# A Collaborative Approach to Nutrition Education for College Students

Tara M. Cousineau, PhD; Marion Goldstein, BA; Debra L. Franko, PhD

**Abstract.** It is well established in the literature that college students have poor eating habits and that many barriers exist to achieving optimal nutrition for this busy population. Little is known about students' perceptions of this problem or suggestions for improving their dietary habits. Similarly, college health professionals need innovative approaches to nutritional education. In an effort to develop an online nutrition resource specifically geared to college students, the authors assessed the availability of Internet-based nutritional information for this population and conducted focus groups with students and health professionals to identify relevant nutrition concerns. They used concept-mapping techniques to conduct a systematic analysis of the qualitative information generated from their focus group participants. Their findings emphasize the need for targeted resources for college students and the importance of using students' suggestions in developing nutrition programs.

**Key Words:** college students, concept mapping, Internet, nutrition

The Internet is an ongoing resource for today's college student that is becoming increasingly central to achieving academic endeavors.[1] Web applications make it possible for health promotion initiatives to reach a large audience at a time when young adults are already immersed in online communication for a variety of reasons (eg, coursework, research, and e-mail). Given this trend, the Internet is an important vehicle for cost-effective measures aimed at a variety of health areas for which campus resources may be limited or allocated to other priority health issues, such as binge drinking or tobacco use. Nutrition is one health area for which online education can serve an import adjunctive resource for students. The transition to college often poses new challenges for students in terms of dietary habits, having food choices determined by cafeteria meal plans or buying and planning food for one self for the first time since leaving home.[2]

Surveys report that many college students tend to engage in detrimental health practices, such as increased use of alcohol and tobacco,[3] decreased use of preventive measures for sexually transmitted diseases,[4] decreased physical activity,[5] and poor dietary practices.[6] More than one third (35%) of college students are overweight or obese, and almost half (46%) report trying to lose weight through exercise or diet.[7] There is also a high prevalence of dieting behaviors among college women who avoid fat, have lower self-esteem, and are preoccupied with body size and shape.[8]

Further, it may be reasonable to assume that normative stressors, such as course load and examination stress, may influence students' dietary habits, yet studies on the stress-eating association remain inconclusive in this population.[9,10] Recent evidence from the Health and Behaviors Teenagers Study (HABITS), however, suggests a dose-response relationship between stress and unhealthy dietary practices among adolescents, with higher levels of perceived stress associated with poor dietary habits, independent of gender, weight, and social factors.[10] Adolescents who perceive greater levels of stress exhibit acute changes in dietary practices, such as skipping breakfast and increasing consumption of fatty foods.[11] The implication of these findings suggests that stress-induced dietary changes may contribute to risks for serious health issues in adulthood. Because college students are faced with a new set of challenges, including developmental, environmental, and social transitions, and are developing established lifestyle habits, they represent an important target group for nutrition education and prevention efforts.

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It is not clear what kind of nutrition resources college students would find most helpful. In developing an interactive Internet-based nutrition education program described in detail elsewhere,[12] we posed 3 preliminary questions: (1) What kind of online nutrition information is currently available? (2) What kind of nutrition information do students want? And (3) Which elements of nutrition information do college health educators and counselors perceive as most relevant for today's students? To answer these questions, we used 2 methods—a content analysis of online resources and concept mapping, [13,14] a procedure to identify and quantify data elicited from focus groups.

## What Is on the Internet?

To assess the current availability of online nutrition information for college students, we conducted an analysis of online nutrition information. We chose 5 key word groupings deemed most likely to result in nutrition-related Web sites for this population: nutrition, college students; diet, college students; nutrition program, college students; teens, nutrition intervention; and weight management in college. Using these key-word groupings, we compiled the first 25 search results from 3 popular search engines, Google, Yahoo!, and Lycos. A total of 375 search results (75 hits from each key word grouping) were filtered for redundancy, resulting in a final list of 232 distinct Web links. We categorized each search result as one of 9 types of Web links: vendors or products, nutrition strategies, interactive tools, resource pages or links, umbrella sites (eg, www.colleges.com, www.dietitian.com), research findings, university postings (eg, courses), or content unrelated to nutrition. We then coded each link according to whether the site offered nutrition information targeted to a college population, excluding college course listings or syllabi.

This analysis revealed unexpected results (see Table 1). Not one of the resulting nutrition Web pages specifically targeted college students. Furthermore, only 4 of those Web sites (www.Sodexho.com; www.cspinet.org; www.Learnwell.org; and www.Lifeclinic.com) delivered nutrition information using at least 1 interactive feature (eg, quizzes, body mass index calculations, personal nutrition tracking, or interactive food pyramids).[1] The majority of hits that used this technique led to academic course postings or faculty pages ($n$ = 96; 26%), stand-alone articles presenting general nutrition news, research findings, or nutrition-related tips ($n$ = 64; 17%), health Web sites that did not have nutrition as its primary focus ($n$ = 50; 13%), weight control products promotions ($n$ = 27; 7%), and pages presenting a series of links to other Web sites ($n$ = 25; 7%). We were surprised at the dearth of nutrition information specifically designated for college students. Indeed, this initial content search revealed the need for accessible comprehensive nutrition information that is targeted to college students. It also revealed an opportunity to offer quality nutrition education in a way that students would find interactive, engaging, and responsive to their nutrition concerns.

**TABLE 1. College Nutrition Web Resources Found in Search†**

| Web link category | Frequency | |
|---|---|---|
| | *N* | % |
| Vendors or products | 18 | 8 |
| Nutrition strategies | 5 | 2 |
| Interactive tool | 7 | 3 |
| Resource page or links | 15 | 7 |
| Umbrella site | 38 | 16 |
| Research findings | 31 | 13 |
| Articles | 31 | 13 |
| University posting | 57 | 26 |
| Unrelated to nutrition | 27 | 12 |

†Total search results = 232.

## What Nutrition Information Do Students Want? Which Elements Do College Health Professionals Perceive as Most Important?

We conducted focus groups to identify online nutrition information college students would like to see available and what college health staff view as the main nutritional concerns on college campuses. Typically, focus groups are used to identify program needs or themes and to share and compare ideas. One drawback of focus groups is that questions may be asked or interpreted inconsistently, depending on the interests of the researcher. Another limitation of focus groups is that participants may be influenced by each other or be unwilling to disagree with opinions put forth, which limits the discussion to fewer ideas.[15]

To overcome these limitations, we employed a process called concept mapping (CM), a "structured conceptualization" technique used for program planning. CM has been used to develop programs in various areas, including educational administration, multicultural awareness, personnel management, and counseling services.[13,16–18] The CM process is particularly suited to focus groups because it establishes a thematic consensus on the basis of the preferences and ideas of individual participants. CM is typically conducted with 10 to 20 participants to ensure a variety of opinions.[13] CM minimizes researcher bias by having the group under study work independently in generating written responses to a specific question, such as describing which nutrition-related issues, resources, and information are most relevant to college students. The process is both intuitive and structured and brings a more rigorous methodology to evaluating qualitative data. The data are analyzed using the Concept System® software (Concept System, version 1.751, 1996–2002S, 401 East State Street, Suite 402, Ithaca, NY), which uses a combination of multidimensional scaling and cluster analysis to generate concept maps based on the written ideas generated by the participants. These maps identify program goals by visually depicting the most salient relationships among the themes generated.

We used this approach in a series of focus groups conducted as part of a larger study to develop a prototype of a college nutrition Web site.[12] Concept mapping allowed us to organize this information systematically from our potential end users (ie, students and college health staff), as well as ensuring that the content of the program would be framed in the language of its users.

## METHOD

### Participants

We held focus groups in the United States with 27 college students (3 groups of 9) at 2 university sites, 2 groups at a large campus in the Northeast, and 1 group at a campus in the South. Because our content area (nutrition concerns in college students) is fairly narrow, we limited the total number of groups to 3 to avoid theoretical saturation (ie, when the addition of groups no longer yields new information).[15] Of the total sample, 56% were women ($n$ = 15) and 59% were minorities (primarily African American and Hispanic or Latino; $n$ = 16). We oversampled for minority students to ensure that adequate attention would be paid to the nutritional concerns of a diverse group of students. We recruited an additional 8 students from the university in the Northeast for a second phase. Six professionals who work in college health settings in New England were also gathered for a focus group (eg, 2 health administrators, 2 counselors, a dietitian, and a nurse).

### Procedures

Our study was approved by the Inflexxion institutional review board (IRB) and by the IRBs of the universities involved.

During the first phase, we asked all student and expert focus group participants to discuss the major themes, concerns, and barriers to maintaining healthy nutrition during college and what would be most helpful in promoting healthier eating habits. We also asked them to generate as many written statements as they could think of in response to a focus prompt: *The most important features of the proposed [program] are*_____.

In the second phase, we asked participants to structure these focus statements by sorting and rating the responses to the focus prompt. These participants included a new set of college students ($n$ = 8), nutrition experts and consultants ($n$ = 8), and the research team ($n$ = 5). To sort the list of items, individual participants placed each focus statement on a pile that they created, so statements that individual participant s perceived as similar in meaning were grouped in the same pile. When all statements had been sorted, the participants were asked to title each pile. Finally, participants were asked to rate the importance of each statement on a 5-point scale (1 = *not at all important* to 5 = *extremely important*), according to how critical they thought each nutrition topic was for the proposed college nutrition program. The students were paid $50 and the experts $100 for their time.

We filtered the list of approximately 200 responses for repetitions, resulting in 67 focus statements. Each statement represented a distinct feature or content area related to nutrition (see the Appendix). The research team entered this list of statements into the software program. When sorting and rating were complete, we used the concept mapping software to conduct an analysis and locate each statement as a separate point on a concept map. Statements that participants grouped together most often were represented as closer on the map than those sorted less often together. Next, we organized the statements into higher order conceptual groupings. The software generated a series of maps that overlaid the average ratings of the points in a cluster so that a cluster with many levels had a higher average rating than a cluster with fewer levels. The software generated a series of maps that overlaid the average ratings of the points in a cluster so that a cluster with many levels had a higher so that labels that characterized each map cluster and the research team edited the labels to ensure clarity. Next, the software generated a pattern match analysis between the college students and experts. This analysis allowed a comparison, both visually and statistically, of 2 sets of ratings from a concept map[19]; it also allowed us to examine consensus among students and health experts and to identify areas of high or low correspondence.

## RESULTS

Concept mapping results permitted us to assess how participants organized disparate nutrition-related concepts or features and to make a direct comparison of the perceived relative importance of these ideas. Figure 1 presents a cluster map for all participants with 6 clusters. They include healthy eating on a budget, healthy meal planning, student personalization features, basic nutrition facts, body image or weight concerns, and expert nutrition information. Figure 2 depicts the pattern match analysis.

The correlation between the ratings of clusters by both groups was $r$ = .92, indicating a high level of agreement between how students and experts rated the relative importance of the 6 clusters. These 2 groups rated all 6 clusters in nearly identical order, suggesting that both experts and students viewed these content areas as equally important (minimum average cluster rating was 3.53 out of 5). The only exception was that students rated body image or weight control concerns higher than expert nutrition advice, whereas the experts rated expert nutrition advice higher than body image or weight concerns. The high correlation between the 2 groups suggests that students and experts agreed on the most important nutrition issues for college students. Alternatively, the refined list of 67 concept-mapping statements generated by both groups identified the most relevant nutritional needs of this college student population, which in turn generated high levels of agreement. Because the experts were all health professionals on the front lines at campus settings, they were particularly attuned to the health needs of students.

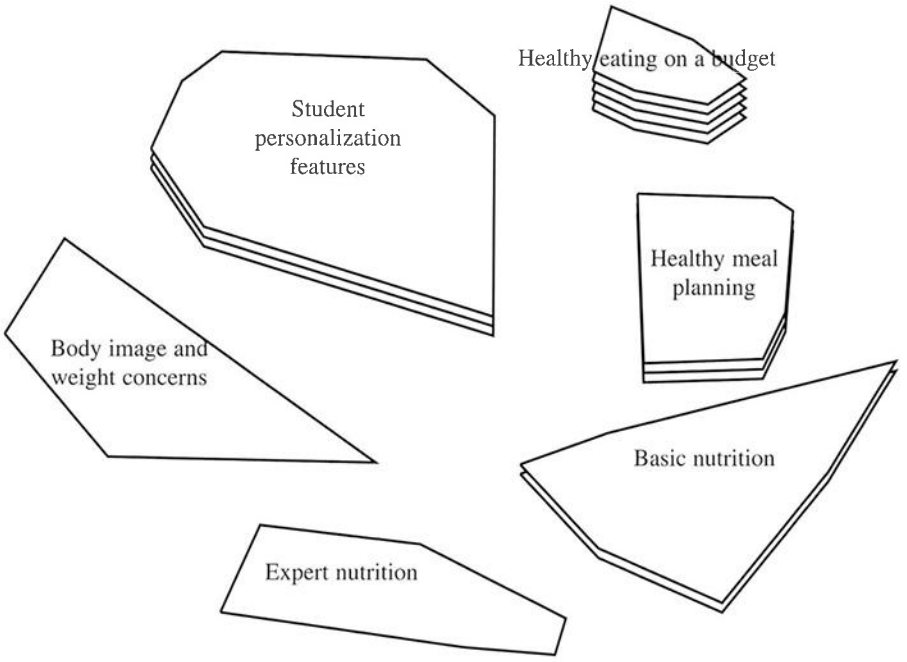


**FIGURE 1. Concept map derived from focus groups to determine Web Site content.†**

†Concept mapping analysis and results conducted using the Concept System® software: Copyright 1989-2002S; all rights reserved. Concept Systems, Inc.

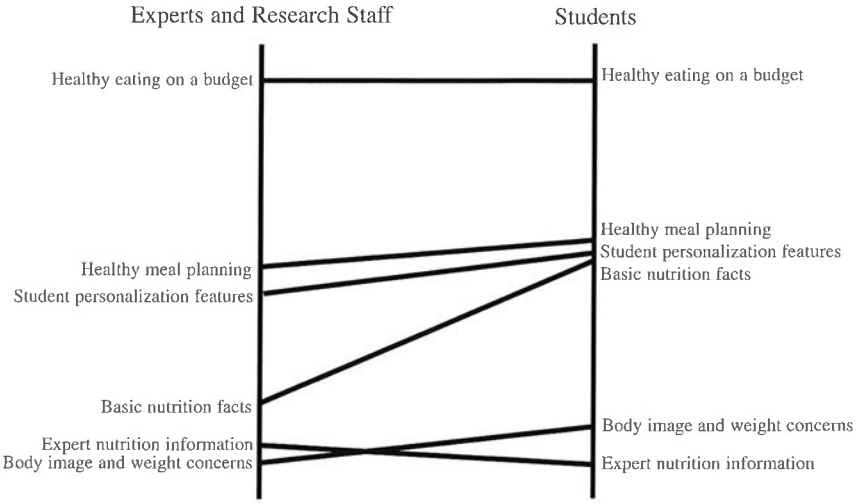


**FIGURE 2. Correspondence between expert and student rating (pattern match).†**

†Concept mapping analysis and results conducted using the Concept System® software: Copyright 1989-2002S; all rights reserved. Concept Systems, Inc.

## COMMENT

Both the Web site analysis and the focus groups with students and health educators helped conceptualize nutrition education goals targeted to the realities of college life. The concept-mapping approach allowed us to systematically identify the critical relationships among the ideas generated by both sets of participants. Concept mapping made it possible for us to conceptualize our education goals in the language of the participants rather than that of researchers or

of established nutrition curricula, which are typically developed by experts.[13] Conducting qualitative research with a target population such as college students and health educators is an important process in developing the content of a nutrition education program and will ultimately ensure that the program content will be germane to those who use the program.[20] Our findings identify the most salient nutrition issues for college students, which will be included in the development of an interactive Web site.

### Limitations

Although concept mapping offers an innovative method for quantifying narrative data, we should note several limitations in the current study. The results are determined in part by how well the focus prompt is developed, and subsequently, the quality and relevance of the written statements generated during the focus task. In our efforts to maximize diversity, we used focus group students who were largely from urban university campuses; therefore, the needs and nutrition concerns of this group may not reflect those in smaller rural settings or community colleges. Another limitation was the small sample size. Because our content area was fairly narrow (nutrition concerns in the college setting), we limited the number of focus-group participants.[15] We plan a randomized controlled field study with a large sample to test the efficacy of the resulting online nutrition program.

Finally, although the research team did not participate in statement generation (potentially introducing their own bias and language), they did participate in the sorting and rating of these statements. In program planning and evaluation research, a variety of pertinent people (or stakeholders) often participate to allow for a broader sampling of opinion. In this case, the research team had combined expertise in both the nutrition education field and Web-based prevention programming, so we included their ratings.

The concept-mapping method is increasingly being used in social science research, and we found it particularly instructive in program planning.[13,16–18] This study offers an example of how structural conceptualization can be used collaboratively with college students and health educators in the development of a nutrition education program.

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### NOTE

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*appendix on next page*

## APPENDIX

### Students' and Health Educators' Generated Concept-Mapping Statements†

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Personalized advice about nutrition
How to find and choose inexpensive healthy food when shopping
Nutrition myths and facts
Animated description of digestive process
Information from health experts (Q&A)
Information on ideal weight or body throughout history
Information on food safety
Dietary information on fast food
True stories from students with nutrition or body image con` cerns
Interactive nutrition log or planner (printable)
Differences between a maintaining a healthy diet and dieting
Quizzes about nutrition
A list of calories of daily foods or calorie counter
Healthy recipes
Scientific articles dealing with nutrition
Food pyramids including those for vegans or vegetarians
Rating of quality of diet
Information on how different nutrients affect the body
Food group descriptions
Fact or fiction about dietary supplements, shakes, protein powders, and energy drinks
Peer comments or questions
Fad diet drawbacks
College specific dietary advice (tips)
Snack suggestions
Workout tips
How stress influences nutrition
Links to nutrition chat rooms
Book recommendations
Information on the link between smoking and weight change
Recommended calories for various weights or builds
Information on long-term consequences of undereating or malnutrition
Information on different types of fat and why some fat is necessary
Definition of healthy eating
Information on how the brain controls eating behavior
Information on importance of protein
Information on body mass index and how to determine your optimal weight ("set point")
Information on late-night eating
Tips on how to choose healthy food in the dining hall
Information on how much water is good and the effects of too much water
Information on recommended number of meals to eat in an average day
Information on why eating less is not always healthier
Explanation of why vegetarian diets are not always healthy
Information on how to adjust your diet for things like allergies
Information on how to gradually change diet to become healthier
Information on why breakfast is important
The relationship between gender and weight gain or body image concerns
Information on serving sizes for different food groups
Comparisons of different milks: whole, skim, etc
Creative suggestions for eating recommended servings of fruits and vegetables
Information on different kinds of carbohydrates
The consequences of drugs or alcohol on diet
A comparison of the drawbacks between eating unhealthy food versus skipping meals
Information on different sources of protein
Exercise suggestions for building muscle and cutting fat
Suggestions for obtaining fiber in diet
Information on whether it is recommended to skip meals
An explanation of the short- and long-term effects of too much cholesterol
Ways to maintain a healthy diet when eating out or drinking
Information on effects of caffeine
Information on whether alcohol hinders fitness goals
A realistic meal plan to fit a student's schedule
A comparison of eating habits around the world
The connection between sleep and good nutrition
Explanations of common nutrient deficiencies and how to prevent them
Information on artificial sweeteners
"Brain food" facts and myths

†Statements were in response to: *The most important features of the proposed [program] are*_____.