Body Awareness Resource Network (BARN)

Twenty Years of Research and Development

LMS

Learning Multi-Systems, Inc.

Technology to Inspire Learning

Contents

Overview of BARN

Program Purpose: The Body Awareness Resource Network (BARN) is designed to promote healthy lifestyle choices among middle school and high school students. The program's overall goal is to prevent or delay the onset of risk behaviors among adolescents, and to promote conscious decision making and control over risks among those adolescents who do engage in risk behaviors. As a universal prevention program, BARN is designed for use by all students, regardless of their level of risk or previous experience with risk behaviors.

Topics Addressed: BARN is broad-based and multidisciplinary, with components addressing students' concerns about alcohol and other drugs, smoking, stress management, body management (weight and nutrition), human sexuality, and HIV/AIDS.

Versions: Versions: 1.0–Apple II; 2.0–MS-DOS; 3.0-Macintosh; 4.0–Macintosh/Windows; 5.0–Macintosh/ Windows (in development).

Current Format: The curriculum version of BARN is produced on eight CD-ROMs. Two teacher guides with supplemental activities and group instructional strategies are provided as spiral-bound books; and two softbound Student Portfolios contain worksheets for student use.

Intended Population: The content and presentation is appropriate for males and females of all backgrounds in grades 6–12 (roughly ages 12–18).

Implementation Setting: BARN is in use in more than 5,500 middle schools and high schools. Some schools have chosen to make BARN available for independent student use in the library, computer lab, or resource center, while others have chosen to incorporate BARN lessons into classroom health and science curricula. Individuals or small groups can use BARN at a personal computer or network terminal; or large groups can use a computer with large-screen projection (or a television) that allows everyone to view the software at the same time. In this latter scenario students often work together and challenge other groups in games, quizzes, or lively discussions.

Secondary implementation sites have included social service agencies and profit and non-profit youth organizations, such as Job Corp., summer camp organizations, and Girls, Inc. Other potential implementation sites include after-school programs, church youth groups, and health clinics. Such sites generally make BARN available for use either on-site or for checkout by teens and their families.

Historical Review of BARN Development and Supporting Research: BARN research and development spans a twenty-year period. The original version (BARN 1.0) was developed between 1981 and 1988 at the University of Wisconsin—Madison, and was designed to operate on an Apple platform using 40 floppy disks. Learning Multi-Systems, Inc. (LMS) added an MS-DOS Version 2.0 in 1992 and a Macintosh Version 3.0 in 1995. BARN Multimedia, Version 4.0 (1998), constituted a major revision, bringing BARN up to the level of current technology. Major changes included 1) content updates based on facts and scientific strategies; 2) incorporation of video, voiceovers, and animation to give the activities motivational appeal and a new look; and 3) the crossover from floppy disk to CD-ROM, which made BARN more current technologically and easier to manage.

Forthcoming is BARN Multimedia Version 5.0, with additional revisions incorporating the latest ATOD prevention activities that are based on scientific principles judged to have the greatest likelihood of causing behavior change.

Sources of Development Funding by Year:
1981–1988 W.K. Kellogg Foundation
1988–1995 Learning Multi-Systems, Inc.
1996–1997 National Institute on Drug Abuse
1997–1998 National Cancer Institute
1999–2001 National Institute on Drug Abuse

Awards/Citations:
• The American Medical Association named BARN "Best Comprehensive Health Education and Prevention Program."

• Recipient of the American Medical Association's prestigious award for Excellence in Adolescent Health Education and Prevention.

• Selected by the Association for Supervision and Curriculum Development to appear in the 1995 edition of *Only the Best: The Annual Guide to the Highest-Rated Educational Software.*

• "One of the top comprehensive health education programs..." —*Booklist*

• "...significantly superior to the rest. BARN is accurate, personal, engaging, non-judgmental, comprehensive, and makes good use of the computer. The BARN system is highly recommended."—*U.S. Department of Health and Human Services study*

BARN (Version 1.0)

Content

As originally developed, BARN contained information and activities in five topic areas: Alcohol and Other Drugs, Body Management, Human Sexuality, Smoking, and Stress Management. After the completion of eight years of development and evaluation during 1981 to 1988, LMS began publishing BARN, and, subsequently, underwrote the development of an HIV/AIDS module in 1988–1989.

The modules that were initially evaluated comprised five different instructional approaches: games, information presentation, interactive interviews, practice in realistic situations (via simulations), and decision-making aids. A brief description of each original module follows (see page 13 for a description of the HIV/AIDS module):

Alcohol and Other Drugs

Use/Abuse/Dependency introduces students to the progression—from substance use to abuse and to dependency—and to the characteristics of each stage.

Overdose: What to Do provides facts about medical risks, signs of overdose, and how to help someone who has taken an overdose.

Whiz Quiz contains randomly-ordered questions about alcohol and other drugs and related issues, such as driving under the influence.

Should I? walks students through possible consequences of alcohol and other drug use, focusing on how this behavior interferes with their achieving their goals.

You Bet Your Life is a game of chance set in the context of a party. Players make alcohol-related decisions and experience how their decisions affect their lives.

Stay on Track focuses on the consequences of drinking and driving.

Help lists local and national resources for information and confidential help.

Body Management

Meal Selection Exercise calculates nutrition information on foods the student selects, given the person's age, height, weight, and estimated activity level.

Body Management Game evaluates the player's food and activity-level selections during a 24-hour period to determine the player's success in a space adventure game.

Information on Nutrition provides clear, easy-to-understand facts on recommended daily allowances, weight control, and diet.

Human Sexuality

Introduction compares the student's responses on a variety of issues (school, family, independence, relationships with the opposite sex) with responses given by a survey sample of teens. The purpose is to place sex in perspective as one of many aspects of life.

Soaps simulates realistic situations where teens face sexual decisions.

Reproductive Anatomy describes and illustrates male and female reproductive systems, and tests the student's knowledge in a game format.

Pregnancy/VD Resources lists community and national resources for support and information.

Sexually-Transmitted Diseases Triangles tests the student's knowledge of sexually-transmitted diseases.

Dear BARNY letters answers questions submitted by more than 300 teens. Topics range from pregnancy to birth control, menstruation, erections, sexually-transmitted diseases, relationships, dating, and physical changes during adolescence.

Tough Choices provides the student an opportunity to write a play, making decisions for the characters. The computer program evaluates the user's choices, and presents consequences of various choices.

Skunk BARNY asks questions of students and responds with feedback to reinforce correct information and debunk myths.

Smoking

Deciding about Tobacco: Saying "No" discusses the factors influencing the decision to smoke and offers ways to resist.

Information presents facts about active and passive smoking.

Tips on Smoking assesses the user's smoking habits, based on responses to questions, and offers methods of quitting from which the user can select the one with the best likelihood of success.

Stay-Quit Tips lists techniques for avoiding relapse.

Self-Test on Attitudes and Beliefs about Smoking presents questions, the user's responses to which are compared with those of other teens.

Helping Someone Quit gives suggestions on how to persuade someone to quit, with tips on how to lend support to someone trying to quit.

The Tobacco Game presents questions about tobacco and the consequences of its use in a board-game format.

Stress Management

Learn More about Stress defines stress and how it can affect people.

Assess Your Stress Level helps the student determine his or her stress level, provides appropriate information about stress symptoms and sources, and gives strategies to deal with excessive stress.

Figure Out What to Do about Stress helps the student clarify feelings about a stress-inducing person or situation, providing tips about how to talk to others without becoming angry; it also lists information on stress producers and reducers. The student can write a hypothetical letter to a person who is causing stress.

Find Resources is a decision-analysis exercise that helps teens determine whom they feel comfortable talking with about problems.

Development Process for Version 1.0

BARN was developed by a multidisciplinary team of researchers at the University of Wisconsin–Madison Center for Health Systems Research and Analysis (CHSRA). The development team identified a major barrier that often prevents adolescents from satisfying their natural curiosity and obtaining accurate information about risk behaviors: Many teens are hesitant about approaching adults for fear of being lectured. Too frequently, adolescents do not receive accurate information until after they have gotten into trouble with a risk behavior. The goal of BARN was to delay or prevent the onset of risk behaviors by providing teens with a source of easy-to-understand, accurate information presented in a confidential and nonjudgmental format; teens could access this source privately when facing lifestyle decisions.

To develop such a program, project staff divided into independent work groups, each assigned to one of the BARN topic areas: Alcohol and Other Drugs, Body Management, Stress Management, Sexuality, and Smoking. Each group contained an advisory group of university experts, community practitioners, teachers, teens, and parents. Among the university researchers were representatives of the following disciplines:

- Computer Science
- Counseling
- Education
- Educational Psychology
- Health Education
- Industrial Engineering
- Journalism

- Mass Communication
- Medicine
- Nursing
- Nutrition
- Psychology
- Social Work
- Statistics

As a result of the broad perspectives incorporated in BARN, the system included numerous ways of communicating about health. Experience with health and adolescence was emphasized over computer expertise in selecting participants, in order that programming concerns not overshadow the adolescent expertise (Hawkins et al., 1985). Each group identified for its topic area what information teens needed, what information was already available, and what skills would help them use the information in decision making. Adolescents were asked what information they needed but were not getting because they were either unsure where to find it or afraid to ask about it (Bosworth et al., 1983). In addition, health curricula used by schools at that time were identified and analyzed. Once the content had been determined through these processes, the group developed flow charts outlining how BARN would be presented on the computer.

Evaluation Setup and Description

BARN was made available in many different settings on a test basis—including schools, homes, churches, physicians' offices, clinics, libraries, and social service agencies. University of Wisconsin researchers worked to evaluate where and how teenagers used BARN—before the programs were made available to the public.

During 1982 and 1983, BARN programs were tested with more than 6,000 adolescents and 200 families. The object of testing was to discover who was using the BARN system, what influenced the extent of BARN use, and what impact BARN was having on adolescents' health-related knowledge, attitudes and behavior regarding BARN topics.

Early test sites included two high schools (one rural, one urban) and three middle schools (one rural, two urban), along with an equal number of similar control schools where no BARN program was made available. Major findings are summarized in this report.

At the test sites BARN staff introduced the system to parents, teachers, and administrators. Inservice training gave adults a chance to try BARN and understand its philosophy—giving teenagers facts and strategies to make decisions. Students received one class period of instruction about BARN. Follow-up school announcements reminded students about BARN, and newspaper articles alerted families that BARN could be checked out for home use.

Students tended to use the systems at school either alone or in groups of two. BARN was set up in libraries or instructional media centers. A private location seemed to influence the level of BARN use—students preferred an area where adults were not able to view the BARN screen. Teachers sometimes assigned BARN for extra-credit work in health education or physical education. Some teachers reported that students who had used BARN contributed facts from BARN to classroom discussions.

Based on evidence of test-site effectiveness—when compared with control sites—the researchers established pilot sites in two Wisconsin communities. During the 1985–1986 school year, BARN systems were in junior and senior high schools in Baraboo and Beaver Dam, Wisconsin. Teenagers there could use BARN at school or sign up to take BARN home.

Many additional school test sites were established during 1987–1988: six in Milwaukee, Wisconsin; two in Oakland, California; two in Watsonsville, California; four in South Bronx, New York; four in Brooklyn, New York; and three in rural North Carolina. School staff reported that students of diverse economic and social backgrounds used BARN.

Contrary to traditional, well-intended public information campaigns that often reach the people who least need information, BARN consistently reached students who were more likely to have undertaken a variety of risk behaviors before BARN was installed. It is clear that BARN's health information reached teens in need.

Figure 1. Average Number of Times Students Used BARN during 14-Month Period over Two Academic Years
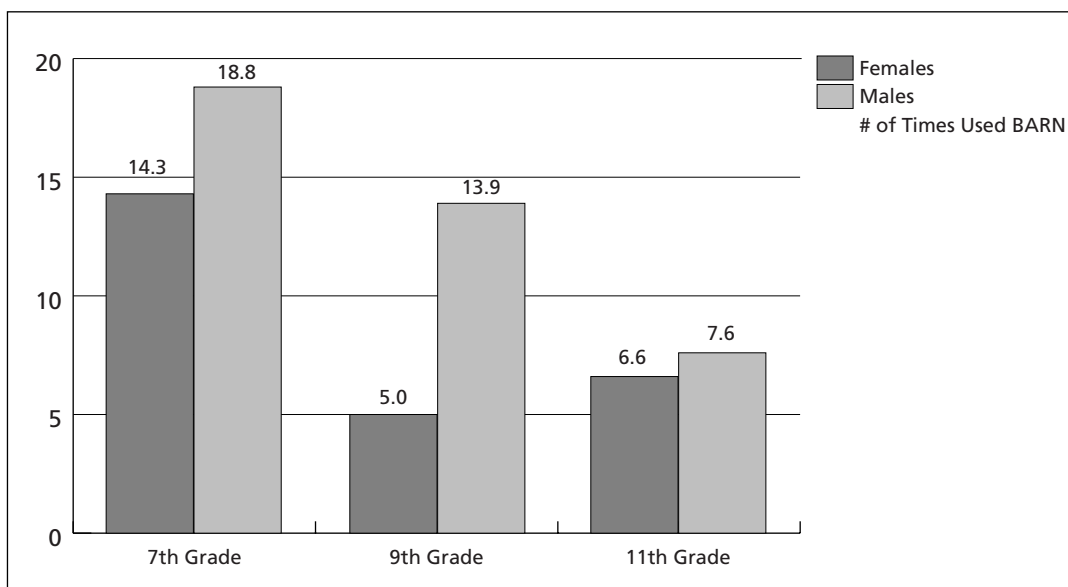
* That boys reported using BARN more often than girls, especially at the 9th grade level, could raise the issue of the computer being sex-identified. However, given that health education programs have traditionally been weak in reaching adolescent boys, the heavy use of BARN by 9th grade males could be viewed as a positive achievement.

Evaluation Procedures

- *Computer-collected data.* The computer collected data on user characteristics and patterns for 1,472 users: students answered questions on age, gender, how many times they had used BARN, and whether they were using BARN as a group or individually. The computer also recorded which programs were used and the paths users chose within a specific program.

- *Interviews.* During the first two years of implementation, BARN researchers interviewed more than 250 students and 40 faculty to elicit responses about how BARN was functioning, what students were learning from BARN, and what effect BARN had on students' lives. Suggestions gleaned through interviews also helped BARN programmers streamline the programs.

- *Surveys.* Before BARN was installed, and again two and four years later, BARN researchers administered comprehensive surveys to students at both test and control schools. The 360-question pre/post surveys measured students' health knowledge, attitudes, and behaviors. Other questions covered intervening variables, such as peer pressure, family communication and attitudes, self-concept, mental health, and values. The survey also collected demographic data, such as age, gender, parental education, parental employment, and race. Random samples of 7th, 9th and 11th graders participated in the surveys—1,600 in 1982; 2,400 in 1984; and 1,500 in 1986. Of the first two surveys, 800 were part of both surveys. These matched cases, including 400 from control schools, allowed BARN researchers to draw a profile of health attitudes and behavior changes for these 800 adolescents as they grew older.

Key Evaluation Findings

- BARN was used by the students who needed it most. Students already taking health risks were more likely to use BARN than those who were not. More importantly, risk-taking students used BARN content relevant to the particular risks they were taking.

- Students who used BARN early in adolescence (grades 8 and 9) were less likely to begin risk behaviors than those who did not use BARN.

- Sexually-active students who used BARN were more likely to adopt effective contraception than nonusers (94% vs. 70%).

- Students who had experimented with smoking were more likely to quit if they used BARN, but only if they were light smokers. Frequent (and thus more likely to be addicted) smokers continued to smoke despite BARN.

- Of the students who reported a problem with stress in 1983, more BARN users than non-BARN users reported reduced stress in 1984. The BARN stress program appeared to help girls at a younger age than boys.

- Students who used BARN reported a slower progression toward involvement with alcohol and other drugs. BARN appeared to inhibit the progression to heavier and more problematic use for every sub-group tested except for those who reported drug-related problem behavior in the 9th grade (pretest).

Figure 2. BARN Program Use by Middle School Students
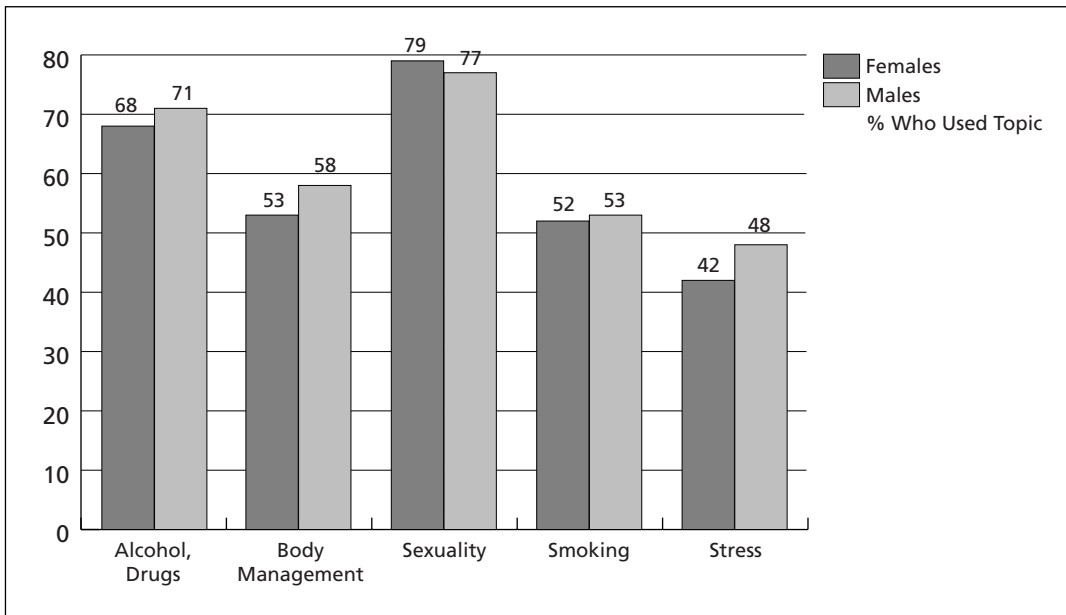
Figure 3. BARN Program Use by High School Students
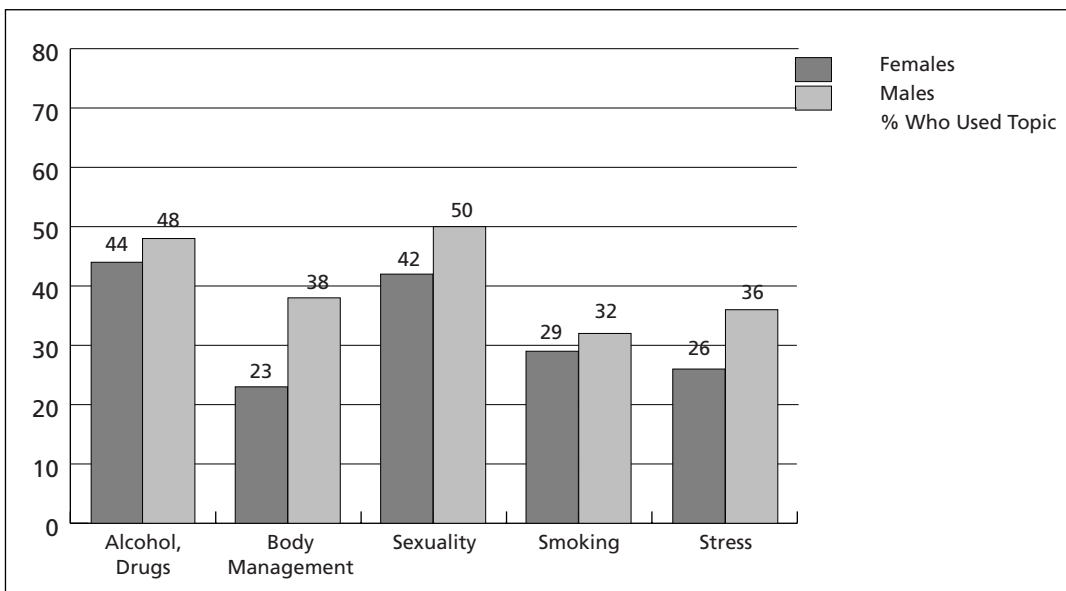
Source for Figures 2 and 3: BARN survey of 2,400 7th, 9th and 11th graders in ten schools. High school figures are an average of 9th and 11th grade responses.

BARN Multimedia (Version 4.0)

Content Revisions

LMS released BARN version 2.0 (MS-DOS) in 1992 and version 3.0 (Macintosh) in 1995, each incorporating content and technology upgrades. Since these versions were non-multimedia, however, it was clear that both the technology and content needed to significantly further evolve. In terms of content, BARN primarily focused on presenting information, whereas newer research showed that other developmental strategies, such as peer modeling and resistance skills, have a greater effect on changing attitudes and behaviors. In addition, the Body Management (Versions 2.0 and 3.0) activities were based on the four food groups rather than on the food pyramid model of nutrition.

Scientific Research Supporting Revisions

The theoretical underpinnings that guided the instructional design used throughout BARN Multimedia:

1. **Skill Acquisition Model** (Dreyfus & Dreyfus, 1986) postulates five stages of learning a new skill, from novice to expert, with learners having different needs at each stage.

2. **Social Learning Theory** (Bandura, 1986) highlights how children observe the verbal and nonverbal behavior of role models. If the role model has status and the action is perceived as having a positive consequence, then the child is likely to imitate that behavior in similar situations.

3. **Standard Instructional Design Process** (Reigeluth, 1983; Laurel, 1990) was used to guide the development process from conceptualization through design, story boards, review, prototype development, usability testing, revision, evaluation, and distribution.

4. **Alternative Developmental Interventions** (e.g., Bruvold 1993) shifted the focus of BARN away from presenting information to changing attitudes and behaviors.

5. **Life Skills Training Model** (Botvin & Botvin, 1992) emphasizes the role of strengthening decision-making skills, independent thinking, self-image, communication skills, social skills, refusal skills, and assertiveness in delaying teens' initiation of risk behaviors.

In terms of technology, the Macintosh and MS-DOS platforms were being displaced by cross-platform Windows/Macintosh with multimedia. The original programming language had very limited capabilities for graphics, and did not have the visual appeal of video games and other media teenagers were becoming accustomed to using. The advent of CD-ROM and LCD projector technology offered a much more efficient means of information storage and presentation, allowing the incorporation of music, voiceovers, animation, and special effects and using the software individually or in large groups.

Nature of Revisions: Smoking, Body Management, Alcohol and Other Drugs

To address these content and multimedia needs, LMS submitted an SBIR (Small Business Innovation Research) grant proposal to the National Institute on Drug Abuse (NIDA) for revision of all six modules. It became clear, however, that the Smoking and Body Management modules would need to be almost completely rewritten to

incorporate updated content and prevention approaches. This was not feasible within the scope of the NIDA grant, so a second SBIR grant from the National Cancer Institute was secured. Below are the nature of the revisions for the three programs.

Smoking

The two activities on quitting smoking were judged inconsistent with a prevention message and were eliminated. The remaining activities were reworked and updated into four new activities: Dealing with Pressure incorporated the information in Deciding about Tobacco, and increased emphasis on refusal skills, communication skills, and social influences. Three units within this activity presented multiple-choice questions regarding media pressure and advertising messages, people pressure, and decision making. The Tobacco Game remained unchanged in structure, since it had proved highly motivating. The questions were reviewed for accuracy and currency, plus new graphics and instructional/motivational features were added (e.g., timed games, opportunities for review).

Teen Views on Radio TLK was created to make the Compare Attitudes and Beliefs interactive interview more contemporary, interesting, and motivational. A panel of teens appears on real-time video, answering questions from callers to a radio talk show.

The Truth about Tobacco presents information segments about 1) the immediate effects of smoking; 2) the dangers of chewing tobacco/dipping snuff, breathing secondhand smoke, women smoking, and using pipes and cigars; 3) the effects on the lungs and heart; and 4) the chemicals in tobacco. The addition of sound and graphics made this text/graphics unit more interesting.

Body Management

The Body Management module was almost completely rewritten to incorporate new paradigms of nutrition, as well as prevention concepts, such as normative education and assertiveness practice.

Nutrition Power Game is similar in format to the Tobacco Game. Players roll the dice and answer multiple-choice questions to advance around a game board.

Teen Views on Radio TLK again involves a panel of teens appearing on real-time video answering questions from callers to a radio talk show. The structure is an update of the interactive interview format, incorporating peer modeling through the teen characters.

Weight Control is a didactic information unit with multimedia elements that focuses on basal metabolism and weight and on weight gain and loss.

Alcohol and Other Drugs 1 & 2

Stand Up for Yourself focuses on refusal skills. Video has been added to introduce two teen role models, Mike and Shawna. An interactive segment with voiceovers presents various options for politely, but effectively, refusing alcohol and other drugs in various situations. As reinforcement, a second video segment shows the role models refusing a drink. The unit also increased interactivity through opportunities for the user to choose responses.

Should I? was completely revised from the original interactive interview format, which students deemed confusing. A video presentation based on a radio talk-show format—similar to the Radio TLK units in Smoking and Body Management—replaced the text-intensive original.

Stay on Track became a realistic simulation of drinking and driving. The computer is programmed to slow reaction time and simulate impaired judgment, if the user elects to drink and drive.

You Bet Your Life was enhanced with video simulations and voiceovers to make the game more realistic.

Use/Abuse/Dependency, Overdose, and the *Whiz Quiz* were enhanced with video, animation, and voice-overs.

Nature of Revisions: HIV/AIDS, Stress, and Sexuality

The HIV/AIDS, Stress, and Sexuality modules all received a complete content and editorial review in the course of adding technology updates. One of the major changes resulting from this process was removal of the information regarding birth control from the Sexuality module to accommodate the schools taking an abstinence-only approach to sex education. The material addressing birth control is now available in a special edition of BARN Multimedia. The remaining Sexuality materials were divided between two CDs—*A Healthy Me*, presenting information on physiology and sexually-transmitted diseases; and *Respect & Responsibility*, focusing on communication and decision making. Finally, modules were added explaining how to perform breast and testicular self-exams.

The result of these changes is that while much of the evaluated content of original BARN has been retained, it has been repackaged in new units and given a high-interest multimedia treatment. Currently, these three modules contain the following activities.

HIV/AIDS: It's Up to You

Tip of the Iceberg is an introductory, didactic unit that presents basic facts about and symptoms of HIV and AIDS.

Risk Assessment is an interview format that asks the user to answer a series of questions about his/her own (or a hypothetical person's) sexual behavior. Based on the responses, the computer calculates the person's relative risk of contracting AIDS.

The AIDS Advisor presents common questions from teens to "Dear AIDS Advisor," who replies in a short letter like those that appear in advice columns. The topics include Information about HIV, AIDS Prevention, AIDS and Drugs, AIDS and Sex, and Testing for AIDS.

AIDS Maze Game offers a series of mazes that students negotiate by correctly answering questions about HIV and AIDS.

Stress Management: A Healthy Balance

A Healthy Balance explains the importance of maintaining a healthy balance of stress—how either too much or too little can negatively affect a person. This is essentially a didactic unit that presents information.

Fight or Flight outlines the fight-or-flight response, how such physiological changes can be counterproductive in situations of emotional stress, what is the difference between chronic and episodic stress, and how people may deal with the physical energy of stress. Interactivity is increased with the addition of some questions.

Assess Your Stress is a guided set of questions that helps the user identify what factor is causing the greatest stress and to learn how to rate physical, emotional, and behavioral characteristics of stress on a three-point scale.

Ways to Reduce Stress provides eight tips for stress reduction, such as, relaxation, avoiding caffeine/cigarette use, and getting adequate sleep.

Talking Straight Talk teaches the technique of using "I" messages to confront somebody about a situation that is causing stress. Students can practice creating "I" messages in a series of realistic situations.

Human Sexuality 1 & 2

Male Health/Female Health are companion units presenting information about the anatomy and physiology of the male and female genital systems, as well as the physiology of the sexual response.

Teen Advisor is a computerized "advice column" answering questions from real teens. Questions relate to puberty, sexually-transmitted diseases, menstruation, erections, and self-exams for breast or testicular cancer.

STD Quick Check helps students determine whether they might be infected with sexually-transmitted diseases by presenting a series of questions relating to disease symptoms.

Just the Facts Game is a capstone game that presents questions relating to all units on the CD. Students roll a pair of dice and move around a game board, attempting to answer questions correctly to reach the finish.

Teen Views presents the results of a survey of 1,900 teens about what things are important in their lives, emphasizing that many issues are more important to teens than just sex.

Soap Operas presents three dating situations in which the characters face choices. Feedback on the situations is provided, and some opportunities for students to explore different outcomes is provided.

Tough Choices allows the student to write a play about a couple's decision on whether to have sex and the consequences of their decisions.

Myth and Reality is a board game presenting questions about sexuality and sexual decision making. Students roll a pair of dice and move around a game board, attempting to answer questions correctly to reach the finish.

Development Process for Version 4.0

Five segments from Alcohol and Other Drugs, Smoking, and Body Management were selected for an intensive development process to pilot multimedia strategies that would enhance the prevention message. The Alcohol and Other Drugs activity prototypes were developed first. Usability testing with students was conducted late in the process, after the video footage had all been finalized. Students recommended changes to the Alcohol and Other Drugs module, including criticism of the video, which were valid but could not be made that late in the development process. Subsequently, the development process was modified for the Smoking and Body Management segments to allow more student input at an earlier stage.

Alcohol and Other Drugs

Initially, all BARN activities were reviewed by two of the developers of the original BARN program to identify appropriate additions of multimedia, based on criteria that they 1) were consistent with research findings regarding effective prevention; 2) could strengthen the health promotion message; 3) facilitated the portrayal of strong, positive role models; and 4) increased opportunities for user interaction. The design team next focused on *Stand Up for Yourself* and *Stay on Track*, fleshing out the basic concepts for the two activities. A professional scriptwriter and a graphic designer then developed the script for the video and the format of the game, respectively. Once the prototypes for *Stand Up for Yourself* and *Stay on Track* were developed, they were reviewed by 28 middle and high school students who were drawn from various sites, including an alternative middle school and a center for runaway youth. In the audio-taped interviews, which lasted between 20 minutes and an hour, students were asked about their opinions, feelings, and experiences with pressure to use alcohol and other drugs. After their input, they reviewed the two segments and completed a short questionnaire about the importance of various multimedia features and the quality of the video.

Students generally liked the concept of including video in *Stand Up for Yourself*, but noted that the script and casting need to be credible. In particular, they pointed out the age disparity between the two role models and the younger teen who offers them alcohol. They also had comments about the screen design, including the small size of the buttons. Opinions were mixed about the voiceovers—some students turned off the volume. This feature seems to have the most utility for the students with reading difficulties and for using the software in group presentations. Reactions to Stay on Track were highly positive.

A second focus group was held with five health teachers, all of whom had been using BARN for at least a year. Participants described how they currently used BARN, reviewed the two prototypes, and finally completed the same questionnaire used in the student interviews. They pointed to four strengths of BARN: 1) it has good information, 2) it actively engages students, 3) it allows teachers to work with students in nontraditional ways, and 4) it allows students to move at their own pace. Like the students, teachers felt the inclusion of video was important and they liked the general message.

In terms of responses to the questionnaire, there was an interesting dichotomy, with the teachers generally rating the multimedia components as being more important than the students did. The teachers were also far more critical of the technical quality (e.g. digital video) and credibility than were the students.

In response to the critiques, the video segments of *Stand Up for Yourself* were edited and improved with interactive questions. The feedback was used to strengthen the video segments for Should I?, the next segment developed. Specifically, a focus group of teens was convened to review the script prior to shooting the video, and more attention was paid to issues of casting and direction.

Smoking and Body Management

While the development for these two modules was similar, more teen input was sought earlier in this process in order to avoid the problems that arose previously in *Stand Up for Yourself*. The consultants reviewed the modules to determine where prevention information needed to be changed or added to conform to current thinking, as well as where multimedia could strengthen the message (using the criteria described previously). In the Smoking module the material in sections covering media influences, coping with anxiety, and communication skills—particularly refusal and assertiveness skills—was updated and reinforced with video and multimedia. More peer modeling was incorporated to strengthen the social learning component.

The questions for the two games (*The Tobacco Game, Nutrition Power Game*) were reviewed for content and appropriateness. Since the game format was modeled after existing LMS games that had been extensively reviewed, it was decided to devote resources to developing the video segments (*Radio TLK*), rather than to conduct further review of the games. As before, the video concept was developed by the design team, including the consultants, two of the original developers of BARN, and a professional scriptwriter hired to complete the writing. Before production commenced, however, eight middle-school students reviewed the script for content and appropriateness. After script revisions, the video was shot and edited, and then two focus groups of middle-school students (one in a school, the other in a community center) reviewed the video. Based on their critiques regarding the authenticity of the characters and the script, the video was re-edited before being embedded in the software. Finally, the *Radio TLK* segments, as well as prototypes of the other programs in these modules, were reviewed by a third group of students. The positive reactions of these reviewers confirmed that the developers had succeeded in creating motivating programs that presented content the students found useful.

BARN Multimedia (Version 5.0)

Development for Version 5.0

Phase 2 development is ongoing to complete BARN Multimedia Version 5.0 and to conduct scientifically-controlled evaluation of its effectiveness as a prevention agent. As of September 2000, all eight CDs have been designed with music, voiceovers, video, 3-D graphics, special effects, and animation. The next step will be a year-long evaluation of BARN effectiveness. Because it was judged impractical in terms of data collection and use by schools to evaluate the complete content of all eight CDs, several activities were selected that are judged to have the greatest likelihood of affecting behavior change, based on theoretical modeling. Printed teacher and student guides were developed to accompany these materials. The selected activities are as follows:

Stand Up for Yourself is the same activity discussed extensively in the BARN Multimedia section. It was included to address **refusal skills** and positive **peer modeling**.

You Bet Your Life is a game of chance in which students attend a party and have to make decisions about using alcohol and drugs. They have the opportunity to tempt fate and try to "beat the odds," reinforcing the random consequences of risky behavior. This game serves as **behavioral rehearsal** of decision-making skills in a realistic setting.

Making Decisions, a program focusing on tobacco, provides a step-by-step decision-making model to help students choose what is best for them. Strengthening **decision-making skills** is a proven prevention strategy.

Media Pressure helps students analyze media messages about smoking and to identify factors that influence people to make particular decisions. Addressing **media messages** is a key prevention strategy.

People Pressure allows students to analyze and evaluate situations in which one friend is pressuring another to do something he or she does not wish to do. With a focus on smoking, this activity addresses resistance to **peer pressure**.

Great Ways to Reduce Stress gives eight tips for **stress management** through communication and changing personal habits, since many adolescents are attracted to drugs and alcohol as a way to relieve stress.

Straight Talk teaches **assertiveness skills** that help students communicate—without yelling, blaming, accusing, or using put-downs—with a person who is causing stress.

The Challenge is an interactive capstone game in which students answer questions about alcohol, tobacco, and other drugs. It serves the dual purposes of providing **accurate factual information,** while debunking **myths of high norms** (i.e., everyone else is using drugs).

Current Evaluation

An evaluation study is currently underway to test the following hypotheses:

- BARN Multimedia, used as a computer-aided instructional resource integrated into regular health education, will yield significantly more positive student outcomes than will regular health education alone.

- Health education messages delivered using BARN will be perceived as very credible.

- Computer-aided health education via BARN will be equally effective with and credible to multiple subpopulations of youth.

Classrooms in five participating middle schools in the Milwaukee and Madison areas of Wisconsin are the subject population. Twenty-two classrooms were designated as controls, and received a semester of regular health instruction only. The other 22 classrooms received the regular health education curriculum plus six days of BARN use in the computer lab. Students worked alone at a personal computer and completed specific activities.

Half of the classrooms participated during the first semester and the other half during the second, allowing replication of the study and lending confidence to the reliability of results.

BARN Multimedia is expected to add several features to the health curriculum. Most health education classes focus on knowledge acquisition, which has limited efficacy in altering behaviors or attitudes. BARN adds skill development and practice to promote behavior change. Whereas classroom instruction typically occurs in a large group and is didactic in nature, BARN is personalized to the individual and is interactive to facilitate active engagement in learning.

Evaluation Measures

Three types of data were collected: student surveys, student responses in focus groups, and teacher logs. The survey was developed using items from BARN, as well as items from scales published in the prevention literature. It measured immediate outcomes of health education, long-term behavior-change outcomes, feedback (at immediate post-test only) regarding the perceived credibility of the information in BARN, and feelings about the health education experience. Following pilot testing and revision of the survey instrument, the final item pool has been established and incorporated into a multimedia CD-ROM, creating a computer-assisted self-interview. The survey was administered (1999–2000) to both experimental and control groups of students at the beginning of the semester and at the end (to measure immediate outcomes), as well as again in the next school year (to measure long-term outcomes).

A series of 12 focus groups was also held with selected students from a sample of classrooms during each semester of implementation. The students were asked about their experience with health education, the perceived credibility of the source and message, and their likes and dislikes regarding BARN and other aspects of health education.

Teachers were asked to maintain logs of the health education topics, the date, dates of use of BARN modules, and attendance on the days of BARN use. Teachers were also surveyed before and after participation for their perception of the level of glamorized talk about drug use in the participating classrooms (an indicator of students' attitudes), students' acceptance of BARN, and their own rating of the experience.

The following variables were measured:

- Knowledge regarding consequences, social influences, peer norms, and skills relative to alcohol and other drug use
- Self-efficacy and confidence in the ability to resist negative behaviors and practice positive behaviors
- Intentions to engage in future drug use
- Credibility of the health education source
- Onset (lifetime) and past month involvement in risk behaviors.

When fully completed, this study will add to BARN's twenty years of research and development history. There is every reason to believe that the results will again be positive, making BARN one of only a handful of prevention programs to have proven efficacy in reducing health risk behaviors across a wide spectrum of adolescents with different ethnic backgrounds and levels of risk.

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