Implementation of a Diabetes Education Kiosk in a Low-Income Clinical Setting: A Community Implementation Process

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The rapid rise in rates of diabetes among the U.S. population[1] underscores the crucial need for assistance in everyday self-management of chronic illness.[2,3] Yet, a major gap exists in the dissemination and implementation of research findings on *1*) the extent to which communities are aware of best practice guidelines for diabetes prevention and management and *2*) strategies for assisting communities in adopting identified best practices.[4] A community needs assessment of key stakeholders in central Texas revealed a need for diabetes patient education in low-literacy rural communities because of residents' limited access to trained educators for diabetes self-management.[5]

In an effort to address the double challenges of limited access to health care providers (HCPs) and insufficient educational materials for disadvantaged, at-risk populations, the Diabetes Prevention and Management Program (DPMP) at the Center for Community Health Development[6] developed a low-literacy, touch-screen computer module, the Diabetes Education Kiosk (DEK). The DEK is a form of interactive behavior-change technology (IBCT) designed to encourage healthy behavior changes by motivating patients to be more independent and improve their self-management with little or no assistance from their HCPs.[7] IBCT can also improve communication between patients and health care teams by facilitating clinicians' review of patients' status and guiding delivery of educational messages.[8] IBCTs include the use of hardware and software to promote and sustain behavior changes. Examples include e-mail messages, patient-centered websites, personal digital assistants, DVDs, smartphone and iPad applications, voice-response or automated phone calls, and touch-screen kiosks. Touch-screen kiosks or monitors have been used effectively for health education and other medical purposes.[9–12]

This article describes the pilot implementation of a computer-based touch-screen diabetes educational training tool in a central Texas family medicine residency training clinical setting that serves predominantly low-income and low-literacy patient populations. Specifically, the article *1*) describes the development of and implementation process for the DEK and *2*) identifies best practices for implementation in low-income clinical settings. Examination of the implementation process aids in identifying factors contributing to its success in reaching the community with valuable diabetes health information.

Design and Methods

DEK description

Combining evidence-based diabetes management information with behavior-change principles,[13] the DEK is a bilingual (Spanish and English) touch-screen computer education program with multiple self-management modules designed for underserved populations, with a special focus on those with low literacy. A user-friendly multimedia approach for improving patient adherence to diabetes self-management behaviors was developed after collecting interdisciplinary input and contributions regarding crucial

information that should be included in a diabetes kiosk implemented in clinical settings in the pilot region.[6] After several reviews by HCPs, the DEK was launched.

The touch-screen kiosk offers users modules on six different topics, presented in their preferred language (Spanish or English). Module 1 (What is Diabetes?) addresses the different types of diabetes, causes, risk factors, prevention, and signs and symptoms. Module 2 (Diabetes Care) discusses ways in which people can care for their diabetes such as by eating a healthful diet, taking medications, balancing emotions and stress, and addressing depression symptoms. Module 3 (Diabetes Prevention) focuses on prevention measures, including steps to a healthier life, healthful eating, and physical activity. Module 4 (Things to Do Every Day) addresses daily self-care behaviors such as maintaining personal hygiene, taking medications, setting goals, paying attention to food portion sizes, and taking steps to prevent potential complications. Module 5 (A Message From Your Doctor) provides an opportunity to customize the DEK to local settings with a message from a trusted source (e.g., a message from a local HCP about diabetes resources, including self-management programs available for a specific community). Module 6 (Goals) is a distinctive section through which participants can set specific goals tailored to what they feel they will be able to accomplish to prevent or manage diabetes. The goals section allows participants to set goals and take straightforward action steps to reach those goals.

The six modules are presented on a screen offering text written at a fifth-grade reading level. For those who might have difficulty even at that level, the text is accompanied by a video and audio recording that provides participants with additional information.

Translation process

DEK modules were translated to Spanish and reviewed by two additional bilingual Spanish speakers. The Spanish translation functions analogous to the English version, including diabetes information, images, and goal-setting capabilities. Translating DEK modules into Spanish was necessary to reach the vast number of Spanish-speaking individuals who receive clinic services at the implementation site.

The research plan intentionally incorporated native Spanish speakers into the research team. The translation process involved several steps, including reviews, back-translation of specific terms, and adaptation to phrases and terms that are generally understood by the majority of Spanish-speaking individuals. In addition to using appropriate terminology within the DEK, the team found it necessary to change some of the images to make the Spanish DEK culturally appropriate. The images were modified to include individuals with Latino/Latina features and some traditional cuisine. A native Spanish speaker recorded the video and audio for fluency of presentation.

Site selection and implementation

As part of the implementation process, the team first conducted a community environmental scan. A standard form was used to assess community locations that were under consideration as potential implementation sites. Before selecting a site, a graduate assistant visited different locations and met with at least one key stakeholder within the clinical setting to obtain feedback regarding optimal DEK placement within the setting.

Comparisons were made between various community settings and, after an initial review, project leaders implemented the DEK at the Texas A&M Family Medicine Residency (TAMFMR) clinic in Bryan, Texas. The TAMFMR site was chosen for its convenient location, number of patients seen on a daily basis, high percentage of low-income and uninsured patients, flexibility of operation (same-day appointments available), Spanish-speaking staff, and affiliation with the university. The TAMFMR was ideal for its capacity to expose residents in training to the diabetes technology, as well as to provide practicum opportunities for graduate students in public health training. The close association with Texas A&M University was seen as beneficial because staff were likely to be more familiar with and inclined to support the research aspects of the project.

Once the site was selected, DEK and clinic staff met to carry out a clinic environmental scan to evaluate the physical layout of the facility and to observe standard practices, patient flow, and other daily clinic routines. The environmental scan revealed three locations within the clinic where the DEK could be placed. The first was in the main lobby leading to the clinic. The lobby appeared to be an optimal location given that the DEK would be in a high-traffic area in which patients could use the device while waiting to see their HCP. The second location was a side hall used by patients during certain times of the year (i.e., babies during flu season) but which was narrow and lacked electrical outlets. The third possible location was a conference room separate from the patient waiting area, which had little traffic and was used occasionally for support group meetings. The conference room was not considered an ideal location because of its remote location from the patient waiting area. The team decided that placing the DEK in close proximity to the waiting area was crucial to prevent patients who used it from possibly missing their name being called and thus delaying clinic appointments.

This environmental scan of the clinic also revealed some potential obstacles, including limited availability of electrical outlets, the need for headphones to maintain user confidentiality in the busy lobby area, and a lack of readily available staff for users who may need help with the kiosk. The environmental scan, along with feedback from clinic staff, revealed useful information that *1*) allowed the team to determine that the family medicine residency clinic was an optimal location for the first implementation of the DEK and *2*) assisted in the selection of the lobby as a prime location within the clinic.

Participant recruitment

The population targeted to use the DEK were individuals ≥ 18 years

of age who are at risk for or had been diagnosed with diabetes. Participants were recruited through multiple methods. Clinic staff (e.g., front office workers, doctors, and nurses) were asked to refer appropriate patients to the DEK to learn more about diabetes prevention and self-management. Clinic staff made referrals by identifying patients at risk for or diagnosed with type 2 diabetes based on patients' medical history or reason for clinic visit. DEK staff members also sat in the lobby and invited patients to use the DEK while waiting to see their HCPs. Posters advertising the DEK were affixed to the walls in strategic locations within the waiting area where participants were most likely to view them. The signs invited individuals to learn more about diabetes prevention and management. Importantly, two different recruitment signs were developed for this project. Clinic staff considered the initial sign to be too research oriented (i.e., too impersonal and having too much text). Following their recommendations, the project team modified the posters to be more pleasing to the eye, less research oriented, and more personally appealing. Finally, participants could self-refer to the DEK based on their curiosity or interest in the topic while waiting to see their HCP. Typically, individuals occupy themselves in a clinic waiting room by reading magazines or pamphlets or watching informational videos or TV. Learning about diabetes by using the DEK provided an alternative means of positively occupying waiting patients.

Data collection

Data to evaluate the DEK implementation process and kiosk usage were collected via DEK staff observation, feedback from clinic staff, feedback from participants (i.e., questionnaires), and an electronic data collection feature embedded in the DEK software.

DEK staff observation. A DEK staff member integrated herself into the clinical setting and observed and recorded the use of the kiosk during five 3-hour site visits. The first two visits involved "fly on the wall" observation and did not interrupt the usual clinic routine. The last three visits involved approaching individuals and asking them to use the DEK and provide feedback on their experience. Observations were recorded using a DEK observation form focusing on factors such as the number of people in the waiting area, the number of individuals and time spent using the DEK, technical observations (i.e., whether the DEK was functioning properly), proper placement of promotional posters, and clinic staff participation in referring patients.

Clinic staff feedback. Clinic staff were interviewed during the environmental scan to determine the best location in which to place the DEK. Clinic staff feedback was additionally requested during the implementation process to determine changes that needed to occur to facilitate success. The team also depended on clinic staff to notify DEK staff in the event of technical problems with the kiosk or its printer. Such notifications came from front-office staff members who were in a position to observe the waiting area.

Participant feedback. Individuals waiting to see their HCP or waiting for a family member to see an HCP were invited to use the DEK. After using it, they were encouraged to complete a questionnaire (available in Spanish and English) evaluating their experience. The questionnaire asked participants to rate items such as, "The Diabetes Education Kiosk is easy to use" and "I found the Diabetes Education Kiosk useful." The DEK team observer was available to answer questions and assist respondents.

Electronic data collection. The DEK was programmed to collect user data after obtaining participant consent. Participants had the option of using the DEK with or without the data collection feature. For those who consented to data collection, the DEK's embedded programming collected user data such as pages visited, length of time viewing each module, goal-setting activity, and repeat visits.

The DEK project received approval through the Texas A&M University institutional review board.

Project Results

During a 3-month trial period, the following data were collected and analyzed.

DEK staff observations

During five observation visits, a total of 121 patients were waiting to be seen by medical staff. During the first two visits, the DEK staff member observed without interfering or taking an active role in the clinic's daily functions. During the third and fourth visits, the observer approached patients and invited them to use the kiosk. During the final visit, the observer noticed technical difficulties with the kiosk and was unable to recruit patients to use it.

Potential weaknesses and barriers. During the five site visits, the observer identified several factors that potentially limited more robust use of the kiosk. Initially, posters promoting the DEK were not sufficiently visible to patients. To remedy this, DEK staff, in consultation with clinic staff, modified the posters and strategically placed them in high-visibility areas. A second factor included lack of DEK visibility within the waiting room; the DEK appeared to blend inconspicuously into the clinic décor. Many patients seemed to not notice or be interested in the kiosk, perhaps glancing at it and then moving away. Furthermore, to maintain confidentiality, the kiosk monitor was placed so that other patients could not see a user's responses; this further decreased the visibility of the DEK. Finally, the observer noted limited waiting time among patients in the waiting room. During the observation period, there were > 100 potential kiosk users; however, their waiting time was limited to about 10–15 minutes. For individuals who were able to use the kiosk, this amount of time allowed for viewing of only one or two modules.

Participant feedback

During pilot testing, a total of 10 surveys were collected by clinic staff and the DEK staff observer as one strategy for assessing patient acceptability and satisfaction. Nine of the 10 participants found the DEK to be

helpful, with one indicating it was not helpful, indicating that he or she was well informed about diabetes. In terms of difficulty of use, nine individuals did not find it difficult to use, and one did not provide an answer. When asked if the DEK would help them take care of their diabetes better, five reported yes and stated that it gave them information about exercise and diet, was easy, and provided guidance one step at a time. One person indicated that it would not help because they were already knowledgeable, and four did not respond to the question. Participants reported technical difficulties when asked what they found difficult or not helpful about the DEK. Technical difficulties included not being able to use back buttons or to go to a certain section within the program. Other users affirmed that the DEK was helpful. Finally, when asked about what other information the DEK could have provided that would have been helpful, participants responded that the program covered everything and told them everything they needed to know about diabetes.

It is worth noting that some individuals declined to participate. Reasons for lack of participation included statements such as, "Diabetes is for fat people," "I don't feel like going over there and listening to it," and "I don't care about diabetes." Some simply did not provide an explanation for not wanting to participate.

Electronic data collection

During the study period, a total of 180 individuals used the DEK while waiting for their clinic appointment to begin. Only three individuals used the DEK more than once in the 3-month period. The average age of participants was 38 years, with a range of 18–86 years. It should be noted that some participants entered birth years ranging from 1990 to 2008, and 29 age responses were not viewed as legitimate.

Overall, 81 users allowed us to track their use of the DEK. Sessions lasted an average of 6 minutes, with an average of 38 page views per user. Within the goals section of the DEK, ~ 94% of participants (76 of 81) set goals during their interaction. Users

Table 1. Specific Goals Set by DEK Users (*n* = 81)

Goal	Total
Goal Category 1: Eat more healthy foods	54
I will eat regularly during the day	14
I will not eat fried foods	10
I will eat more fruits and vegetables	18
I will eat less fat and sugar	12
Goal Category 2: Be active for 30 minutes most days	22
I will take a walk	6
I will walk the dog	6
I will mow the yard	6
I will clean the house	4
Goal Category 3: Take your medicines	18
I will keep a list of my medicines	4
I will check off when I take my medicines	4
I will use a reminder system to help me keep track of my medications	6
I will tell my doctor if I am having trouble with my medications	4
Goal Category 4: Check your blood sugar every day and write the number in your diary	14
I will write down my blood sugar at least 1 time a day	2
I will take my blood sugar every morning	6
I will take my blood sugar every evening	6
Goal Category 5: Check your feet every day for cuts, blisters, sores, swelling, redness, or sore toenails	12
I will look at my feet every morning	8
I will look at my feet every night	2
I will look at my feet every time I bathe	2
Goal Category 6: Brush and floss your teeth every day	26
I will brush and floss my teeth every morning	8
I will brush and floss my teeth every day after lunch	6
I will brush and floss my teeth before I go to bed	12
Goal Category 7: Control your blood pressure and cholesterol	8
I will eat less fat	2
I will eat more fruit and vegetables	2
I will be active for 30 minutes most days	2
I will take my medicine	2

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Table 1. Specific Goals Set by DEK Users (*n* = 81), *continued from p. 284*

Goal Category 8: Quit smoking	40
I will not smoke after dinner every day	8
I will not smoke in the car	8
I will not smoke inside the house	10
I will not buy cigarettes	10
I will enroll in a quit-smoking class	4

were able to select up to eight goals under the following categories: *1*) eat more healthy foods; *2*) be active for 30 minutes most days; *3*) take your medicines; *4*) check your blood sugar every day and write the number in your diary; *5*) check your feet every day for cuts, blisters, sores, swelling, redness, or sore toenails; *6*) brush and floss your teeth every day; *7*) control your blood pressure and cholesterol; and *8*) quit smoking.

Under each goal category, participants were able to select specific goals (Table 1). A total of 194 individual goals were set, with eating healthier, brushing and flossing teeth, and quitting smoking being the main concerns for DEK users.

Lessons Learned and Changes to Implementation Protocol

Table 2 highlights the lessons learned from the pilot test and recommended protocol changes for enhancing successful implementation of a new technology in a clinical setting. Building on the importance of a community-based participatory approach (CBPR), the DEK team used several CBPR strategies, including conducting initial assessments of the need for the new technology, making site visits to the implementation location, asking for feedback from office staff to identify potential complications, and seeking feedback from all parties associated with the project.[14] Nonetheless, the team still encountered some challenges.

Although the signs advertising the kiosk were visible, they did not seem to entice patients enough to use the kiosk. Participants mentioned that the signs blended into the front office décor and thus became "just another sign" to read. Additionally, the kiosk appearance blended into the clinic, which may have decreased its ability to attract more users. This

Table 2. Lessons Learned in the Implementation Process

Lessons Learned	Recommendation
A community-based participatory approach was helpful in the implementation process of the DEK, enabling the research team to identify an appropriate clinical setting, prime placement within the clinical setting, and necessary changes to the process.	Undertake a community-based participatory approach when implementing a DEK within a clinical community setting.
Promotion materials are important to enhance DEK use.	Develop promotional materials that are easy to read, pleasing to the eye, and inviting. For example, text should be written at an appropriate reading level for the target population, and the materials should have uncluttered text and images.
The visibility/placement of the DEK can affect its use.	The structure and encasing of the DEK should be considered. The encasing of the computer module should make it distinguishable from clinical décor. The structure of the kiosk, its color, and its external appearance should be developed to ensure that it does not blend into the setting and is inviting to potential users.
Computer and technical problems will arise in the introduction of new technology in clinical settings.	Have easy-to-use technical troubleshooting materials available for the location office/clinical staff.
The DEK will need maintenance.	Assign an office or staff person to monitor the functionality of DEK.
DEK awareness and use by patients will not be automatic.	Engage office and clinic staff to increase patient referrals.
Clinic personnel need easy-to-use training materials.	Develop a memo of understanding and a quick-start guide.
Incentives may be necessary to boost data collection efforts.	Consider what types of patient or clinic incentives might be most effective based on office protocols and patient flows.

observation points to the importance of being aware of the influence of environmental factors as cues to behavioral action.

Moreover, computer technology troubleshooting was needed. It is speculated that the computer in the DEK caused difficulties by "freezing." Because the Spanish version had not yet been uploaded, the system "froze" when participants tried to access the Spanish version, thus hindering participants' further use of the kiosk. The computer had to be restarted for proper functioning; however, there were no clinic employees assigned to monitor the functionality of the DEK. Some front-line staff would call the team when they noticed difficulties, but others were not so inclined. Thus, having an assigned person to monitor functionality will be crucial to long-term success.

For future DEK implementations, we recommend developing a memorandum of understanding through which clinic staff will be assigned to particular tasks related to the kiosk, as well as providing a DEK quick-start guide offering information about how to use the kiosk. Tasks within the memorandum should include placing signs in a visible location to guide or refer patients to the kiosk, ensuring that that the kiosk is functioning properly, and, if any additional troubleshooting is needed, contacting the DEK project director. Examples of such written tools can be found online at http://www.sph.tamhsc.edu/hpm/diosk/index.html.

To address referral issues, project leaders met with clinic staff to devise new strategies to increase patient use of the DEK. In addition to comments about improving signage and DEK visibility, a staff incentive plan was recommended and implemented. This involved offering receptionists $25 gift cards for every 12 surveys collected from patients who were referred to the kiosk. Surprisingly, this strategy was not as successful as expected. One possible explanation is that receptionists and other staff were already overloaded with other clinic responsibilities and did not view this project as fitting into their assigned duties. Understanding the most effective ways to embed research elements into clinical practice requires an appreciation of clinic procedures and patient flows.

Community implementation process

The lessons learned through this pilot study are offered to others considering the implementation of similar educational technology or programs into either clinical or community settings. In this vein, we share our 10-step community implementation process in Table 3. As described in more detail in the table, the iterative steps that were crucial to implementing and evaluating this new technological intervention included *1*) conducting an environmental scan, *2*) selecting a clinic for implementation, *3*) appointing a clinic liaison, *4*) ascertaining the best location for placing the new tool in the clinic, *5*) installing the tool and encouraging clinic staff to use it, *6*) observing the use of the tool in the setting, *7*) reviewing usage data and engaging clinic staff in discussions to solve identified problems, *8*) making appropriate changes, *9*) observing

Table 3. DEK Community Implementation Process

Step 1	An environmental scan was conducted at several community settings to identify the location in which the DEK was most likely to be successful. Several clinics were compared within the Brazos Valley and Burleson County region.
Step 2	A clinical setting was identified to implement the DEK.
Step 3	Once the location was selected, staff from the Center for Community Health Development (CCHD) at the School of Rural Public Health at the Texas A&M Health Science Center identified key staff within the clinical setting who could serve as the liaison between the two locations and monitor the successful use of the DEK within their clinic.
Step 4	The optimal location for placement of the DEK within the clinic (i.e., the front lobby or hallway) was identified.
Step 5	The DEK was installed in the clinical setting. During this phase, physicians and clinic staff had the opportunity to use the kiosk.
Step 6	After the DEK was installed, CCHD staff observed patients' use of the DEK. The staff observer took a "fly on the wall" approach without interacting with participants or clinic operations.
Step 7	After reviewing the observations, CCHD staff consulted with the clinic liaison with regard to the limited use of the DEK and measures to take to increase its use.
Step 8	The team made appropriate changes based on observations and suggestions from the clinic liaison (i.e., change DEK recruitment signs to make them seem less research-oriented).
Step 9	After making the recommended changes, CCHD staff observed the DEK in the clinical setting and guided participants to use it.
Step 10	After making observations and guiding participants to use the DEK, staff identified further challenges and developed strategies to overcome them (e.g., providing incentives to front office staff to refer patients to use the DEK).

the effect of changes, and *10*) identifying remaining challenges and working with key stakeholders to develop strategies to overcome them as needed.

Conclusion

The DEK is a potentially valuable diabetes education tool for HCPs wishing to provide and disseminate diabetes self-management information in rural and low-income community settings, particularly when face-to-face patient educators are scarce. Effective strategies identified in this study will prove to be useful for future programs seeking to implement similar supplemental patient education tools.

The DEK pilot program was successful in several ways. Overall, participants appeared satisfied with the educational material provided in the kiosk. The material was easy to understand; did not require high literacy skills; allowed participants to set personal, detailed self-management and prevention goals; and was clinically appropriate and comprehensive in the information it provided. Thus, this study demonstrated the need for and value of the diabetes self-management education kiosk content and the viability of the technological means to disseminate this information. Pending further study about the impact of the DEK on patient outcomes, the computer module is a potentially valuable tool that can be used in community settings where limited diabetes self-management education and support resources are available.

Given the multitude of emerging communication and information technologies, we envision the DEK content being accessible through other modalities such mobile devices and mobile-enabled websites. There are also several potential scenarios in which the DEK could serve as a gateway to or follow-up of other educational efforts. For example, the DEK could include a rapid assessment of behaviors that could be shared with HCPs and diabetes educators to help tailor one-on-one counseling or identify the need for further follow-up. The goal-setting function of the DEK could trigger dissemination of a handout offering tips on topics such as exercise or tracking daily activity levels.

Several study weaknesses must be acknowledged. The pilot implementation process was only tested in one graduate residency clinic associated with a major university and thus may not be generalizable to other clinic settings. Given the focus on the implementation process, only limited patient outcome data were available. The computer program provided general material about patient goal-setting, but no patient clinical outcomes were collected. Additionally, very few patients completed surveys, which, in retrospect, is not surprising given the low education levels of the clinic population.

In future studies, several of these research limitations can be addressed by including other qualitative data-collection approaches such as focus groups, key informant interviews, or researcher-administered surveys to reduce literacy barriers and increase the number of completed surveys. Moreover, for enhanced generalizability, we recommend that the DEK be implemented and tested in multiple settings and that patient characteristics and feedback be more closely tracked to better target future implementations.

The DEK research staff did not compare the effectiveness of the kiosk to other educational modes of delivery (e.g., the provision of written or video materials, physician-provided behavioral counseling, education provided by a certified diabetes educator, or any of the rapidly proliferating evidence-based diabetes self-management class programs).[15] However, the intent of this study was to focus on strategies for improving the implementation of interactive behavioral change technologies that have been shown to be promising for imparting knowledge and changing behaviors.[16] These technologies should be seen as one part of the armamentarium of diabetes education approaches, with each approach ideally enhancing the educational experience and helping patients understand how to better manage their diabetes.

Lessons learned from user and clinic feedback provide for the following recommendations to enhance the successful implementation and sustainability of the DEK or related new technologies in clinical settings: *1*) early involvement of the health care community to identify community needs for self-management, *2*) identification of a clinic champion who can promote DEK familiarity among clinic staff, *3*) clinic-wide training on the DEK and the vital role of clinic staff in providing patient referrals and support, *5*) understanding of clinic operational procedures and patient flow, and *6*) willingness of all parties to engage in an iterative process to identify and overcome identified challenges and problems.

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References

[1]Centers for Disease Control and Prevention: Number (in millions) of civilian, noninstitutionalized persons with diagnosed diabetes, United States, 1980–2011. Available from http://www.cdc.gov/diabetes/statistics/prev/national/figpersons.htm. Accessed 3 March 2013

[2]Ory MG, DeFriese GH. *Self-Care in Later Life: Research, Program, and Policy Issues*. New York, Springer, 1998

[3]American Diabetes Association: Standards of medical care in diabetes—2014. *Diabetes Care* 37 (Suppl. 1):S14–S80, 2014

[4]Ory MG, Evashwick CJ, Glasgow RB, Sharkey JR, Browning CJ, Thomas SA: Pushing the boundaries of evidence-based research: enhancing the application and sustainability of health promotion programs in diverse populations. In *Behavioral Change: An Evidence-Based Handbook for Social and Public Health*. Browning C, Thomas S, Eds. Edinburgh, Scotland, Churchill Livingston, 2005, p. 267–293

[5]Hora K, Prochaska J, Bolin J, Ory MG: Lessons learned utilizing the CBPR model to address disease management guidelines in rural communities. *Texas Public Health J* 59:17–20, 2007

[6]Bolin J, Fulton D, Hora K, Martinez L, Prochaska J, Ory M: CBPR approaches to low-literacy diabetes education in rural areas: use of touch screen computer-assisted diabetes self-management education. *Texas Public Health J* 59:28–31, 2007

[7]Piette JD: Interactive behavior change technology to support diabetes self-management. *Diabetes Care* 30:2425–2432, 2007

[8]Flores G: Culture and the patient-physician relationship: achieving cultural competency in health care. *J Pediatr* 136:14–23, 2000

[9]Gerber BS, Brodsky IG, Lawless KA, Smolin LA, Arozullah AM, Smith EV, Berbaum ML, Heckerling PS, Eiser AR: Implementation and evaluation of a low-literacy diabetes education computer multimedia application. *Diabetes Care* 28:1574–1580, 2005

[10]Goldschmidt L, Goodrich GL: Development and evaluation of a point-of-care interactive patient education kiosk. *J Telemed Telecare* 10 (Suppl. 1):30–32, 2004

[11]Jossi F: Customer service: patients find a new age of conveniences in kiosks, portals and carts. *Healthc Inform* 22:31–33, 2005

[12]Peters J, Jackson M: Accessibility and use of touchscreens by black and ethnic minority groups in the three cities project. *Ethn Health* 10:199–211, 2005

[13]Ory MG, Jordan PJ, Bazzarre T: The behavior change consortium: setting the stage for a new century of health behavior-change research. *Health Educ Res* 17:500–511, 2002

[14]Ory MG, Bolin J: Celebrating community-based participatory research in Texas. *Texas Public Health J* 59:5–10, 2007

[15]Ory MG, Ahn S, Jiang L, Lorig K, Ritter P, Laurent D, Whitelaw N, Smith ML: National study of chronic disease self-management: six month outcome findings. *J Aging Health* 5:1258-1274, 2013

[16]Dickinson WP, Glasgow RE, Fisher L, Dickinson LM, Christensen SM, Estabrooks PA, Miller BF: Use of a website to accomplish health behavior change: if you build it, will they come? And will it work if they do? *Am Board Fam Med* 26:168–176, 2013

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