



Research Article

Creating Project CREATE: Lessons Learned and Best Practices for Developing Web-based Resources for Public Health Practitioners

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ABSTRACT

Background: This paper discusses the Rural Center for AIDS/STD Prevention's effort to develop a web-based service called Project CREATE that responds to a need for targeted health promotion materials expressed by directors of HIV/STD prevention services in predominately rural states. **Purpose:** Project CREATE allows users to select customized photos, taglines and applicable statistics in order to design targeted prevention posters to reach persons at risk for HIV/STDs in their areas of rural America. **Methods:** Project CREATE resulted from a bottom-up development process that involved pilot testing the website prototype with members of the target audience (i.e., rural HIV/AIDS health educators, prevention specialists and program coordinators), a model that could be applied to any health promotion effort. **Results and Discussion:** The assessment data from the pilot test attests to the need for services like Project CREATE that are developed in close coordination with the practitioners who will ultimately use these resources. **Translation to Health Education Practice:** The paper concludes with recommendations for best practices for public health researchers working with software developers to create web-based tools designed to be used by practitioners.

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BACKGROUND

Contrary to popular misconceptions, the effects of the HIV/STD epidemic in the U.S. are not confined to urban settings. By the end of 2007, 56,209 rural people had been diagnosed with AIDS.¹ Although only 5-8% of all AIDS cases occur in rural counties,² HIV incidence rates in rural America disproportionately affect specific geographic regions, particularly the rural South. For instance, the South accounts for 68% of all rural AIDS cases, and in some areas of the South, HIV/AIDS rates in rural areas almost match rates in urban areas.³ In 2006, 67%

of all new rural AIDS cases were located in the rural South, and more people died from AIDS there than anywhere else in the country.¹ Gonorrhea and chlamydia rates in the rural Southeast were some of the highest in the nation in 2008.⁴

The burden of HIV/STD falls especially heavily upon minority populations in rural areas, such as rural African Americans, men who have sex with men (MSM), and injection drug users. Although African Americans comprise only 13% of the U.S. population, they constitute 50% of all rural AIDS cases.³ More than half of all males diagnosed with

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AIDS in rural areas are exposed to HIV through male-to-male sexual contact.¹ Additionally, 20% of males diagnosed with AIDS in rural areas are exposed to HIV through injection drug use.¹ These groups might be considered “double minorities,” as they both live in rural areas that have been historically underserved in terms of HIV/STD-related services and identify with minority populations whose needs are often marginalized in health policy discourse in rural settings.

Indeed, the Rural HIV/STD Prevention Work Group⁵ found evidence for the underservice of rural areas in general and of “double minority” populations in particular in its work to identify factors that contribute to challenges of rural HIV/STD prevention, which include:

- Lack of infrastructure to support MSM.
- Rural to urban travel for sex.
- Denial that HIV exists in rural areas.
- Stigma toward HIV and those at risk.
- Traditional values and heritage of independence/self-sufficiency.
- “Hidden” at-risk populations.
- Social and geographic isolation.
- Lack of community infrastructure.
- Poor access to preventive and medical services.
- Methamphetamine use.

Considering these factors, the sociocultural and structural issues that typify the U.S. HIV/AIDS epidemic at large may be very different in rural America than in suburban and urban America. Rural residents may not have access to services taken for granted by their metropolitan counterparts, such as high-speed Internet, stores that stock a wide variety of condoms and free or low-cost HIV/STD testing. Compounding this challenge is the fact that rural America is far from monolithic. For example, rural culture in Appalachia may bear little resemblance to that in the Plains states, and both of these cultures are distinct from the characteristics of rural life in the Deep South or the West. Clearly, a “one-size-fits-all” approach to developing HIV/STD interventions is not a

realistic strategy for addressing the HIV/STD epidemic in multicultural rural America.

One approach to HIV prevention has involved the development and evaluation of behavioral interventions.⁶ In order to disseminate those behavioral interventions demonstrating efficacy, the Centers for Disease Control and Prevention (CDC) launched its Diffusion of Effective Behavioral Interventions (DEBI) website project to translate the protocols of effective evidence-based prevention interventions into packages of materials for implementation by HIV prevention community-based organizations (CBOs) and agencies.^{7,8} This essentially represents a *top-down* model of behavioral prevention. Although this model has some advantages, it also has weaknesses, including the long period of time it takes to move interventions from development to dissemination. Also, it is worth pointing out that none of the current 29 DEBI interventions were originally developed with rural populations.⁹

Another HIV prevention strategy involves a *bottom-up* approach. That is, researchers can partner with agencies to develop products that build the capacity of practitioners who are “on the ground” conducting HIV prevention activities. One specific area in which researchers can respond to rural practitioners’ needs is the development of web-based tools to assist providers with offering effective services within the constraints of limited budgets. A recent review of the state of health information technologies indicates that most electronic health resources have been developed for consumer rather than practitioner use.¹⁰ Therefore, despite the recognized advantages of web-based services in allowing for the development and distribution of targeted materials at low cost to many individual consumers,¹¹ by and large, the customization capabilities offered by web-based technologies have not been leveraged for the benefit of practitioners. The only web-based tools for practitioners are designed for electronic health record-keeping, training and networking purposes¹⁰ rather than for helping practitioners produce health promotion materials. Examples of web-based training

resources for practitioners can be found in the areas of eating disorder prevention,¹² substance abuse prevention,¹³ and acute and critical care nursing;¹⁴ an example of a social networking site developed for specialists can be found in the STD prevention area.¹⁵

PURPOSE

Toward the objective of collaborating with rural practitioners to develop tools to assist them in their HIV/STD prevention work, several of the authors made contact with directors of HIV prevention services in 20 predominately rural states. We asked them to describe the availability of HIV prevention materials targeted to rural residents of their states. Without exception, none of the directors reported offering such materials. The directors indicated that typically, states purchase generic, one-size-fits-all HIV prevention materials from national vendors such as ETR or Journeyworks. Directors also explained that development of local materials can be quite labor-intensive and time-consuming. Perhaps most importantly, we learned that states typically had little incentive to develop HIV prevention materials targeted to rural residents, simply as the result of competing priorities in the context of very low annual reported incidence of HIV infection in rural areas. This point was less salient to the directors, however, after discussing that targeting HIV prevention materials to rural residents is not generally considered a priority in terms of national-level research and programming.

To address this need for HIV prevention posters targeted to rural residents, the authors partnered with the Office of Research and Instructional Technology at the University of Kentucky’s Department of Communication to lead the Rural Center for AIDS/STD Prevention’s (RCAP) development of a web-based service called Project CREATE. Project CREATE provides rural health educators, prevention specialists and program coordinators with the ability to select customized photos, taglines and applicable statistics in order to design targeted prevention posters to reach persons at risk for HIV/STDs in their areas of rural



America. Project CREATE allows practitioners to design targeted promotional posters toward the goal of raising awareness among hard-to-reach rural populations of the HIV/STD prevention and treatment agencies and CBOs in their areas.

Because Project CREATE is web-based, practitioners can instantly access the tool anywhere in rural America. Furthermore, this web-based poster-creation tool represents an emerging technology for practitioners involved in any area of public health promotion, not just HIV/STD prevention. The Project CREATE model for developing web-based tools to create promotional materials in close coordination with practitioners could be applied to any health promotion effort involving the use of printed posters, from anti-smoking and dieting/exercise to vaccination and mammography. By describing the development of the poster-making tool, we hope to share lessons learned from the process of creating Project CREATE that will benefit other researchers, practitioners and technical developers in their collaborations to design similar web-based resources for further public health promotion efforts.

METHODS

The goal of developing the Project CREATE website prototype was to allow users to target specific rural audiences with their poster designs. Targeting refers to the approach of designing messages aimed at reaching clearly defined sub-groups of a population based on the shared characteristics of group members.¹⁶ A recent meta-analysis⁶ found that interventions were most effective when practitioners focused on a well-defined target population, or what is known as an "audience segment."

Consistent with the social marketing approach to health promotion, customized messages are perceived by members of the audience segments to which they are targeted as more relevant than generic messages, and therefore, customized messages are more likely to inspire behavioral change than generic messages.¹⁷⁻¹⁹ Developing targeted health promotion materials can

be seen as even more crucial for reaching rural populations affected by HIV/AIDS and STDs, as these individuals are typically members of underserved "double minority" groups who may not identify with generic messages that are not targeted to address their specific needs and concerns.

Targeting is distinct from tailoring health messages, which involves individualizing messages to one specific person based on attributes related to the health behavior measured using an individual assessment.²⁰ Although tailored print health behavior change interventions can be more effective than other types of messages in formats such as pamphlets, newsletters and manuals/booklets,²⁰ posters designed to be placed in public locations must, by necessity, attract the attention of more than one individual and engage a targeted group with their messages. Therefore, targeting allows health educators to employ the persuasive advantages of segmented over generic messaging while maintaining a broader appeal than posters tailored to a specific individual might.

The site provides three levels of targeting based on the type of STD users are seeking to prevent, the at-risk group they are trying to reach, and the racial composition of the group. In order to tell the website which audience they are targeting, users answer the following questions after logging on:

- Would you like to develop prevention materials for STDs or specifically for HIV? (Select STDs or HIV).

- Now, choose the group you are trying to reach with your materials. (Select men who have sex with men, heterosexuals, injection drug users, or youth).

- Now, choose the racial or ethnic group you are trying to reach with your materials. (Select white/Caucasian, black/African American, or Hispanic/Latino).

After the target audience has been specified, the user is offered a set of images, taglines and statistics relevant to his or her audience segment from which to choose. As users select images, taglines and statistics, the site generates a preview of a poster using the items they have selected. These images and taglines are automatically placed on a poster, which can then be saved to the user's account and reviewed at a later time. Users can continue creating and saving posters until they determine which poster(s) they would like to produce.

By working with this website, practitioners can avoid expending undue effort to acquire resources for creating targeted prevention materials, which may preclude them from using targeted materials in the first place. The Project CREATE team quickly discovered how the effort to acquire these resources

Figure 1. Screen Capture of the Poster Design and Preview Page of the Website

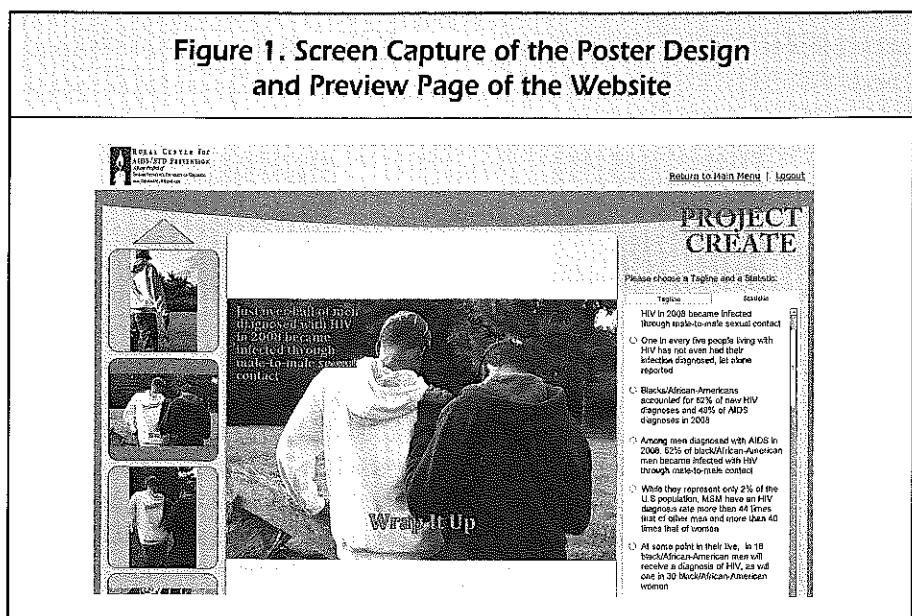
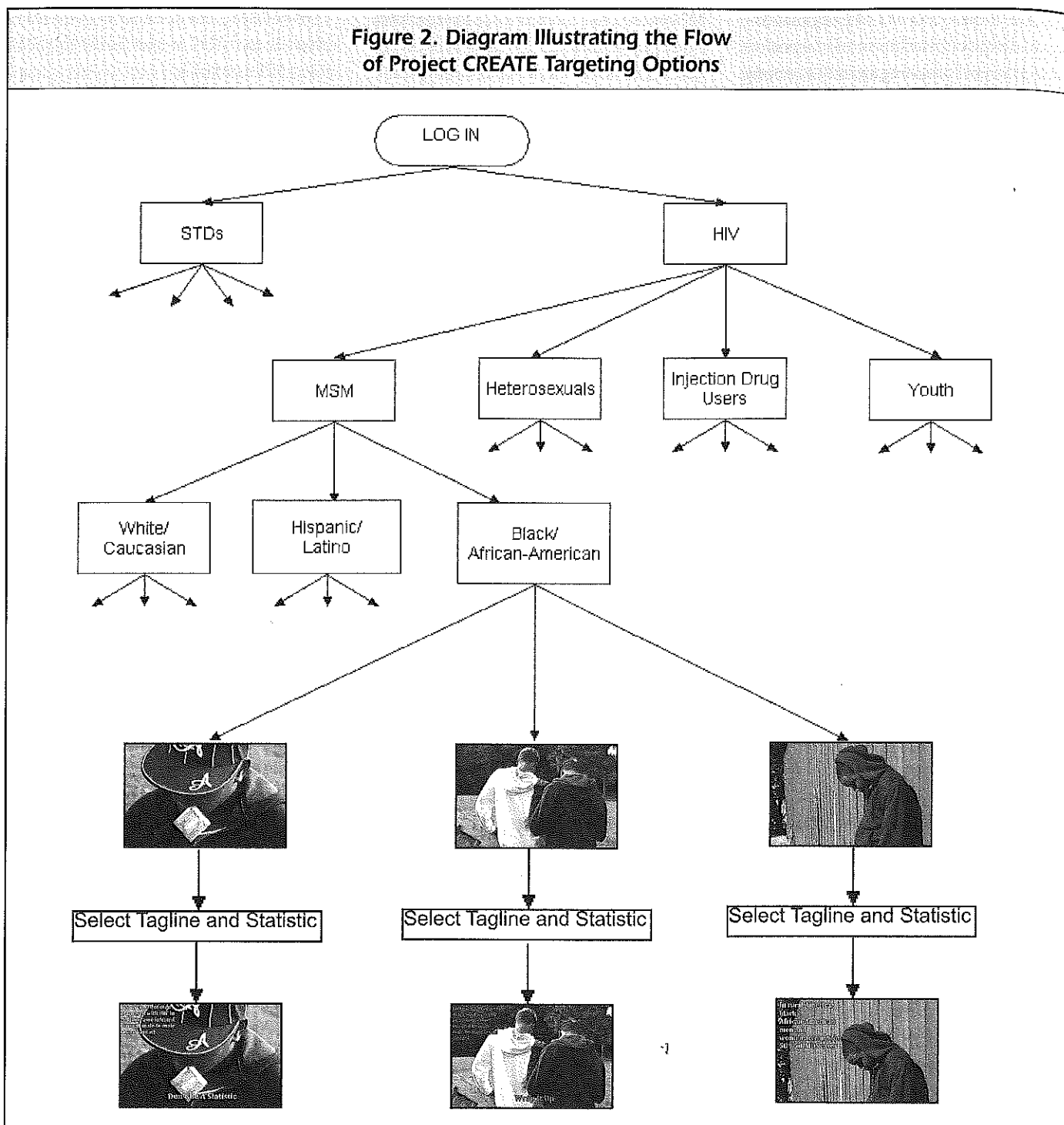




Figure 2. Diagram Illustrating the Flow of Project CREATE Targeting Options



could present a formidable barrier for practitioners, as each of the three components of the customizable posters (the images, the statistics and the taglines) involved significant amounts of formative work.

Initially, the team encountered substantial difficulty in finding images that were not copyright-protected and were designated as

within the public domain; additionally, the images the team found that met these criteria typically did not depict facets of rural life that would appeal to the target audiences of Project CREATE's users. Considering that we could not simply use existing stock photography, the team decided to generate our own photographs to supply Project

CREATE's database of images. Working with two volunteer photographers who were incentivized to participate by the opportunity to include the resulting photography in their portfolios, we recruited "models" from each racial group represented in the website prototype and set up photo shoots at rural, pastoral locations.



One of these recruitment efforts involved partnering with a local modeling agency to enlist volunteer models, who participated in the photo shoot with the incentive that they could add the photos to their modeling portfolios. As the result of the three photo shoots, Project CREATE was furnished with a database of images that became property of RCAP, allowing users to incorporate any of these images into their poster designs without proprietary restrictions.

Developing the statistics and taglines was a somewhat less-involved process than generating the images. Relevant statistics for each combination of target audience variables (e.g., targeting white/Caucasian youth with STD prevention messages, targeting Hispanic/Latino heterosexuals with HIV prevention messages) were compiled using the most current statistical information provided by the CDC. Taglines were developed by soliciting the input of many rural HIV/STD prevention professionals and researchers who were members of the RCAP listserv. The Project CREATE team then edited the taglines and matched them to the appropriate target audiences.

Once all of the poster elements were prepared, the partnership between the researchers and the technical development team of the Office of Research and Instructional Technology at the University of Kentucky's Department of Communication became crucial. The technical development team transformed the raw materials (images, statistics and taglines) into the web-based product following the logic illustrated in Figure 2. After creating elements of the website, the technical group tested the function and flow of the website internally and then turned it over to the researchers in what became an iterative process of development, troubleshooting and refinement. As the research team located errors and bugs, we reported them back to the technical team for revision and further testing. The lead author systematically tested every possible combination of target audience variables to ensure that the programming logic generated the appropriate images, statistics and taglines, and worked with the technical team to place

the text fields for the taglines and statistics on each image. This iterative internal testing process also involved the continual refinement of the website's flow to incorporate user account data stored in Filemaker© Pro 10 with the web-based programming so that users could save and ultimately produce the posters they created.

The final phase of the prototype development involved pilot testing the website with a select group of public health professionals who work on HIV/STD prevention issues in rural areas of the United States. The pilot testers included 12 health educators, prevention specialists, program coordinators and directors of state and local health departments as well as CBOs in rural areas of Nebraska, Colorado, Alabama, Idaho, Alaska, Tennessee, Maine and Ohio. Bringing in a small, targeted group of external testers to evaluate a website prototype is common practice among technical developers. The goal of this pilot test and the data it gathered was not to generate statistically significant results regarding reactions to the website, but rather to elicit feedback from a specific group of individuals who are characteristic of the target audience for the website prior to investing additional time and resources into making Project CREATE available to the entire community of rural providers.

Therefore, the research team's objectives in developing the assessment tool were to determine whether pilot testers were representative of the target website user in terms of their organizations' health promotion goals and their positions within the organization as well as to evaluate the utility and relevance of the website to pilot testers' daily work in HIV/STD prevention.

The research team brainstormed questions for the assessment tool by envisioning how practitioners might use the website and designing questions that would solicit feedback from testers about the utility of each feature of the website, from its overall appearance and navigability to the customization options for photos, taglines and statistics. In addition to questions with quantitative, Likert-type scale options about the relevance of the website to testers' pre-








vention efforts and the frequency with which the testers thought they might use the website, the assessment tool included questions eliciting qualitative, open-ended responses to offer suggestions for improvement. Prior to the launch of the pilot test, the assessment tool was tested by a small group of graduate students who were unaffiliated with the project to ensure that both the instructions for pilot-testing the site and the assessment questions were clear.

RESULTS

In order to invite pilot testers to evaluate the site, the Project CREATE team initially contacted approximately 20 members of the target audience (rural practitioners) via e-mail and sent several reminder e-mails. The pilot testers invited were selected because they are representative in terms of practitioners from different states as well as practitioners working in differing prevention contexts. The technical team created a username and password that allowed each pilot tester to log into the website and follow the directions on the site to create a few posters using the poster-making tool. After completing the assessment survey, pilot testers could then review all of the posters they had created, select their favorite posters and order a printed copy of that poster as an incentive to participate in the pilot test.

Of those invited to participate, 12/20 (60%) agreed to pilot test the website. HIV/STD prevention outreach was a central focus of each of the organizations that these 12 pilot testers represented; 11 of the 12 rural providers ranked HIV/STD prevention activities as a "very high" priority within their organizations, and the final tester ranked prevention activities as a "high" priority. Similarly, 10 pilot testers indicated that their organizations do either "a lot" (a 4 on a 5-point Likert scale) or "very much" (a 5 on a 5-point Likert scale) HIV/STD prevention outreach, with three testers selecting the "a lot" response and seven testers selecting the "very much" response. Therefore, this group of pilot testers represents the target audience that Project CREATE attempts to serve: rural public health practitioners engaged in HIV/

Figure 3. Responses to the Question "Where Would you Place the Posters that you Created Using this Website?" (Check all that apply)

#	Answer	Bar	Response	%
1	In clinics		9	75%
2	In schools		4	33%
3	In bars		9	75%
4	In adult bookstores		5	42%
5	Out in the community		11	92%
6	On your organization's premises		10	83%
7	Other locations		5	42%
Other locations				
Churches				
Pride rallies, CBOs				
Substance Abuse Programs				
Truck stops, community based orgs, coffe shops, off site testing locations, bus terminal				
Rehab facilities				

STD prevention activities and outreach.

Overwhelmingly, the pilot testers conveyed that Project CREATE offered a valuable service to rural HIV/STD prevention providers. The assessment data are very positive, as can be seen in Table 1. For each question, the numbers reported are those answering a "4" or "5" on a 5-point Likert scale for each item.

Pilot testers also provided information about the ways in which they envisioned using the Project CREATE service. Four of the 12 pilot testers indicated that they would use the website on a weekly or monthly basis, and eight of the participants said that they would use the website either quarterly or bi-annually. The participants also indicated that their organizations would be able to use the posters created with the website in a variety of locations, as shown in Figure 3.

DISCUSSION

In addition to providing quantitative data regarding these closed-ended questions, participants also provided qualitative feedback on specific dimensions of the website. The most important qualitative feedback from testers that the research team employed to

refine the website design was the addition of a function to customize the contact information provided on the posters, allowing users to manually enter the name, address, phone number, website and other information for their organization on their posters.

Other qualitative feedback from pilot testers provided suggestions regarding the overall appearance of the site; the options for customizing the poster; tagline, image and statistics options; and options for saving and viewing posters. For example, one pilot tester indicated an interest in having taglines in Spanish available, and another expressed a desire to be able to customize posters for transgendered populations. Several testers voiced preferences about additional racial groups to whom they would like to be able to target posters, including Asian Americans and American Indians. Many of these recommendations will be incorporated into the website as additional funding provides for further development.

After its initial development and testing on a University of Kentucky server as the first step in the creation of this RCAP service, the Project CREATE website was transferred to a server at Indiana University where RCAP is

headquartered and linked off RCAP's main website (<http://www.indiana.edu/~aids>). RCAP hosts the site and will update the taglines, statistics and photos periodically based on feedback from users. Users will be able to generate production-ready PDF files of their created posters, which they will use to print their posters themselves.

The preceding discussion highlighted important development principles for Project CREATE that can benefit researchers as they collaborate with practitioners and technical developers to design similar web-based resources for other public health promotion efforts. To summarize, these principles included:

- Designing resources that fulfill practitioners' expressed health promotion needs.
- Providing practitioners with tools to target promotional efforts to at-risk populations in their areas of the U.S. based on demographic factors.
- Allocating sufficient time and energy to formative work to generate website components such as images, taglines and statistics.
- Conducting internal testing of the website prototype with the project team.

**Table 1. Assessment data for Project CREATE, N = 12**

Item	%	n	Responses (4 or 5)
How helpful would the images, taglines, and statistics provided by this website be in reaching your target population(s)?	92	11	"Helpful" or "Very helpful"
How relevant would this website resource be to the HIV/STD prevention efforts of your organization?	92	11	"Relevant" or "Very relevant"
Would you recommend the use of Project CREATE to others, such as colleagues who you work with?	100	12	"Probably" or "Definitely"
Overall, how much did you like the Project CREATE website?	92	11	"A lot" or "Very much"
How do you rate the overall appearance of the site (e.g., layout, colors, etc.)?	84	10	"Satisfied" or "Very satisfied"
How do you rate the ease of navigating through the site?	92	11	"Satisfied" or "Very satisfied"
Assessment data for Project CREATE, N = 12.			

- Conducting external testing with a targeted group of pilot testers who are representative of the target audience who would make use of the tool.

- Incorporating both quantitative and qualitative responses into assessment surveys completed by pilot testers to facilitate iterative prototype refinements.

TRANSLATION TO HEALTH EDUCATION PRACTICE

Because software and application development for health promotion efforts requires close coordination between researchers and technical developers, we will conclude this discussion by providing recommendations for best practices in maintaining productive relationships between developers and researchers. These four best practices were formulated through a reflective conversation between the researchers and technical developers involved with Project CREATE.

1. Both researchers and technical developers should demonstrate mutual respect and understanding of each other's respective areas of expertise and the limitations thereof.

To build synergy and a sense of common purpose between technical developers and

researchers, each team member should approach the project with a sense of respect for the unique expertise of their counterparts. Both researchers and technical developers may be sensitive about feeling respected for what they know and defensive about what they do not know.

Each team member should seek never to apologize for what he or she does not know about other team members' areas of expertise and should strive to feel comfortable asking for guidance. For example, a researcher should be able to tell a technical developer, "I don't have a clue about how to design the website logic. That's why I'm so glad to have you on the team." Productive, successful relationships result from mutual respect of team members' abilities and knowledge and a willingness to ask for help when reaching the limits of one's expertise.

2. Researchers should dream big but accept limitations to developers' technological capabilities, timelines and resources.

Vital to the success of any creative endeavor is the team's enthusiasm to explore new possibilities and dream big to achieve the goals of the project. However, these big dreams on the part of researchers must be tempered with a readiness to accept the

bounds of feasibility from a technical perspective. For example, rather than a researcher approaching a developer with a request and saying, "I don't care what's possible or not. Just do it!" or "There has to be a way to do it," a researcher can phrase the request by asking "Is this possible?" Therefore, in terms of communication dynamics, it is important that researchers approach technical developers with requests in a way that conveys that the tasks requested might be outlandish or downright impossible to complete.

3. Researchers should cultivate a detail-oriented mentality that allows for adequate lead time for the team members to do their jobs.

In technical development, the devil is in the details, so it is crucial that researchers present technical developers with fully formed ideas and expectations so that they can allocate appropriate time and resources to attending to the detail-oriented work inherent to technical development.

If the developers' scope of work for the project is constantly shifting based on continual revision of objectives by researchers, then developers do not have sufficient time to work at a reasonable, thorough pace and test their work. For example, after establish-



ing the scope of the project, the researchers often sit idle and begin considering new ideas that dramatically expand the scope of work without realizing that each additional request increases the amount of time the development team will need to create and test the website components. Researchers should be open to communication with developers about whether the timelines they have associated with completing tasks are realistic for developers to execute given limited time and resources.

4. Researchers should make appropriate use of communication technology and shared work environments in their work with technical developers.

One strategy for improving communication about project details and shifting timelines is to use communication technology effectively. Often, researchers fail to recognize that developers operate in different software programs than they do. Unlike with Word documents that can be continually edited up to the moment of printing, database and software development files cannot be easily modified minutes before a pilot test launch; to do so would be like an architect approaching a construction engineer six months into a house construction project to bring the engineer an entirely new set of blueprints for construction. Researchers and developers can avoid conflicts related to software platforms by operating in a shared work environment, such as setting up a Filemaker® Pro database that both researchers and developers can access and revise in the same format, akin to a "cloud" environment that allows for simultaneous editing.

Another tactic for using communication technology more effectively is to be considerate about when it is necessary to meet in person and when e-mail communication is more appropriate. For example, at the beginning of a project, it is important to meet in person with the entire research and developer team to brainstorm and establish respectful rapport. E-mail is a perfectly suitable and efficient means for exchanging information about the project once the mutually respectful tone of the working relationships has been established. The ex-

ception is emotionally charged situations in which the lack of nonverbal cues and tone inherent to e-mail exchanges can potentially cause miscommunication.

In conclusion, although web-based health promotion tools can be challenging to develop, the investment of time and resources is well worth the effort, as these web-based services can allow public health practitioners across the country to access valuable tools for creating effective, targeted promotional materials for use in their communities. By offering the lessons learned from the creation of Project CREATE, we hope that future collaborations between researchers, technical developers and practitioners will be enhanced and result in the development of additional web-based tools that respond to the needs of public health providers and their communities.

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