Food Information Network: Informed Shopping for Healthier Living

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Abstract
The Food Information Network is a system designed to help people make better choices about the food products they purchase. The system will have access to a large amount of data and will allow such activities as finding alternative food products and the products available at different grocery stores. The system has also been designed to try to encourage people to prepare their own meals by helping them spend less time shopping for healthier food and showing them that it is neither so difficult nor time-consuming to cook at home. The system also encourages users to share nutritional recipes with friends.

The design process followed a scenario-based design methodology, which included field studies, writing activity scenarios, and early user testing with a paper-based prototype. A portion of the system was then implemented and additional user testing was done with the system running on a cell phone and a Palm™ simulator.

Keywords
Health, nutrition, shopping, scenario-based design.

ACM Classification Keywords
H.5.m Information Interfaces and presentation, H.4.3 Communication Systems.

Introduction

Nutrition and health are a constant concern for everybody. Many countries face some type of malnutrition problem. In the U.S. and other countries, both under-nutrition and over-nutrition are problems that can coexist in the same city and neighborhood. A shortage of money frequently leads to poor diets as a result of the lack of food, but can just as easily lead to poor diets because of cheap, low-quality food. Furthermore, a sufficient amount of money does not necessarily mean that a person is adequately nourished. The proliferation of fast-food restaurants, junk food, and sugar and fat-laden foods overwhelms and nearly obliterates the healthy choices. Add to this that many people are simply too exhausted after full days of work, long commutes, or other responsibilities that take away from time spent at home, and need assistance buying or searching for healthy food. Then, there can be the time and learned skills to prepare and cook nutritious meals that cause some to opt for easy, but poor quality alternatives.

Approach

In addressing the issues of nutrition and health in the world, our group decided to focus on the consumer who makes bad nutritional decisions while at the super market because they lack the information necessary to compare products or are simple unaware that alternative products exist. We arrived at the decision that this kind of information is valuable largely because it resonated with our own curiosities and felt that for many others also, inconvenience and inaccessibility to this kind of information results in poor dietary habits. In-class interviews with health and nutrition experts also called our attention to this problem.

An example of this issue would be that of a consumer who goes to the supermarket with their shopping list in hand. As they address each item on the list they habitually select the same product they always get for convenience sake. They know where in the store it is located, approximately how much it will cost, and how it can function. If this information is given to the shopper across the board for all available products alike, the playing field can potentially be leveled and room made for the consideration of nutrition.

We also want to help the person who has the desire to lead a healthier lifestyle by cooking for themselves yet has little experience cooking. Our system is designed to let people leave recipes and cooking tips that will encourage others to cook more often at home. We hope that people will realize that though some food products are expensive, preparing your own meals is far cheaper than eating out and can be much healthier. In addition, we hope that as people gain the skill and experience that cooking can require, they will find that cooking does not have to take a lot of time and they can easily fit making their own meals into their schedule.

Design Process

Rosson and Carroll[1] guided the whole scenario-based design process. We began with some in-class talks and interviews with professionals from outside our classroom. We talked with Laurie Trieger, who works for Food for Lane County, a local food bank, Dr. Carl Bybee from the University of Oregon School of Journalism and Communication, and Dr. Terry Brooks, a pediatrician and member of the Lane Coalition for Healthy, Active Youth. During these discussions, each team member began to formulate ideas of ways we could design a system to help in the area of health and

nutrition. Afterwards, as a team we discussed our different ideas and did some field studies. During the field trips, we observed the information technologies and systems that people use in the grocery stores. Finally, we settled upon one – a kiosk, internet, and cell phone-based system to help people become more informed about the food they buy. Figure 1 shows an overview of the system. The system would provide alternatives, make their shopping more efficient, and would encourage them to prepare meals at home more often.

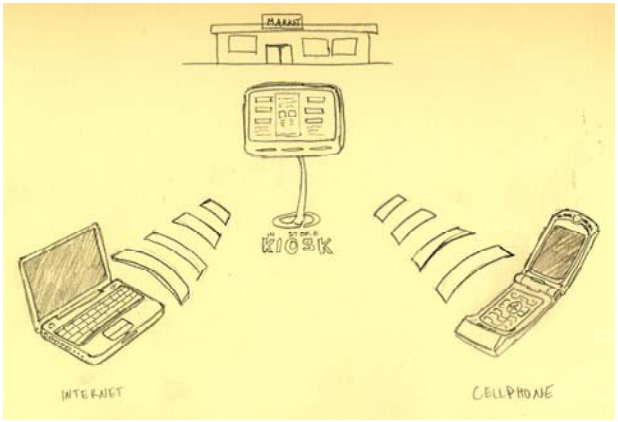

Figure 1. A sketch of the proposed system.

Field Studies

Stakeholder interviews were helpful in the early stages of the design. We talked to the managers and customers in local small grocery stores as well as large chain grocery stores, and found out that a small, locally owned neighborhood store can easily form a personal relationship with their customers. The storeowner and managers decide what products to stock and thus customers can easily influence the store's inventory. We wanted our system to have this effect on larger stores. We hope that by providing the ability to quickly and conveniently shop for alternatives and examine products at multiple stores, that this will force stores to provide choices according to local demand. The store may enjoy economic benefits, and thus be willing to pay for the cost and maintenance of our system, if a community spirit around that store can be developed.

We also found that some consumers care a great deal about the nutritional content of the food they buy. Our system design gives quick access to this information. In addition, some consumers wanted to spend as little time in the grocery store as possible. Our system will not only locate items in a store, but will also allow one to comparison shop before even entering the store.

Activity Scenarios

Creating activity scenarios allowed us to visualize our system in use by real people, though the stories were partially fictional. We did not initially focus on the details of our system, which allowed us to concentrate on what the system would do to help people with their tasks without being bogged down with the details of implementation. We found it interesting that our system ended up being much simpler than the way the somewhat improbable scenarios described it, but still achieved the same results.

Claims Analysis

Claims analysis was another simple but useful step in the design process. As we prepared to create a prototype with which to test, we needed to begin a discussion of the features of our system. This took the form of a brainstorming session where we listed

features as we thought of them, and then discussed the pros and cons of each. We found that a few of the features were simply not required in order for our system to work. Claim analysis helped us to develop and implement our design ideas systematically.

FORMATIVE EVALUATION STUDY

Several paper-based prototype screenshots were used for formative evaluation. Though our design allows for different ways to access the system, such as home computers, in-store kiosks, or Portable Digital Assistance, we chose to use a cell phone prototype. The study was conducted with four test subjects. Each subject was asked to perform the same set of tasks. The tasks were a subset of the activities that a user might undertake while using the system, but they were considered by the team to be the most frequently used parts of the system. We assumed that users would have the expertise to navigate through menus on their phone. In evaluating our prototypes, we followed "Apple's ten steps for conducting a user observation"[2]. We began each session with an introduction of the team. We made it clear that we were testing our system and not the user, and that in no way should they feel bad if any part of the test was confusing or could not be completed. Each session lasted about 15 minutes, which included the introductions, testing, and a few post-testing questions.

The results of these tests were quite useful. For instance, we found that some features of our system, which we had begun to think were trivial and unnecessary, were indeed essential. For example, all of our testers expressed the need for the system to help them locate items inside the store. One of our testers, who worked at a grocery store, confirmed that one of the most frequently asked questions is where an item is located.

Working Prototype

TECHNOLOGY

Based on our formative evaluation, we developed a working prototype which implemented several features that we had envisioned for the food information network. This working prototype is used to further verify the design choices of our system. The food information network we proposed in this paper is mainly a web-based application. The development tools we used include mysql, php, html etc.

We understand that the context of use will determine what technology can be successfully applied to the problem. When implementing an application that is accessible from different devices, special attention should be paid to the different environments. In our system, the cell phone browser parses an HTML file quite differently from Internet Explorer and other desktop web browsers, in that it is much less forgiving of HTML errors. In addition, downloading images from a website through cell phone browser is quite slow. Though some cell phones give the option of not showing images, we decided not to decorate our website with any fancy graphics. Buttons and check boxes also may have different looks in a cell phone browser. The length of a line and the length of one screen need to be well understood for each platform. Our goal is to design an informative website that can be properly browsed by various devices, especially small ones. The resulting screen layout is actually quite sparse and minimalistic.

System features

Upon calling up the system website a user is prompted to login to their account. Once logged in, the user has 3 menu options: *View shopping list*, *Groups* and *Recipes*. We understand that this is a limited set of the possible functions that can be provided by our system, but as a working prototype, we suspect that it is an adequate subset to evaluate the proof of concept of our design.

Under the *View shopping list* option the user keeps their shopping list to which they can add or remove items, view or compare items, or access nutritional and price information. This list also displays the item location in the store as well as if the item is on sale. Under the *Groups* option the user is presented with a list of groups which they can enter. These groups are a device for creating a sense of community as well as a means of sharing information and recipes with people with similar dietary interests. Under the *Recipes* option the user may access the entire database of recipes, which have been categorized in terms of culinary style and complexity. Upon finding a recipe that one wishes to prepare, the user may add all the necessary ingredients to his/her shopping list where they can be easily viewed.

In our implementation of this working prototype, we assume there is only one store in order to reduce the data collection, and to constrain the design process. Further user store selection or store awareness features could be developed by using GPS or Bluetooth technology.

User testing

We prepared our tests with a script and a task list. The script is adapted from "Apple's ten steps for conducting a user observation"[2]. The tasks for the subjects include creating a shopping list, finding the location of a particular product, finding the cheapest or lowest fat content of a particular product, finding a recipe recommended in a group message board, and adding ingredients in the recipe to the shopping list. The data of ten kinds of food products were collected from a local grocery store and used as the system's database. The whole test process was videotaped and the video data was later played and reviewed in a media room at the library.

Figure 2. User testing in a grocery store.

Since our Food Information Network is a web-based application, it can be accessed by cell phone anywhere, a kiosk at the grocery store, or a computer at home. In the evaluation, we tried to test our system with different devices. We had two participants test with a

cell phone in a grocery store and one participant test at home computer. One user had participated in both our paper and working prototype studies. The results suggested that experience with the paper prototype improved their performance on the working prototype. This suggests that using our system, performance will improve over time.

RESULTS

The user testing shows that our design is working well. But it also helps us see and analyze some features that need improvement in our system. As one participant pointed out, typing in a cell phone should be avoided as much as possible. For instance, it would be better if the user can add the ingredients in a recipe to the shopping list by selecting instead of typing.

Another user suggested that instead of using aisle numbers or descriptions like "west wall" to indicate the location of a product, a simple map would be a better choice. The reason is that some stores may not have aisle numbers and many people cannot tell which direction is which when indoors. One user raised the concern about the cost of getting cell phone access to the Internet, but with the development of mobile technology, we believe that the cost will be reduced and the speed will increase.

Participants said that they would be willing to use our system if it were implemented. And they think our system provides useful information about food and nutrition.

Future work

We have found that the design is working fairly well, though there will need to be some changes. The first couple changes to our system would include: Re-examine the interactive process and refine the design of web pages so that they can be more easily read through a cell phone screen. And explore more efficient ways to raise the attention of the users to the nutritional information. Our evaluation process clearly has some limitations, such as not addressing the ultimate question of whether people would use this system in their everyday life. But the design project does provide useful information and takes a good first step.

Conclusion

In this paper, we proposed a design choice of the food information network - a system that helps people make better food choices by keeping them informed, encouraging community involvement, and providing assistance with buying food within a budget. It can be accessed through cell phones, kiosks, or computers. The scenario-based user interface design principles led the whole design process and helped us develop the design decisions systematically. We hope in the future more people will use it and find it helpful.

Acknowledgements

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Reference

1. Rosson, M. B. & Carroll, J. M. (2002). *Usability Engineering: Scenario-Based Development of Human-Computer Interaction.* Morgan Kaufmann.
2. http://developer.apple.com/documentation/mac/HIGuidelines/HIGuidelines-73.html.