Balance Pass: Service Design for a Healthy College Lifestyle

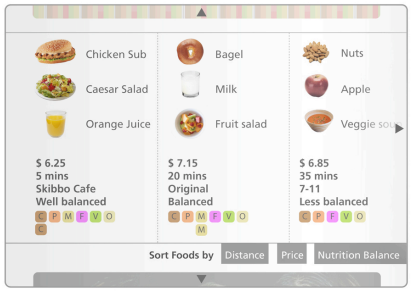

Figure 1. A screen shot of Meal Advice from cardholder display. Students can sort by distance, prices, and nutrition balance of selected meals

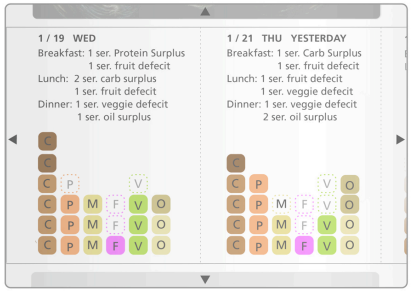

Figure 2. A screen shot of daily view of dietary intake history.

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Abstract
This paper describes the design of a service that provides nutritional feedback to female college freshmen. A variety of background research methods—food journals, competitive product analyses, and ethnographic interviews—led to the design of a service that integrates into existing university systems with little effort.

Keywords
Interaction Design, Service Design, Nutrition, College Students, Handheld Device, Mobile Computing, Context-Aware Computing, User Interface Design, Information Architecture, Structured Interviews, Expert Interviews, Contextual Inquiries, Journal Studies

ACM Classification Keywords
J.3 [Computer Applications]: Life and Medical Sciences — Health; H.5.2 [Information Interfaces and Presentation]: User Interfaces — User Centered Design;

Introduction
While there are many points in life that could be considered formative, it is during the initial college years that many people experience living without the aid of parents for the first time [14]. This can be

particularly important for nutrition, as students slowly learn the variety of methods with which one can acquire meals: on-campus fast food locations, vending machines, cooking, off-campus restaurants, delivery services, and more.

College can also involve quite a bit of hard work. It can be very tempting to simply follow the laziest or fastest routes to get meals, but these meals are often not particularly well-balanced. These unhealthy habits can easily live on in post-college life and generally set bad precedents for the students' expectations of nutrition. For women these habits tend to be passed on to their children, thus creating a vicious cycle.

With these issues in mind, we designed a service to develop healthy food habits for young women from 18-24 years of age. We followed an iterative design process where we identified existing problems using interviews, Contextual Inquiry, literature review, and competitive product analysis. To solve these problems, we designed a service to fit existing university meal plan, made interface prototypes, and tested the service concept with our target audience.

Figure 3. Observation of female college students' living environment

The service, called Balance Pass, pushes nutritional information based on a student's context, and reflects nutritional balances on food purchases made in campus.

Target audience

We focused our design solution on young women from the age of 18-24 based on our background research and expert interviews with health practitioners. Research shows that young women consider physical attractiveness more important for popularity than do boys and experience more dissatisfaction with their appearance than do their male counterparts. Also, adolescent boys in general do not internalize their weight problem as a personal failure, as do young women, and they are much less likely to suffer from low self esteem as a result of their obesity [2][4].

Background research

With our target audience in mind, we first examined the difficulties first year female students face in living a healthy lifestyle. We found that many young women's body image is influenced by media, competition and social comparison [7]. Our interviews with young women and the nutritionists suggested that many young women who feel the urge to diet and control their body weight. However it is often difficult for these young women to track what they have eaten and accurately judge a balanced diet. For example, the nutritionist described a case where some young women skipped meals during the day to compensate for the calories they would consume while drinking liquor at the party later that night. This is a clear case of a misinformed attempt to balance calories.

To avoid these situations, the USDA Dietary Guidelines provides recommendations to promote health through diet and physical activity [1]. The food pyramid is used to educate consumers about these dietary guidelines [8]. Use of graphics, animations and games help people understand the food pyramid. However, while interviewing students, we found that going from knowing to believing to practicing is a difficult task for them. Some of the participants said that they began to practice a healthy diet and exercise regimen only after realizing that they had a health problem. Many participants also attributed their unhealthy lifestyle to a

busy schedule. One participant even said that she would choose sleep over a meal.

Apart from dietary guidelines, there are a number of products designed to help people track the number of calories consumed and expended. We studied some of these products currently available on the market.

BodyMedia provides solutions for wearable body monitoring [9]. One of their flagship products, bodybugg™, uses sensors to collect data about a person's physical activity. This data is then algorithmically processed and presented to the user. The internet is used to collect food journals using a form-based web site. While studying the product we also interviewed an expert from BodyMedia. We found that bodybugg™ is built on an existing ecosystem consisting of the gym and its instructors. The involvement of the instructors keeps users motivated to enter their food intake on the otherwise laborious website.

We also studied myFoodPhone™ which helps users monitor what they have been eating [10]. In this web-based service system the users of myFoodPhone™ can take pictures of their meals and send it to a dietitian who provides feedback. Again, the system relies on a real person to motivate users to follow a healthy lifestyle. The involvement of a personal dietitian makes the service expensive for an audience of first year female college students. Also, it can be difficult to identify the food item from the low resolution mobile phone image.

Figure 4. Photo taken by a participant for a journal. The water was important to stay for hydration.

In an effort to help to guide students to eat better, many college campuses have begun to require (with some exceptions) that all first year students be on a university-regulated meal plan. These meal plans are often available for upperclassmen as well. Meal plans allow parents to pay up front for the students' meals and allow the university to regulate exactly how and when meal points can be spent; hopefully encouraging students to eat in a more regular fashion than they would otherwise be inclined to do.

Interviews

To understand the needs of our target audience we interviewed 9 female students aged 18-24. Participants were asked to maintain a food journal for a week. Most students had cameras in their mobile phones and used them to capture photos of their food.

The goal of the journal was to help us identify touch points, a tangible moment within a user experience. By examining the journals, we could identify where and when our design could exert influence on users' perception and choice of foods to eat. In addition, a contextual inquiry was conducted to observe these young women in the environments they live in. We found that the majority of their eating activity takes place outside their dormitories. Their decision on where and what to eat is often influenced by their friends. When they eat alone, they usually go for the quickest, closest and cheapest food available. Figure 6 shows a typical purchase decision model for the students we interviewed.

Final Solution

After investigating various options, we decided to go with a design, which could be implemented and integrated into the campus environment today; a

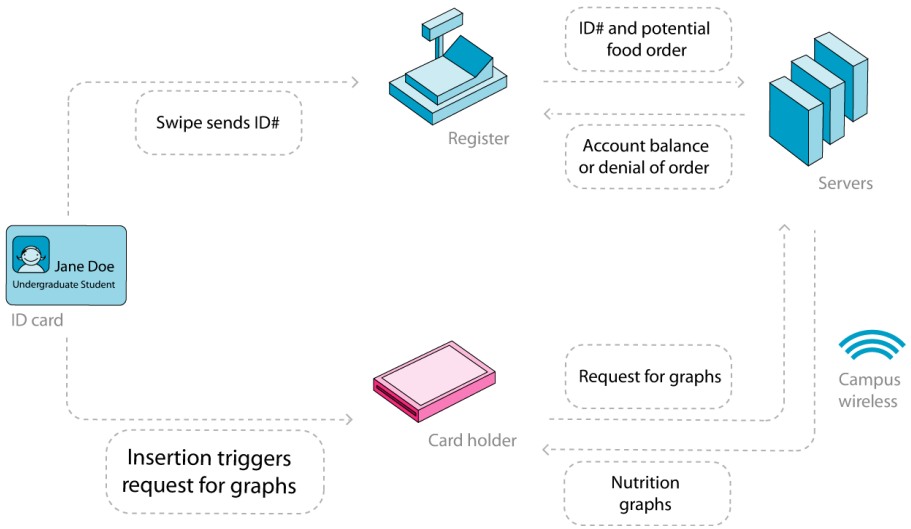

Figure 5. A system diagram shows the service is initiated by swiping the campus ID card

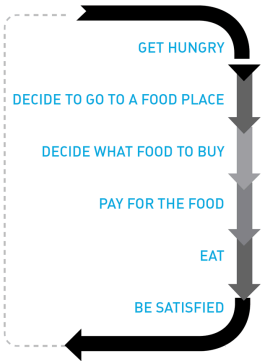

Figure 6. College student food purchase model

design, which could be seamlessly integrated into an existing service model to extend it to perform tasks for us. Thus, our design is an extension of a typical campus meal plan. Some universities have student ID cards, which can be used as debit card within the university and also act as meal plan counter. Our design extends this system.

Balance Pass is a service that uses student ID cards to track students' purchasing behavior, makes approximations of their food habits based on what they have purchased, and provides just in time recommendations to help them make healthy food choices. Students interact with the service using a handheld device which also acts as a student ID holder.

The system diagram (Figure 5) illustrates how the new service integrates with the existing infrastructure.

The recommender system strives to augment the existing student purchase model (Figure 6). The system *pushes* recommendations and a summary of food history to the student when they pay for their food. However, students can also *pull* data on their food history and recommendations at any point in time. Figure 7, 9 illustrates a journey and the interaction flow of the system.

Students can ask for recommendations whenever they get hungry (Figure 1). Based on their food history and location on the campus, the system gives them recommendations on healthy food choices using price, nutritional value and estimated time (Figure 2, 9).

Students can sort food recommendations by these criteria (Figure 1). Though nutrition balance is one of the sorting indicators, all of the food choices are pre-balanced for nutrition based on the food pyramid.

Whether the students ask for recommendations from the system or not, the system pushes their food behavior when cards are activated to pay for purchases.

A think aloud protocol was used to test the screens with students, and we made several iterations on screen design and information flow based on feedback from these sessions.

Figure 7. A journey through the system.

We also found from our research that a reward system can help keep users motivated. Thus, we designed our system to reward the user at regular intervals for their healthy food choices. Users gain a point from taking a suggested meal. By accumulating the reward points to a certain amount, the students can reward themselves by enjoying a free ice cream or two free tickets to a movie.

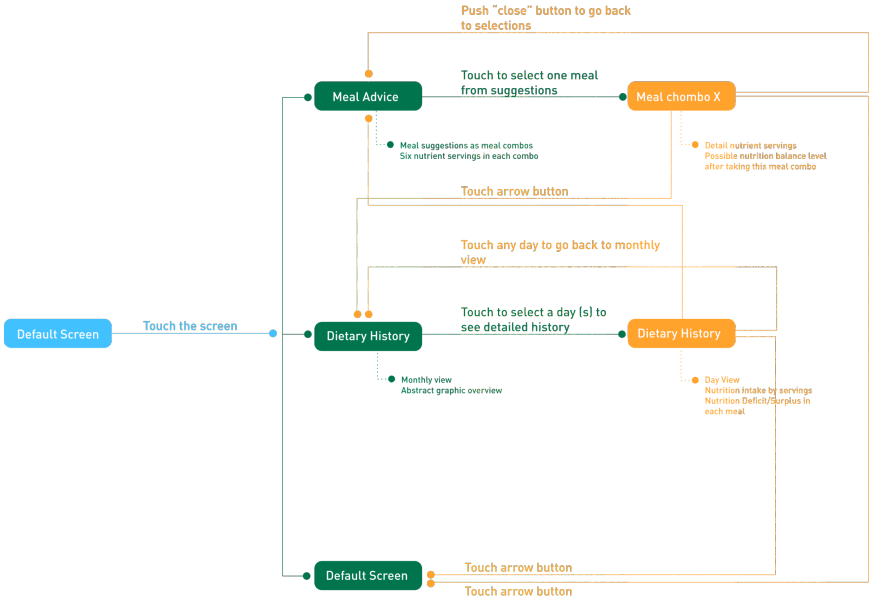

Figure 8. Dietary History from cardholder display. An ambient display is used to show eating trends over the past month.

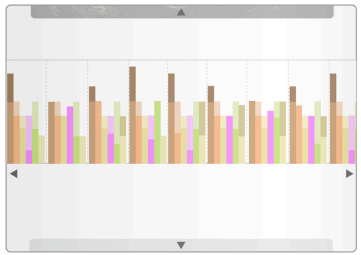

Figure 9. A screen shot of Dietary History from cardholder display. An ambient display is used to show eating trends over the past month.

Limitations

This system does not track the actual amount of food consumed by the users; it is assumed that all food purchased is eaten right after it is purchased, which is an unfortunate assumption for this user group. It does not track group eating behavior or help adjust it. It cannot automatically track food paid for using any method other than the student ID card (although students could manually enter these purchases online).

Conclusion

Promoting good eating habits during college years can help form good eating habits for the rest of students' lives. There are universities that already understand this and have developed entire meal plan systems around this concept. Our research shows that such meal plans may be a good first step, but without real feedback are not enough.

We designed a service to provide this feedback and help students make informed decisions. Our service can be directly inserted into meal plan systems already in use without difficulty. The universities, which provide meal plans are already aware of the benefits of encouraging healthy eating habits, so we expect that our service will be well received.

Acknowledgments

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