

Phase I Final Progress Report
1 R43 CA108345-01
Interactive Tobacco Cessation for College Students
Project Period: 08/01/2004 – 04/30/2005
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Summary of Specific Aims:

- Aim 1. Design an interactive tobacco cessation and education program that uses existing computer-based technologies to deliver a personalized and confidential risk assessment, motivational feedback and other informational content tailored to 18 – 24 year old college students. This program would incorporate input from health center medical staff and the target audience, and draw from the developers' extensive experience in the area of tobacco cessation and education and the creation of interactive programs.
- Aim 2. Develop an Alpha version prototype for a hybrid CD-ROM/Web site that analyzes input from the user to identify appropriate tobacco prevention and cessation messages, and presents all the necessary tobacco content elements, using dynamic media, including video, audio, animation, text, graphs and interactive programming.
- Aim 3. As part of the CD-ROM/Web site, create an online log-in system that registers users and collects pre- and post- assessments from the participants.
- Aim 4. Using data from the pre- and post- assessments, evaluate the efficacy and consumer satisfaction of the interactive program with 50 college students at a four-year public university and 50 students from a community college in Oregon, who are identified as tobacco users and offered the CD-ROM by a health care provider during their visit to the health center.

Phase I Final Report

Overview

The primary goal of the Phase I project was to develop a prototype program and evaluate the program for usability, consumer satisfaction and efficacy in a pilot study. The College and University Tobacco Interactive Education (CUTIE) hybrid CD-ROM/Web-based program is an innovative approach to reducing tobacco use among college students that may offer advantages over traditional methods. The program was designed to provide information to tobacco users about tobacco and cessation in a way that meets the specific needs and experiences of 18-24 year old college smokers.

Phase I Program Development

The development process for the computer-based program included: (1) review of existing computer-based tobacco education and cessation programs targeted to youth and college-aged smokers; (2) focus groups with student health providers and college students; (3) development of the program content and interface; (4) pilot-testing of the program with potential end-users; and (5) evaluation of the program by student health providers and college students.

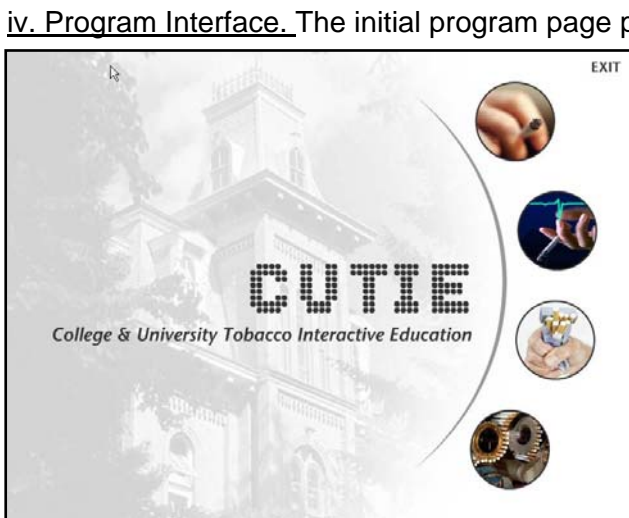
i. Review. Extensive searches were made for Web or other computer-based tobacco education or cessation programs that were targeted to college students, and although we located several prevention and cessation websites geared towards adolescents, and many cessation sites targeting a general adult audience, we found only four Web-based tobacco programs aimed at college students: mystudentbody.com, tobaccofreeu.org, smokefreevcu.org and leavethepackbehind.com. We then reviewed these college-oriented programs for content and strategies. In addition, we conducted a literature review of college smokers and cessation.

ii. Focus Groups. Focus groups were conducted to better understand the audience of college smokers and inform the content of the intervention. College student smokers were asked about their use of technology and features that they would be interested in exploring as part of a computer-based educational and cessation program which targeted them. Examples of potential interfaces were evaluated within the group, and the participants completed a survey that asked them to rate potential content areas for interest and relevance to the program. The results were tabulated and used to supplement the development of the program content. The development of the program content was also informed by student health providers who comprise the front line of tobacco education and cessation in the student health care setting. Providers were queried about how they

currently approach cessation with students who smoke; their opinions on what types of program content should be included in an intervention; and the most efficacious way to deliver the program to young college smokers.

iii. Program Development. The Phase I intervention included motivational content to encourage student tobacco users who were in the pre-contemplation and contemplation stages of change to move towards thinking about quitting. The intervention also included cessation content designed for college smokers who were planning to quit as well as strategies for quitting. After reviewing the literature and synthesizing the results of the focus groups we adopted the following general guidelines for the program content: a) maximize the use of graphics and other visual elements; b) include only brief text elements; and c) avoid any preaching or nagging.

The appearance and structure of the program was based on review of other Web-based programs and discussions with design experts. Certain principles of design were incorporated into the program including: the use of consistent placement of the program logo, consistent layout and navigation through the program, brief text elements, use of attractive visuals and interactive activities, and consistent easy to use navigation buttons.



iv. Program Interface. The initial program page provided four buttons the user could use to access the main program content areas: Student Smoking, Health, Quitting, or Big Tobacco. Access to the program's elements was menu-driven with each of the four main topic areas leading to four or five sub-topics in each area via a hierarchical information architecture. The program contained a total of 18 separate sub-topics to explore. The user could choose or exit any program page at any time. Pages used text information, graphics, links, video clips, quizzes, and other interactive elements to provide interesting and engaging experiences.

Program Content: Main Topics

The program was organized into four main topic areas and 18 sub-topics. In addition to the brief descriptions of the content below we have included a table of contents and a CD-ROM of the program in Appendix D.

Student Smoking. We included a section that focused on issues we felt would be of particular interest to college smokers. Strong feedback from the focus groups led us to include content on social injustice and a review of tobacco alternatives. As we expected, many of the program's users identified themselves as "social smokers," so we included information about social smoking, addiction, dating and attraction.

Health Based on clear feedback from college smokers we included information on the positive health effects of quitting, as well as the negative short-term, longer-term and cumulative health consequences of smoking, and the deleterious health effects of second-hand smoke exposure.

We included content on the definition and experiences of a social smoker, an interactive quiz designed to help the user assess his/her degree of nicotine dependence, issues related to social norms regarding college students' smoking/nonsmoking attitudes, a discussion of the fact that there are no safe smoking alternatives (including a video clip depicting the chemistry of burning tobacco), and a discussion of the social injustice perspective of smoking (including a link to www.bigtabacosucks.org).

In health subtopics, we included content on "countdown to health" (interactive countdown clock shows the health benefits of quitting), "anatomy of a smoker" (interactive student body used to illustrate the many short-term and long-term health consequences and diseases caused by smoking), "every cigarette does you damage" (five videos illustrate the cumulative consequences of cigarette smoking on the body), "the truth about sex and smoking" (myths and



fact regarding sex and smoking with content tailored for men and women), and “you smoke and everyone chokes” (information about second-hand smoke is presented through factoids and video clips).

Quitting. We included content on “thinking about quitting” (type of preparation and support the user may need to be a successful quitter, including how to deal with smoking urges, weight gain and stress), “dealing with withdrawal” (nicotine withdrawal symptoms with reference to Nicotine Replacement Therapy and other smoking cessation medications), “what kind of smoker are you?” (interactive quiz to help the user identify stage of change with tailored quitting tips), “building your quit plan” (personalized, printable quit plan that allows the user to input their reasons for quitting, whom their support will be; and how they will deal with triggers, cravings, weight gain).

Big Tobacco. Both college students and health providers indicated that they were interested in the role of the tobacco industry in terms of specifically marketing their products to college-aged youth. This area provided information on the production of tobacco products, the size and placement of product warnings, and how tobacco products have been persuasively marketed over the last 100 years. More specifically, content included “wimpy warnings” (warnings on cigarette packages from the U.S., U.K., Canada and the European Union), “smoking in the movies” (influence of tobacco images seen through movies are explored with images of recognizable film stars and links to related websites), “marketing milestones” (interactive timeline of tobacco industry marketing in the 20th century that underscores its influence), and hidden hazards” (interactive activity that illustrates how cigarette smoke contains thousands of chemicals many of which are poisonous and carcinogenic).



Phase I Pilot Testing

After the design and development phase, pilot-tests were conducted with four college students and eight in-house testers to evaluate the usability and functionality of the program. Pilot test subjects and in-house testers provided feedback on the ease of navigation, satisfaction with the look and feel of the program, interest in program content and other aspects of the program’s interface. We directly observed each user and then conducted interviews to get full information on their use and understanding of the program. As a result of the tests, a small number of minor changes were made to the interface to improve its functionality.

Phase I Evaluation

We evaluated the CUTIE program with six student health providers from the University of Oregon (UO), a four-year public university, and Lane Community College (LCC). Student health providers including doctors, nurse practitioners, nurses and health educators in both sites were trained by project staff to distribute the program with an instruction sheet to college students who were identified as smokers. Both sites had procedures in place to ask students about the tobacco use status during intake. The CD-ROM program was handed to qualifying students, who agreed to participate in the study, in the course of visits with their health providers. Distribution of the program lasted for approximately 8 weeks. Enrollment occurred during the last eight weeks of the school year (prior to summer break).

Participating students were asked to log on to the program within 72 hours of receiving the CD-ROM disc. They could access the program as many times as they wanted, but during their first visit they were required to use a unique ID #, provide contact information, give informed consent and complete a brief enrollment questionnaire. After these steps were completed, they could access the program’s content. During the first visit, upon exiting the program, the user was also required to complete a brief consumer satisfaction survey. Subsequent visits required the same ID# and e-mail address, but no informed consent or surveys. Students received a \$40 financial incentive after completing a brief follow-up questionnaire that was prompted by an e-mail sent two weeks after their initial log on.

Student participants were required to be on-line during their review of the program. Information about their use of the program was collected in an on-line database that was accessible to designated project staff. All user activities were logged in the database by user name, and the log files contained dates of each individual’s participation, including which sub-topics they visited and how much time spent in each area. In addition to the student evaluations health providers were also asked to review the program and complete a provider consumer satisfaction survey. Providers gave informed consent and completed the survey in hard copy. Student Health Care providers also provided written evaluation of the program by completing a written

consumer satisfaction measure in which they rated the components of the program, and their perception of its usefulness to their efforts to curb tobacco use among students.

Recruitment. Student health providers distributed approximately 150 discs to college students. Sixty four college students logged onto the program. Sixty-three met criteria for enrollment, as they smoked in the last 7 days and defined themselves as a current smoker. All 63 of these students completed the enrollment questionnaire, half within 24 hours of their health care visit. Sixty-two completed the consumer satisfaction surveys. The student health centers reported giving away 120 CD-ROMs to students in the 8 weeks of the recruitment and over 50% of the students receiving disks used the program and logged in to register for the evaluation study.

Student demographics and baseline smoking behavior. The sample was primarily Caucasian (87%) (representative of the racial/ethnic breakdown of the community), and approximately half were females and half males. Thirty-one percent were college freshman, 18% Sophomores, 23% Juniors, and 21% Seniors. The remaining were graduate students or did not consider themselves as college students.

Seventy-six percent of the students considered themselves regular smokers, 37% considered themselves as social smokers and 14% said that they smoked once in a while. Among those who considered themselves social smokers, 52% said they smoked regularly and 17% said that they smoked once in a while. Seventy three per cent considered themselves daily smokers. The majority (33%) of enrolled students smoked 6 to 10 cigarettes per day on average with one-third smoking 5 or fewer cigarettes a day and one-third smoking more than 10 cigarettes per day. Half of the students smoked within one hour of waking, 85% made one or more quit attempts in the past 12 months, and 79% were thinking about quitting at enrollment.

Attrition at follow-up. Forty-five of the 63 students (71%) completed the 2-week post-enrollment follow-up questionnaire. While attrition appears high, the majority of those who did not complete the follow-up questionnaire had already left school for their summer break. Completion of the follow-up questionnaire was quite high (>85%) among those who enrolled in the study earlier in the school year. Students who did not complete the follow-up assessment appeared to be slightly more dependent on cigarettes than those students who did complete the follow-up assessment. They were significantly less likely to classify themselves as social smokers ($p<.05$) and were significantly more likely to smoke soon after awakening ($p<.01$) than were those who completed the follow-up assessment. However, there were no differences in average number of cigarettes smoked per day, in their contemplation to quit or cut down, or in the classification of themselves as occasional or regular smokers.

Program use and engagement. Among the 61 students who used the program, 85% of the students logged on to the program once, and 15% ($n = 19$) logged on to it more than once. The majority of students who enrolled in the program accessed most of the activities. Only six students accessed activities fewer than 10 times (Access is defined as opening an activity; a single activity may be accessed more than once). The average number of activities accessed by students was 24.5, with several activities accessed more than once. The most popular activities with greater than 70 hits were "The truth about sex and smoking", all five "student smoking" and three of the "big tobacco" activities.

Program effectiveness. As noted above, enrolled students were asked to complete a follow-up 2-weeks after enrollment. As defined by no cigarettes, not even a puff, in the past seven days, two of the 45 students who completed the follow-up questionnaire quit smoking (4.4%). While this prevalence is low, the two-week follow-up does not allow for a grace period for viewing all components of the program, setting a quit date and unsuccessful quit attempts. However, the program had an effect on changing smoking habits and on reduction of smoking. All of the 45 students who enrolled in the program and completed the follow-up assessment reported smoking an entire cigarette in the last seven days. At follow-up, 15.6% ($n = 8$) reported that they did not smoke a cigarette during this period. Whereas 44 of these 45 students reported that they were current smokers at enrollment, 18.2% ($n = 8$) of these 44 reported that they were not current smokers at follow-up. The proportion of students reporting that they smoked daily at the follow-up assessment was also significantly less (58.5%) than that at enrollment (70.7%; $p<.01$).

Among those who reported being regular smokers at enrollment, 10 out of 33 ($p<.001$) changed their self reported status to that of social ($n = 4$) and occasional smokers ($n = 2$) or both ($n = 4$). No occasional or social smokers reported being regular smokers at follow-up. In addition, four individuals who classified themselves as social or occasional smokers at enrollment classified themselves as not smoking at follow-up.

The average number of cigarettes smoked per day in the last seven days also reduced significantly from enrollment to follow-up. Whereas, the average student reported smoking between six and 10 cigarettes at enrollment, this number was to between 1 and 5 at follow-up ($p<.01$).

In addition, the program changed students' self efficacy regarding ability to resist smoking in certain situations. Students reported that they were significantly more confident that they could resist smoking when

stressed or angry ($p < .05$) and when feeling sad or depressed ($p < .05$), and marginally more confident that could resist smoking when drinking alcohol ($p < .10$). However, the change in readiness to quit and readiness to cut down, although in the right direction, was not significant.

Student consumer satisfaction. Students' evaluation of the program was very positive. Among the 62 students who completed the evaluation assessment, 58 rated the program positively. These students felt the program was somewhat or very interesting, somewhat or very well organized, and presented new information. Eighty-nine per cent ($n = 55$) rated the program as very good to excellent, and 91% ($n = 58$) might or definitely would recommend the program to a fellow student who is trying to quit.

Regarding the amount of information presented by the program, 88% ($n = 50$) felt it was about right, while 11% ($n = 7$) felt there was not enough information and 8% ($n = 5$) felt too much information was presented. Similarly, 82% ($n = 51$) felt the number of topics was about right and 11% ($n = 7$) felt the number of topics presented were too few.

Regarding the design of the program, 70% ($n = 43$) liked the program interface a lot, and 25% ($n = 16$) felt it was okay. Eight-two percent ($n = 51$) felt it was very easy to use and an additional 14% ($n = 9$) felt it was somewhat easy to use. Seventy-three percent ($n = 45$) liked the topic titles, 74% ($n = 46$) liked the videos, 83% ($n = 50$) liked the interactive components of the program, and 77% ($n = 44$) liked the quizzes. Seventy-three percent ($n = 48$) liked the overall content of the program, and 77% ($n = 48$) liked the visual presentations of program content.

Regarding specific content areas, 80% ($n = 49$) liked the health information, 88% ($n = 53$) liked the information about the tobacco industry, 73% ($n = 44$) liked the information about social smoking, and 69% ($n = 39$) liked the information regarding developing a quitting plan.

As part of the consumer satisfaction survey, students were asked to indicate if they would like to see additional specific topics or activities added to the program. A majority wish to see information comparing smoking to other risky behaviors and more information regarding alternatives to smoking. Most of the students also stated that they would like to see a "cost of smoking calculator" added to the program. In addition, comments about the program were received from 35 students (excerpts presented in Table 2) many of which were extremely positive:

Table 2: Comments from Participants in Phase I Evaluation
"Overall, it was a very professional, easy-to-use program. I think most students, if they take the time to really look through all the disc has to offer, will learn a lot about their current misconceptions of tobacco use."
"I have been to a different site before and this is by far the most informative and well put together site. I think it is extremely informative and should be available to all students all the time. The health center at my school was a great place to find this, as that is where I went to get Nicorette (sic) to help me attempt to quit. I wanted a cigarette but after seeing your videos and visuals...well thank you because I will not be having one! I will visit again tomorrow to try and keep it up! Thanks for your hard work."
"The program was very thorough and was enjoyable to read. It wasn't dull like many other programs."
"Good information about how marketers have lied, how quitting will affect your health positively, those are good messages to send us."
"Awesome. I really want to quit and now I have the info to help me succeed! Thank you! I will be back onto this site probably today, and tomorrow, and the next day..."
"Great idea, keep at it, this program could help thousands of people every year, not just the young. Wish me luck my last cancer stick was over 1 ½ hours ago. Thanks."

Provider satisfaction. Six student health care providers, one physician, two nurses, two nurse practitioners, and one other provider completed the provider satisfaction questionnaire. The Phase I prototype was evaluated very positively by health care providers. All providers felt that having the CUTIE CD-ROM to distribute made it much easier to discuss tobacco cessation with the student. If available, they would definitely distribute it and they believe it would be very easy to integrate into their daily practice. They definitely did not feel that the time it took to distribute it would be a barrier to distribution. Five of the six providers felt that the CUTIE program was very appropriate for low level smokers, social smokers and regular smokers. The other provider felt it was somewhat appropriate for these groups of smokers. All six would definitely recommend it to other student health care providers.

During informal feedback discussions with project staff, individual health providers expressed many positive comments about the program. For example, one provider said she particularly liked that the program included prevention, education, and treatment information. Two providers commented on the benefits of

incorporating anti-industry material into the program. Most said they really liked the look and feel of the program, its navigation, and its interactive activities

Summary. As noted, the Phase I prototype was evaluated very positively by both students and providers. Although only two students quit, using a strict criteria of no smoking at all, not even a puff, a somewhat larger proportion (approximately 15 to 17%) reported that they were no longer current smokers and that they had not smoked an entire cigarette in the last seven days. In addition, students reduced the amount they smoked, a significant proportion changed their self reported status from that of regular smokers, and students, in general, increased their self efficacy regarding their ability to resist smoking.

Limitations. Although these changes were in a positive direction and support the effectiveness of this program, the design of the Phase I evaluation study did not control for internal and external validity (Campbell & Stanley, 1963). Change in reported behaviors could be due to such factors as demand characteristics and the passage of time, rather than to participation in the intervention itself. Hence, a randomized trial comparing an intervention program to a control (static) program is necessary to evaluate the effectiveness of the intervention program. In addition, the brief follow-up period limited an adequate evaluation of the effect of the program on cessation. This brief follow-up did not allow for a grace period for students to view the program and make more than one quit attempt. Further, we did not use biochemical verification to verify the self report of no cigarette use by two of the students.

Publications:

There were no manuscripts written during the grant award period.

Patents, Copyrights, Trademarks, Invention Reports:

No inventions have been made under the grant or award. See Final Invention Statement and Certification.

Developed Technology:

The Phase I prototype uses an innovative hybrid CD-ROM/Web site that provides a number of benefits. It allows health providers the opportunity to offer a tangible product to give to tobacco-using students, the ability to feature full-screen video, while still providing the flexibility of an updatable Web site. One disadvantage of the CD-ROM is the likelihood that the disc will be lost by the user, lessening the accessibility of the program. In addition, increasing numbers of students have access to broad-band technology, so the Phase II program will have an increased emphasis on Web based technologies, with the CD-ROM's main purpose as the initial launch vehicle. We will also add an administrative Web site that will enable college or university administrators and student health providers to view data regarding students at their respective institutions. A prototype of this function was incorporated into the Phase I program, which allowed us to collect student survey data and track user interactions with the program.

Current Status of Product:

A Phase II grant proposal that would allow us to make substantial additions and refinements to the Phase I prototype has been submitted. The aim of Phase II is to complete the development of the program and evaluate its efficacy in a randomized control trial of colleges and universities. The program will then move into the commercial development stage with final changes to the intervention Web site and the companion administrative Web site. We plan to market the product to universities and colleges.

Status of FDA Approval:

NA

Program Benefits:

The program has not yet been developed into a marketable commercial version, but we plan to move forward with this objective in mind. The commercial version will add to a growing catalog of tobacco education and cessation products distributed and marketed by Applied Behavior Science Press (ABSP), a sister company of Deschutes Research, founded in 1992 to distribute research-based behavioral products.