Using Entertainment to Improve Nutrition Among African-Americans

Andrea Grimes
Georgia Institute of Technology
85 5th St. NW Atlanta, GA 30332
agrimes@cc.gatech.edu

Rebecca E. Grinter
Georgia Institute of Technology
85 5th St. NW Atlanta, GA 30332
beki@cc.gatech.edu

ABSTRACT
African-Americans suffer a higher rate of some diet-related health problems than other segments of the United States population. The public health community advocates culturally sensitive nutrition interventions because individuals' dietary habits may be heavily influenced by cultural practices. In this paper, we argue that the design of nutrition-related technology can benefit from a better understanding of the cultural influences on diet. We focus on the development of entertainment technology for the home and the benefits of using this class of technology to address nutrition within a specific cultural context.

Author Keywords
Nutrition, culture, entertainment technology.

INTRODUCTION
In the United States, some cultural groups are more prone to certain health problems than others. For example, diabetes is 70% more prevalent in African-Americans than in Caucasians [1]. There are significant diet-related health issues facing the African-American community and various initiatives (*e.g.* by the National Institutes of Health and the American Diabetes Association) to address this challenge. However, these initiatives have frequently resulted in educational programs, which while important, do not typically leverage technology.

At the same time, many applications have been developed to address nutrition-related issues in the general population, as can be seen by the myriad of diet and exercise journaling websites (*e.g.* www.fitday.com). In addition, applications have also been developed for smart phones that allow individuals to track their dietary choices on the go (*e.g.* see [13]). However, few technologies exist that account for cultural[1] influences on diet and exercise habits. This technological gap is surprising, given that public health officials frequently argue for culturally-specific approaches to improving nutrition because dietary choices are often rooted in cultural traditions [4]. Researchers warn that interventions that are not culturally relevant may cause individuals to feel socially isolated and subsequently reject recommendations for improving their health. Thus, many community-based initiatives have been developed to target the specific health issues that face African-Americans and other cultural groups.

In this paper we discuss how entertainment technology can be used to develop culturally appropriate nutrition-related applications for African-Americans. While entertainment technology may be useful for helping a variety of different cultural groups improve their dietary practices, we have chosen the African-American community as our point of focus because of the serious health issues that disproportionately affect this population.

We begin with an overview of two studies of how culture influences nutrition within the African-American community. We continue by describing ways that entertainment technology can be used to provide nutritional support. In addition, we discuss the importance of studying the dietary choices that individuals make in the home, the cultural and social influences on these choices, and how entertainment technology may be used to help individuals make better choices.

NUTRITION & AFRICAN AMERICANS
Airhihenbuwa *et al.* conducted a study to understand how culture influences the eating habits of low and middle-income African-American families [4]. These researchers assert that the high diet-related mortality rate within the African-American community (as compared to the rest of the population) is a compelling reason for making culturally specific suggestions for dietary changes. They argue that care must be taken when making these suggestions because food preparation may be a way that African-Americans (or

[1] In this paper we will be using the term *culture* to refer to a group defined by their ethnic heritage.

any other cultural group) preserve traditions or maintain a group identity. Part of their study included a series of focus groups with African-Americans to learn about their dietary habits. During these sessions a variety of comments arose, including, for example, statements attributing current eating practices to the meals that slaves prepared and descriptions of the types of food typical to the African-American diet. In addition, participants discussed the nature of African-American foods. After analyzing the sum of the comments that arose in the focus groups, Airhihenbuwa *et al*. concluded that dietary counseling and interventions should account for cultural context and the meanings that surround food and its preparation.

While the study developed by Airhihenbuwa *et al.* focused on general eating patterns among African-Americans, Horowitz *et al.* looked at how diet influences hypertension (or, high blood pressure) within the African-American and Latino populations [11] in the United States. The researchers conducted a series of single-race (either African-American or Latino) focus groups with hypertensive individuals. The study was conducted within East and Central Harlem in New York City, communities which contain the highest rates of obesity, poverty, and mortality in New York City. The results of the focus groups indicated that participants understood that certain eating habits contributed to their disease but that they felt physician recommendations are difficult to follow within their specific cultural context. Study participants found suggestions proposed by health professionals to be socially and culturally isolating because they required them to be removed from practices common to their community. Horowitz *et al.* concluded that dietary counseling should be improved such that it directly addresses the cultural barriers to maintaining healthy dietary patterns. They suggest doing this by making dietary recommendations that reflect an understanding of the "cultural, economic, and social realities of [individuals]" [11].

SUPPORTING NUTRITION THROUGH ENTERTAINMENT

By considering the results from public health research in the context of technology research, it becomes apparent that the design of nutrition-related technology may be aided by a better understanding of the way culture influences nutritional practices. Aspects of a culture such as traditions and common social practices may affect the way that individuals interact with a piece of technology. To introduce the idea of using entertainment technology to support dietary practices, we begin this section with a general discussion of nutrition-related entertainment technology before discussing it specifically in terms of the African-American community.

Entertainment technology is a promising way to support individuals as they attempt to live a healthy lifestyle. Tasks that might have previously been considered boring, intimidating, or bothersome may be made more appealing when entertainment media is used. In addition, by going beyond written media (the way much health information is currently distributed), populations with low-literacy rates may be better served. Furthermore, entertainment media may be more engaging than traditional paper pamphlets on the "do's and don'ts" of eating healthfully. Thus, technology that leverages entertainment media to improve dietary practices has the potential to be quite effective.

Encouraging Healthy Dietary Behavior

There are a number of diet-related activities that entertainment technology can be used to support. Nutrition education is one area that could be aided by entertainment technology. "Edutainment" (software which educates children through entertainment) is an area where a significant number of applications have been developed [9]. Edutainment may be an effective method of teaching children good dietary habits in a fun and interactive way. For example, the Dole 5 a Day website provides many nutrition-related educational games for children (http://www.dole5aday.com/MusicAndPlay/M_Games.jsp). One game, the Salad Factory, allows kids to create a salad by selecting from various ingredients. When the child chooses an ingredient, he or she receives visual and audio-feedback about its nutritional value. This game helps kids learn how to construct nutritious meals.

Entertainment technology can also function as a social actor by providing support, encouragement, and feedback to individuals as they attempt to live a healthy lifestyle. Nintendo's Pocket Pickachu toy functions as a social actor by creating a virtual relationship with the user [10]. The Pocket Pikachu is an entertaining digital pet that only stays alive if its owner is doing a sufficient amount of physical activity. In this way, users receive positive reinforcement to engage in healthy behavior.

In addition to functioning as a social actor, entertainment technology can help people understand how their current dietary behavior will affect them in the long term. If an individual is able to simulate a scenario (*e.g.* consistently eating fried foods over a 20 year period) and then see a visualization of the potential affects of that behavior (*e.g.* developing heart disease), he may be more likely to modify his current behavior. This type of simulation might be implemented as a traditional video game or in a pervasive gaming environment [12]. The HIV Roulette kiosk is an example of an existing piece of entertainment technology that supports simulation [3]. This kiosk allows visitors at a science museum to create virtual characters by specifying attributes such as gender, sexual behavior, and history of drug use. The kiosk acts as an educational game as it calculates the likelihood that the character will contract the HIV virus. The HIV Roulette allows individuals to get a sobering picture of how their behaviors can put them at risk for contracting HIV. Similarly, simulation may be a useful way to motivate people to maintain healthy dietary habits. At the same time, care should be taken when developing

such applications as simulation may cause negative reactions in users such as shame or fear.

Implementation Platforms

In the previous section we presented examples demonstrating that entertainment technology may be a useful way to educate, provide social support, and help individuals understand the effects of their dietary habits on their health. These services can be implemented on a variety of different platforms. For example, Interactive TV may be utilized as a way to have users actively participate in television programs. Informational television shows on health may be augmented to allow individuals to obtain personalized information. For example, an Interactive TV application could allow viewers of a cooking show to obtain more detailed nutrition information about the meals being prepared. In addition, specialized information could be displayed such that, for example, a diabetic viewer could be alerted if a meal is too high in sugar.

Computer and video games can also be used to help individuals improve their dietary habits. For example, Packy & Marlon is a video game that teaches diabetic children how to manage their disease. In this role-playing game, the player wins if she effectively manages her diabetes (*e.g.* by "monitoring blood glucose, taking insulin injections, and choosing [proper] foods") [6]. This game has been shown to improve diabetes-related self-efficacy in children and to reduce the number of unscheduled urgent visits to the doctor by 77%. As it is estimated that 43% of video game players are between 18 and 49 years old [2], video games are a promising medium for improving the dietary habits of adults as well as children.

Focusing on the Home

We have discussed a number of ways for entertainment technology to be used to help people improve their dietary habits. One context in which these applications should be evaluated is within the home. The home is a setting in which many dietary choices are made as individuals prepare, serve, and consume meals. In each of these activities, critical choices are made which influence whether individuals will engage in healthy eating. For example, when food is served, smaller portions may reduce the chance of an individual overeating. Also, when preparing food, individuals must choose to add ingredients that will either positively or negatively affect their health.

The nutrition related choices that people make in the home (and elsewhere) are influenced by a number of personal, social, and cultural factors. For example, individuals may be more likely to make good dietary choices if they have knowledge of the health risks associated with their choices [5]. In addition, when individuals eat in groups, they may eat more than if they were alone [8]. Also, individuals may eat certain foods because they are staples within their culture. Studies of the home for the development of nutrition-related technology should investigate the presence of such influences because they may affect the way that individuals interact with developed technology.

Both of the implementation platforms discussed in the previous section, Interactive TV and electronic games, are natural choices for the home as many households own TVs, computers, and/or video game consoles. Still, depending on the socioeconomic status of the target group these devices may not be present in the home or, if they are, they may be older models that are incompatible with new technological applications. This is an important consideration because diet-related diseases are many times found in members of low-income households.

Towards Culturally Relevant Entertainment Technology

Thus far, we have discussed nutrition-related entertainment technology and its presence within the home in general terms, without focusing specifically on African-Americans. Indeed, this type of technology may be useful for many different cultures but as previously noted, African-Americans experience many diet-related diseases with greater prevalence than other portions of the population. In addition, aspects of their culture may influence the ways that they interact with technology designed to improve dietary habits. For example, as mentioned before, food is an important part of African-American culture and if an individual is forced to make drastic changes to their current behavior they may feel socially and culturally isolated. We are not suggesting that recommendations for dietary changes be made less stringent; instead we are arguing that nutrition-related technology should be sensitive to the cultural traditions and practices that are valued within the African-American community. Thus, it is important now to discuss how culturally relevant entertainment technology can be developed to address nutrition problems within this community.

Campbell *et al.* acknowledged the need for a culturally relevant approach to improving nutrition among low-income women [7]. They developed a soap opera video in which a man dies of a heart attack because of his poor dietary habits. Over the course of the episode, the man's widow is convinced to improve her eating habits as well as those of her children. The video was designed to entertain and "model healthy dietary changes through character and plot development". Campbell *et al.* developed this video after completing formative interviews with a group of predominantly African-American women about such topics as where they usually obtain their health information and their preferred television program genre.

While the soap opera video was not developed specifically for the home, it is an example of the use of entertainment to improve the dietary habits of a specific cultural group. The development of entertainment technology for the home should similarly be rooted in an analysis of the cultural and social forces at play within a household. Within the public health community, a great deal of research has been done on how African-American culture influences nutrition, and

these studies can serve as a basis for the development of nutrition-related entertainment technology. In addition, researchers may benefit from conducting their own studies of African-American households to better understand the interplay of cultural traditions, dietary practices and technology within this population. With this information in hand, researchers will be better equipped to design entertainment technology to improve dietary practices.

EATING AS A SOCIAL PRACTICE

The authors are currently conducting a study in which we are examining the social nature of eating within the African-American community. One of the environments we are focusing on is the home. In addition to cultural aspects, we are studying the social and technological makeup of each home as described by Venkatesh [14]. We are observing groups of people as they eat and from these observations we hope to learn about the social process of preparing and consuming a meal. In our observations we note various aspects of the social and physical setting, including the conversation, the artifacts (technological and otherwise) that are present, and how the food is served.

In addition, we are interviewing participants to learn more about their attitudes toward eating and nutrition. The interviews include questions about their favorite meals, aspects they find important in a good meal, and their food-related traditions. We are also asking about their attitudes toward technology and what types of applications and devices they currently use. Through this study, we hope to better understand how to develop culturally relevant nutrition-related technology for the African-American population.

CONCLUSION

Entertainment technology can be used to provide users with a more enjoyable experience as they engage in diet-related activities. This type of technology is designed to be fun and non-threatening and may therefore be more appealing to individuals than traditional approaches to nutrition education and management. For this reason, entertainment technology is a promising medium for encouraging individuals to make good choices rather than simply berating them for making poor ones. In addition, entertainment technology may be used to increase self-efficacy, an attribute that helps individuals engage in healthy behaviors [5]. Entertainment technology can be developed on top of platforms that already exist in the home (*e.g.* televisions, computers) and may therefore be a comfortable way for individuals to engage in nutrition management.

The development of culturally specific entertainment technology is an important area of research in the domain of nutrition because of the prevalence of diseases in specific cultures such as the African-American community. Indeed, many public health researchers have identified the need to focus on specific cultures when developing ways to improve nutrition. As an HCI community, we should identify ways to study specific groups of people that will help us create culturally relevant technology. When developing nutrition-related entertainment technology, a good place to begin is by reviewing studies on culture and nutrition done previously within the public health community. In addition, new qualitative studies, for example, may give us further insight into the interplay between the social and technological spaces of the home.

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