Adapting a Diet Analysis Program for an Adolescent Audience

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INTRODUCTION

Lytle and Achterberg identified key components to behavior change for youth interventions: (1) self-assessment of eating patterns for adolescents, (2) use of interactive computer technology, and (3) personalized and targeted messages.[1] Building on this literature and our interviews with individual middle school students and teachers in California, we decided to include a focused computer component as an important strategy for a nutrition education intervention. The cost of developing a computerized diet analysis application was prohibitive (> $100 000). As a viable alternative, saving time and money, we decided to adapt an existing computer application to meet the needs of our new audience. This adapted Web-based application (www.eatfit.net) starts with the entry of a 24-hour diet record by the adolescent and concludes with the output of a personalized and behaviorally focused goal.

Although we believed that our plan was comprehensive, we learned otherwise. This GEM delineates the 6 steps we took to adapt this application. We offer supporting examples from our experiences. These steps might assist others who are considering the inclusion of a computerized diet analysis application into their nutrition education efforts.

The Expanded Food and Nutrition Education Program (EFNEP) and the American Distance Education Consortium funded this software application. This Web-based diet analysis application is part of a comprehensive nutrition and physical activity curriculum. The curriculum can be viewed at http://efnep.ucdavis.edu/eatfit.htm.

STEP 1. CHOOSE APPLICATION/DATABASE FOR ADAPTATION

A review of existing diet analysis applications is the first step. Adaptability (ie, ability to change the database and manipulate data) and availability (ie, permission to adapt and cost to use) are decisive factors. Each mode of delivery (ie, Web, CD-ROM, or both) requires unique programming; therefore, an early decision saves money. We chose the Expanded Food and Nutrition Education Program (EFNEP) Evaluation and Reporting System (ERS) for adaptation. Designed for data entry by EFNEP staff, its diet analysis and foods database components could be manipulated to meet our needs. The foods database contained most of the items that we needed and was familiar to EFNEP staff.[2] Permission to adapt was granted. Our decision to adapt to both Web and CD-ROM came too late to make dual functioning possible.

STEP 2. REVIEW FOODS FOR APPLICABILITY

Use of diet analysis applications requires sorting through a long list of foods. This can be a burden for many users (eg, consumers, adolescents, seniors). Therefore, it is worthwhile to reduce the number of food choices to a manageable number, combining or deleting foods as necessary for use by the new audience. The ERS database originally contained 1600 foods. We narrowed down the list to food items most relevant to our adolescent audience. Some foods were removed (eg, poi, baking soda), some similar foods were combined (eg, several types of chicken noodle soup, dozens of regular sodas), and others were added (eg, fast-food items such as a Big Mac or super-sized fries, snack foods such as Fire Cheetos, and trendy drinks such as Snapple) to finish with a database of approximately 1400 client-familiar foods. Popular terminology was added to increase ease of use by the adolescent (eg, *soda* for *soft drink)* (Figure 1).

STEP 3. ASSESS RELEVANCE OF NUTRIENTS

Not all nutrient databases contain all of the nutrients or information that you may need, or they may not be in a readily usable format. Therefore, it may be necessary to add data and/or alter the format for each item in the existing database. All foods in the ERS nutrient database contained values for iron (mg) and calcium (mg), fat (g), and fruits and vegetables (servings). Because teens typically overconsume "added sugar" in the form of refined products, it was critical that sugar be included in our database. Including this nutrient was a large undertaking, significantly impacting our limited resources. Values for "added sugar" from the Continuing Survey of Food Intakes in Individuals II[3] were used to estimate values for the corresponding food products in our now modified database, and they were manually entered for each of the 1400 foods. By ensuring that calcium, iron, fruits and vegetables, fat, and added sugars were part of the foods database, we could evaluate intake for these foods and nutrients of concern and provide feedback to the participant about over- or underconsumption.

STEP 4. INCREASE USER INPUT ACCURACY

Reporting accurate portions is a ubiquitous problem with diet assessment, and estimating food quantity is difficult for most audiences. Providing support for estimating portions is essential for accurate diet analysis, interpretation, and, consequently, feedback to the

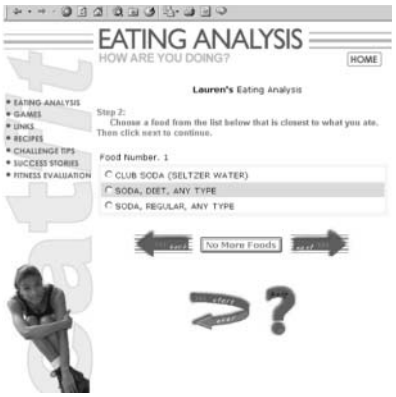

Figure 1. Eating analysis screen.

client. Other support items to consider are spelling aids and a "help" feature. To increase the accuracy of food records for adolescents, we created common pictorial references for food portions. Familiar items (eg, tennis ball, deck of cards, videotape) were included in the screen picture as a reference for portion size for general food categories (Figure 2). We also added a spell checker to correct the problem that adolescents had when searching for misspelled foods, and a "help" button was added to answer frequent questions and ease teacher burden.

STEP 5. CHANGE INTERFACE FOR NEW TARGET AUDIENCE

Most diet analysis programs are intended for professional or paraprofessional use, and this is the case with ERS. When adapting a diet analysis application, it is important to consider the characteristics of the target audience for customizing the analysis output and connecting that output with the intervention goal. Academic- or clinical-appearing screens would not be suitable for a technology-savvy youth audience. An adolescent-friendly interface (Figure 3) and output forms were created. Page design, including representative ethnic images, and a comprehensible analysis output were our most important considerations. Input screens are colorful and lively, with easy transitions, such as "next" buttons and clearly numbered

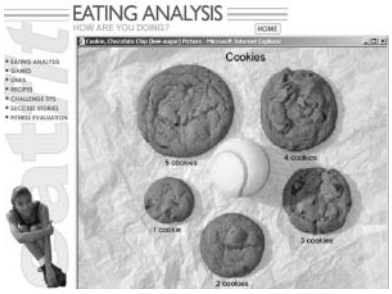

Figure 2. Example of a portion-size photograph: cookies compared with a tennis ball.

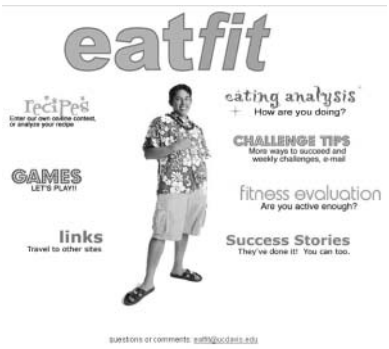

Figure 3. Teen-friendly interface and output screens.

steps. The final output provides positive feedback, such as a "Congratulations for work well done." The output also includes a goal statement for improving dietary behaviors. These statements are personalized with each adolescent's name and chosen behavioral motivators. Based on the student-entered eating record, the application analyzes diet quality using a 6-category ranking system designed by the authors. The analysis formulates a score for each of the 6 diet areas using the percentages of recommended levels (Recommended Dietary Allowances, Adequate Intake, questionnaire points) so that different measurements might be compared.

STEP 6. EVALUATE

Process evaluation during the final stages of application adaptation is essential. The users are the authoritative source for what works well for them and captures their interest. We observed seventh grade students (n = 27) using the new application and then conducted interviews with them. After completing the assignment, participants (76%) rated the Web-based EatFit application as "very fun," "fun," or "okay." Reflecting student suggestions, we included more colorful pages and added teen-friendly foods. The www.eatfit.net on-line application has been successfully used in classrooms and community centers for 3 years. We found that the teens were excited to use this computer-based learning tool. Our studies indicate that the dietary behaviors selected by adolescent clients were successfully adopted (ie, goal commitment was high; 87%-90%).

SUMMARY

With the expansion of nutrition education to the World Wide Web, nutrition educators will find ways to adapt existing programs for new audiences and save time and money. The Internet allows for mass distribution, which decreases reproduction costs, easy updating, and individual tailoring. Compared to developing a new application, adapting an existing diet analysis application to fit the needs of the EatFit intervention took a quarter of the cost and a third of the time. The process of adapting the application took 5 people working part time for approximately 1 year and might have taken less time had we fully anticipated some of the issues ahead of time. The 6 steps outlined here should save others valuable time and resources.

ACKNOWLEDGMENTS

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