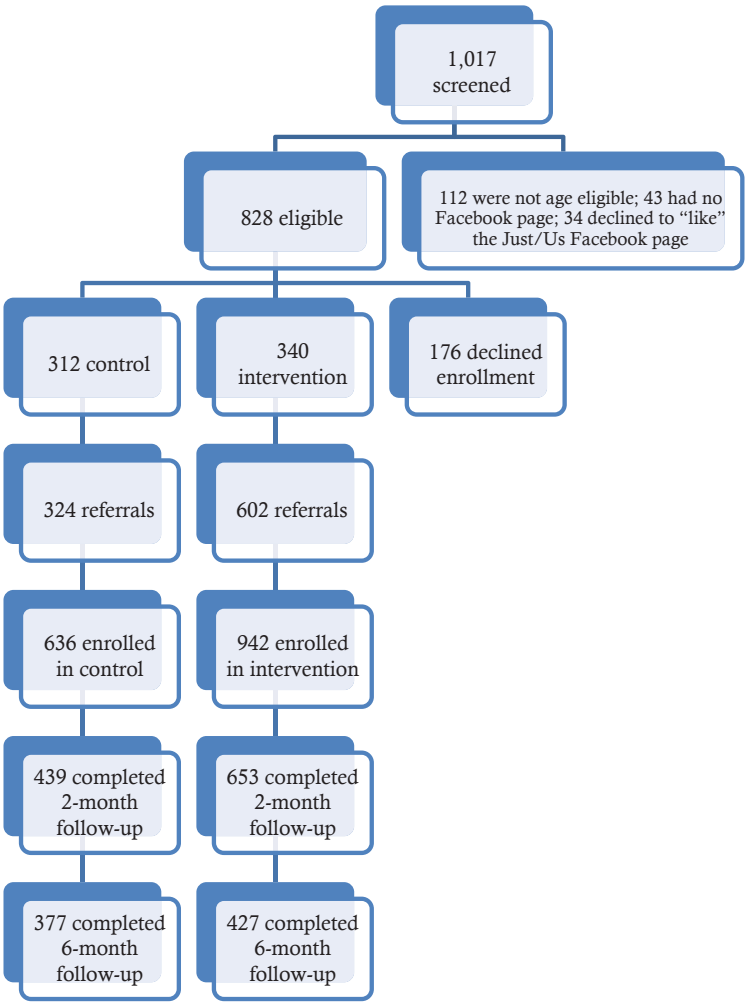

Fig. 9.2 CONSORT diagram illustrating participant enrollment and retention in the cluster randomized controlled trial over time

behavior we were addressing with this blog post was reducing the number of sex partners, making the point that the more partners one has, the more at risk for HIV exposure and transmission. The blog content was provocative and gave tips for navigating the world of "friends with benefits," commonly known as "FWB" online, from the vantage point of both reducing HIV and STI risk and maintaining one's emotional health. The poll for the week asked, "Have you ever hooked up with someone at a party and later became friends with benefits?" and the RSS feed covered reminders such as, "When you decide to have sex, you aren't just having sex with that one person…but everyone that person had sex with too!" At the time

of the blog posting, a movie was released by the same name, *Friends with Benefits*, with Justin Timberlake and Mila Kunis, and earlier in the same year, *No Strings Attached*, with Ashton Kutcher and Natalie Portman, was in wide release. Clearly, the topic was relevant for many participants, as evidenced by the 400% spike in number of comments and loyal user engagement when the blog was posted.

Overall, during active enrollment and participation, the moderators made 589 posts and fans made 277 comments, for a ratio of approximately one participant comment for every 2.1 moderator posts. The history of all the posts and content is available online at http://www.facebook.com/justusisis.

At the 2-month follow-up, we asked participants in the intervention arm how often they looked at the content on the Just/Us Facebook page; content here was defined as content that was pushed to them through the RSS feed on their Facebook news feed page as well as content on the Just/Us Facebook page. About 53% (350 participants) said they looked at the Just/Us content four to six times per week (21 participants) or daily (329 participants). Of these "frequent users," 14 (4%) were male, indicating that female participants were significantly more likely to be frequently engaged with the content ($p<0.0001$). However, there was no difference in gender for those indicating that they saw content at least once a week (329 participants).

Participants were also asked to write open-ended comments about the Just/Us Facebook page at the 2-month follow-up; we asked them to say what they liked and disliked about the page and to offer any suggestions for how we could improve this intervention (Table 9.3). There were 448 comments from participants in the intervention arm at the 2-month follow-up, indicating that 69% of all participants had something to say about the Just/Us Facebook page. The overwhelming majority (94%) of these comments were positive; of the remaining comments, many had to do with wanting to see the results from the study (three comments), complaints about the questions on the survey or not receiving incentives (seven comments), and confusion about the goal of the study (five comments). Only a handful of comments indicated that participants either did not agree with the information or perspectives that were being posted on the Just/Us Facebook page, found it awkward to review this type of material on Facebook, or were annoyed by multiple reminders to participate.

However, given that the overwhelming majority of the comments about the Just/Us Facebook page were positive, and participants said they appreciated having content available on their own Facebook news feed, it seems that participants saw content even if they did not go to the Just/Us Facebook page to post comments or reactions to it.

Moreover, our outcome analyses demonstrated that participants who were exposed to Just/Us Facebook page content were more likely than those who were not exposed to report using condoms consistently at the 2-month follow-up. Unfortunately, at the 6-month follow-up, we saw a decline in study effects, with a decrease to baseline levels of condom use in both the intervention and control groups. These results are reported in detail elsewhere [21].

Table 9.3 Selected comments from user feedback on the Just/Us Facebook page ($N=448$). (Comments are noted verbatim and may include errors in grammar and spelling)

Examples of positive comments ($N=419$)	"I feel that it's a good way to stay informed on sex. It's a little reminder for those who are in sexual relationship(s) to remind them to strap it up"
	"It's really interesting, I've been paying attention to your posts and a video that I saw. If people actually paid more attention to Just/Us, they might actually learn more than what they think they know"
	"Interesting.. ya don't make it awkward"
	"I think its a great project, and I enjoy reading the blogs that get posted on the FB page"
	"Found [this an] interesting way to talk about these topics. Geared towards teens"
	"I like the daily reminders the project posts about cultivating a healthy sexual attitude, and staying safe or abstaining"
Examples of explicitly negative comments	"Although the facts are entertaining and otherwise interesting, I'm not sure how effective the website and Facebook page is as a whole. The people that are looking at the page are the people that already have the facts and are getting tested and taking proper care to avoid STDs and pregnancy"
	"your messages are kinda awkward sometimes when I am sitting in my school's public library and everyone can see…"
Comments on study methods	"Because I know only 2/3 of my CLOSE friends sexual information. And the questions that are asked, for example" how many of your friends on Facebook have had an one night stand" The question should be rephrased " how many of your close friends have had an one night stands" Because when the question is so broad, we are basically being told to stereotype our friends on FB. Because usually only 1/3 of the ppl on FB are ppl we talk to on a regular basis"
	"Some of the questions in the survey are poorly worded and can have double meanings. The survey and Facebook page are heteronormative; e.g. one of the questions asked if I used condoms or a different form of birth control. This question isn't accurate to me because I mostly have sex with men and don't need to use birth control…"
Comments related to confusion about the goal of the study	"Not really sure what it's driving at/what you hope to accomplish"
Neutral comments	"It's OK"
	"Honestly I'm just doing it because of the coupon, and because my friend told me to"

Discussion

Given the disparities in HIV infection and other STIs in the USA among ethnic/racial and sexual minority populations and adolescents and young adults, we are in urgent need of strategies to reach these communities and populations and engage them in effective prevention efforts. However, a history of mistrust of researchers in this country, coupled with potential variation in capacity for researchers to effectively engage with community members [50], suggests that effective engagement of key communities and populations in HIV-prevention interventions remains challenging.

Tindana and colleagues defined community engagement as "the process of working collaboratively with relevant partners who share common goals and interests." This process involves "building authentic partnerships, including mutual respect and active inclusive participation; power sharing and equity; mutual benefit or finding the 'win-win' possibility" in the collaboration [51]. In the USA, community engagement in HIV research has origins in the beginning of the epidemic in the early 1980s. For example, activists, many of whom were gay themselves or closely allied with gay men, lead initial prevention efforts and pushed for the development of a community role in the research in and development of HIV treatments (see Chap. 4). This movement also contributed to the emergence of local community advisory boards, designed to represent diverse voices in the communities where research and prevention practice were taking place. Community engagement has since built on the initial important work of community advisory boards. Increasingly, researchers, funders, health educators, and other types of practitioners have learned the value of engaging members of the community; and along with this engagement comes the transition from community members being viewed as targets to being respected as partners. Community engagement is seen to have broader aims that include improvement of the ethical and scientific integrity of trials; increased transparency and accountability of the research to the community; increased benefits and decreased risks for participants and the surrounding community; and improved local capacity and infrastructure [6, 52–57].

We are only now establishing definitions and expectations for virtual community engagement; although the traditional definition of community engagement may apply to online communities, we lack explicit agreement about what constitutes engagement online. This lack of agreement can be driven in part by what evidence emerges that links community member engagement in the research process to subsequent health outcomes. Ultimately, it will be useful to have a rubric that can assist researchers, funders, health educators, and other types of practitioners to understand what type of engagement, through what strategies and mechanisms, and how much engagement is needed to realize varying level of health outcomes.

Considering the Just/Us Facebook intervention in the context of best processes for community engagement allows us to address a key new factor for community engagement—how to effectively engage in the increasingly important technologic environment of the Internet, mobile technologies, and social media. Here, we consider engagement with the Just/Us Facebook intervention within the three phases previously described: the development of a Facebook page related to sexual health, enrollment of social networks of adolescents as participants in a research study, and interaction with content on the study's Facebook page.

We were able to establish initial engagement of youth through synchronous and asynchronous online focus groups; we and other researchers have demonstrated that engagement not only occurs in the real world through face-to-face interaction but also can be effectively mediated in online settings [21, 25, 58]. Our goal at this phase of the research was to solicit meaningful input on the content and design of our Facebook page. By going beyond the traditional face-to-face approaches, such as focus groups and key informant interviews, and instead, capitalizing on the on-

line environment, we were able to cast our net wider, engaging participants from diverse geographic settings to offer input and ideas that could be incorporated into the intervention. It also ensured that the information gleaned came from those closest to the ultimate user. It was during this process that we generated the concept of Just/Us, with the focus on sexual health as a social right. This is an example of how the virtual environment can generate meaningful engagement.

Our engagement efforts during participant enrollment showed that we could effectively recruit participants using traditional face-to-face methods for research subsequently carried out online. As mentioned above, we relied on face-to-face methods to approach and recruit our initial seeds for a modified RDS approach. After we successfully enrolled seeds and gained their trust, we were able to rely on them to enroll their Facebook friends in the study. Our process suggests that virtual communities may be difficult to work within unless relationships with virtual community members have been established. Our enrollment worked well when we relied on Facebook users to recruit their friends; we suspect that we would never have been able to recruit participants directly online. This finding seems to represent a crucial aspect when considering how to best engage adolescent and young adults within virtual communities.

Furthermore, based on our recruitment experience, social media seems to allow users to stay connected with their real-world friends virtually, but it then means that we compete for their limited attention. For example, a Facebook page promoting sexual health may seem provocative; however, it competes with the other reasons individual are online. It certainly could still be possible to engage participants using banner advertising or targeted advertising within social media sites [13, 59], but it is not clear that this approach would yield access to networks of virtual community members.

Engaging adolescents and young adults after they were enrolled in the study proved enlightening. As this was one of the first intervention research studies of its kind using Facebook for HIV prevention, we had no clear expectations about how participants would engage with the content on the Just/Us Facebook page. We knew that all participants had to "like" our Just/Us Facebook page in order for them to automatically see content, including content that was pushed to them through the RSS feed and automatically posted on their Facebook news feed. The RSS feed served as an opportunity to ensure a minimum exposure to intervention content. We anticipated that some of the content viewed in this manner would be sufficiently compelling for participants to click on it, which would then take them directly to the Just/Us Facebook page for further information and details. However, we also knew that such behavior on Facebook was unusual. Most of the time, adolescents and young people do not leave their own Facebook news feed, so we did not expect participants to click through to the Just/US Facebook page. We strived to make intervention content on the Just/Us Facebook page appealing, following some basic principles related to engagement with adolescents and young people that we believed to be important. These principles included:

- Carefully training moderators to post as representatives from the Just/Us intervention
- Developing content in such a way that was consistent with the expectations voiced by participants during the formative phase, including having content delivered in the form of quizzes, blogs, video links, threaded discussions, and polls
- Ensuring a sufficient number of posts to the page each day to keep participants engaged
- Keeping the Facebook page dynamic
- Evaluating content in real-time to assess what content increased versus decreased monitoring by participants

At the same time, we also wanted to make sure that we did not post so often that participants became annoyed and had a reason to block us or discontinue their fan ("like") status of the Facebook page.

A core group of about 10% of participants enrolled in the intervention group left their own Facebook news feed page to go to the Just/Us Facebook page to post and interact. An analysis of the top 200 brands on Facebook found that in a given week, less than 0.5% of fans actively engage with a brand. This was calculated by dividing the "talking about this" feature on a Facebook page (which shows how many fans are actually engaging with content such as sharing or commenting on) by total fans to create a percentage. About 10% of Facebook pages were reaching an engagement level of 1% or more; and only one brand page reached a weekly engagement level of 2% or higher [60]. Thus, we were doing better than most organizations or companies with a Facebook page.

We were surprised and heartened by the idea that we engaged adolescents and young adults, at least for short periods of time, in a Facebook sexual health and HIV-prevention intervention. We hypothesize that this engagement may represent ongoing interest in sexual health, even in the face of competing demands for attention on social media sites. Our outcomes offer promise for other sexual health interventions to replicate and expand on our efforts and work toward sustaining engagement and behavior change over longer periods of time. Indeed, we are confident that sufficient numbers of intervention participants saw content from the Just/Us Facebook page on their own Facebook news feed page and engaged with it in some meaningful way, based on the fact that consistent use of condoms was greater in the intervention group than in the control group.

An important implication from the identification of a group of frequent users is that they could serve as popular opinion leaders (POL) to engage others in their network; as POLs have been established as being effective in the promotion of healthy sexual behaviors [61], it is certainly possible to consider adapting a more traditional POL intervention for the online environment. Future work should focus on understanding whether it is possible, after individuals begin to engage in this more active fashion, to recruit them as POLs to be brought on staff in a part-time fashion. Staff members identified and hired in this sequence may have the potential to have greater influence on those in their own personal networks than the modera-

tors we hired initially. Our moderators had no personal connection to any of the intervention participants.

We do caution, however, that we cannot assume individuals have the same type of connection with their Facebook friends as they have with their real-world friends, as is illustrated in a comment from one participant: "…. Usually only 1/3 of the ppl [people] on FB are ppl [people] we talk to on a regular basis." This comment supports the notion that the hundreds and even thousands of individuals who are friends with any given Facebook user are not all intimate in the way real-world friends are. As recently stated by an author being interviewed on a radio program, "Facebook must up the meaning of the word 'friend'; it really just means someone I am connected to" [62]. Thus, if we want to utilize POLs, for example, we must carefully understand who are true, real-world friends of the POLs as opposed to who they are merely connected to on Facebook; determining whether peers have greater influence on true friends could be an important direction to investigate as we explore and harness virtual communities for health promotion and disease prevention. In analyses to evaluate the relationship between transitioning to obesity and network relationships, researchers found that close intimate relationships were most influential in the transition to obesity [63]. Although our work is an important first step in illustrating that social networking sites, like Facebook, can be used to influence sexual health, we still have much to learn about how to determine influential members within networks and how to activate those members to motivate sexual health behaviors.

Limitations

In this chapter, we provided a brief summary of innovative HIV-prevention interventions for virtual communities. We also offered a case study of one of the first studies of its kind to use Facebook to engage adolescents to reduce HIV exposure and transmission. Although we are pleased with the outcomes of this study and have learned much about what is possible related to engaging adolescents and young adults, we recognize that important limitations of our research remain.

First, given the profound impact of HIV on Latino communities in the USA, we need to do a better job of recruiting Latino adolescents and young adults into HIV-prevention interventions. We can look to our successes in recruiting large numbers of African-American/black adolescents and young adults as a starting place. We believe some of our success recruiting participants from these populations was because one of our recruiters was an African-American/black college-age woman. Our Latina recruiter, however, was older. In addition, studies demonstrate that networks tend to be similar with regard to demographic characteristics, including gender and race/ethnicity; therefore, recruiting more seeds who are Latina or Latino may help in subsequent recruitment of other Latino participants.

Furthermore, it would be valuable to understand more about what motivates individuals to post or respond to Facebook content. Although it may be useful to

explore what motivates adolescents and young adults to engage with particular content, it is not completely clear that doing so is necessary to generate behavioral effects. It may also be difficult to encourage individuals to post or interact with this particular kind of content, inasmuch as the public environment of Facebook may thwart or discourage open engagement with content that is sensitive and private, such as sexual behavior. Nonetheless, it would certainly be valuable to have more ethnographic and detailed information about the types of things that generally cause individuals within virtual communities like Facebook to act and move from their own Facebook news feed page to another Facebook page, and whether there are particular triggers; for example, provocative content or particularly timely and current information that gets participants talking about specific content.

Third, given the need to move from research to practice to take interventions developed under research conditions to scale, it may be beneficial to consider whether engagement and sustainability would improve if the Just/Us Facebook page were linked to a real-world organization or entity that had regular and ongoing face-to-face connection with adolescents and young adults. Our project was a stand-alone intervention, where the Facebook page was not linked to any institution or group providing clinical services to adolescents and young adults. It may be worthwhile to explore linking the Just/Us Facebook page intervention to a clinical entity, such as a school-based health clinic or other clinic where adolescents and young adults can seek and receive high-quality, comprehensive reproductive health services. Certainly, there is concern that a page such as this cannot be sustained indefinitely unless it is linked in some way to an organization that is willing to support it.

Research Needs and Priorities in Terms of Prevention and Community Engagement

The Just/Us Facebook page with content to promote sexual health is the first ever to be studied for efficacy using a cluster randomized controlled trial to document improvements in sexual health. An important next step is to replicate findings. By our careful documentation of the specific methods for engaging adolescents and young adults to design, update content, and enroll in this trial, we are confident that replication is possible.

It will be important to attempt replication within the context of the lessons learned related to engagement. If we want to follow recent calls in the literature to pay closer attention to issues of translation and dissemination [64], we should ensure that any replication takes into consideration how to design for dissemination and sustainability. One method to accomplish that would be to do what we have just suggested: Link Just/Us Facebook page content to an organization that already regularly serves adolescents and young adults and is perceived to be a credible trusted source for important information on sexual health. Formalizing a relationship whereby organizations such as Planned Parenthood, school-based health centers,

and/or community health centers actively integrate the Just/Us Facebook page content into their patient encounters and educational sessions could be a key next step.

If we do wish to consider approaches to link the Just/Us Facebook page to youth-friendly clinical services, work needs to be done to identify appropriate clinics and train staff and clinic administrators on how to best use social media to establish and maintain relationships with their clients and to share appropriate medical information with them. We can consider strategies to improve both online and offline engagement. For example, after adolescents and young adults have visited information online, they can subsequently go to a clinic where they see content they are familiar with and encounter staff who can reinforce content from the Just/Us Facebook page in a friendly and approachable manner.

Crucial to this work as well as other work that utilizes social media and technology for health promotion is a concern that gold-standard research in these environments happens at such a slow pace that the results may actually be obsolete by the time they are released and disseminated among the scientific and health-practitioner communities [65]. For example, our project was funded in 2006 and our primary outcomes were not under review for publication until 2012 [21]. Six years can be an eternity in the rapidly evolving technologic environment, and we must do better to shorten the timeline in getting prototypes for promising new technology-based initiatives designed quickly and delivered in the market on a much more streamlined timeline.

We also need to ensure that in planning for new prototypes to stay ahead of the technology curve, that we take care to consider dissemination from the very beginning. In the case of the Just/Us Facebook intervention, study partners at ISIS continued to update the Just/Us Facebook page and keep adolescents and young adults engaged in relevant topics after the study was complete. However, questions such as the following remain:

- How do we extend the reach to more people who were not enrolled the study?
- Who will cover maintenance and upgrade costs for both staffing and technology?
- When adaptations are needed, who will do this work?

These questions and related considerations are consistent with the RE-AIM framework established by Glasgow, who, along with Bennett, called explicitly for the need to consider where a technology application for health promotion should be disseminated, by whom, and how many people it could potentially reach, even before any programming of said prototype occurred [66].

We are well into the fourth decade of HIV, and HIV- and STI-related disparities continue to exist for some communities. Thus, we must be creative with both the types of interventions we develop, implement, and test, and the processes we used to develop, implement, and test them. Virtual communities offer seemingly limitless potentials, and we must work within these communities through engagement to ensure that what we do is meaningful and has the greatest potential for successfully reducing HIV and STIs among vulnerable populations.

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