NEEDS ASSESSMENT AND FORMATIVE EVALUATION OF AN ONLINE NUTRITION EDUCATION eLEARNING PROGRAM TAILORED FOR SNAP-ED ELIGIBLE ADULTS IN GEORGIA

by

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(Under the Direction of Jung Sun Lee)

ABSTRACT

This dissertation conducted a needs assessment and formative evaluation to understand user expectations and experience of an innovative online eLearning nutrition education program tailored to Supplemental Nutrition Assistance Program Education (SNAP-Ed) eligible Georgian adults. A longitudinal mixed-methods case-study design was used to explore a user-centered design based on the priority audiences' preferences regarding eLearning nutrition education accessibility, literacy, content, format, expectations, and experience with the program. A constructivist epistemology framed this instrumental, single case study. The case was the newly developed eLearning program Food eTalk. Data collection occurred prior to Food eTalk development (needs assessment) and during pilot rollout (formative evaluation) using focus group interviews, individual interviews, self-administered surveys, and a user tracking system. Goals of the needs assessment were to explore accessibility, digital literacy, and preferred content of eLearning programs. Semi-structured key informant interviews with Georgian nutrition education experts utilized a Food eTalk prototype to generate discourse about eLearning. After the needs assessment, development of Food eTalk included a multidisciplinary

team such as technical support, eLearning designers, and nutrition experts, and required unique resources such as eLearning authoring software and a learning management system. The eLearning development process included challenges and 'lessons learned' for future eLearning development endeavors. Goals of the formative evaluation were to address user expectations and experience with Food eTalk. Major findings indicate SNAP-Ed eligible Georgians have ample smartphone-based Internet access, have high self-efficacy using the Internet, and desire nutrition education content which focuses on disease-specific nutrition education, feeding 'picky' children, and recipes centering on Southern cuisine. A key barrier to engagement in eLearning nutrition education programs as suggested by both Georgia-based nutrition educators and SNAP-Ed eligible Georgians, is low motivation to use such a program. To encourage individuals to use this voluntary nutrition education program, it is important the eLearning program format allows for quick access to relevant content as perceived by the priority audience. Inclusion of videos, interactive active features, relevant nutrition education content, and extrinsic incentives are important to increase motivation for user engagement. This research serves as a foundation for evidence-based eLearning nutrition education program development for SNAP-Ed eligible audiences.

INDEX WORDS: eLearning, SNAP-Ed, Nutrition Education, Online Learning, Qualitative, Needs assessment, Formative Evaluation, Food eTalk

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DEDICATION

This dissertation is dedicated to the individuals for whom Food eTalk and the Supplemental Nutrition Assistance Program-Education (SNAP-Ed) is intended to serve.

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CHAPTER 1

INTRODUCTION

The United States Department of Agriculture Supplemental Nutrition Assistance Program Education (USDA SNAP-Ed) provides financial support in the form of grants for individual state's nutrition education programs. The USDA SNAP-Ed program is developed to support educational interventions and efforts specifically for individuals who live at or below 185% of the federal poverty level (FPL) or who are eligible for SNAP (formerly known as food stamps) benefits through alternate means-tested criteria such as eligibility to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). USDA SNAP-Ed guidance requires innovative, cost-effective, evidence based, nutrition education approaches be employed and rigorously evaluated for effectiveness [1].

As access to the Internet and Internet-accessing devices becomes increasingly available, it is inevitable that more educational opportunities, programs, and classes will be offered online. Online or eLearning is not a novel concept; though, until recently, has primarily been offered in an academic or workplace setting, typically for affluent populations. The "digital divide" refers to the disparity between those who have consistent access to the Internet and those who do not, and this divide is decreasing even among individuals who live at or below the FPL. This decrease is largely a result of commonplace free WiFi access in many public spaces, stores, restaurants, and social gathering areas, increasingly inexpensive cellular data plans, and Internet accessing devices such as smartphones and tablets becoming more affordable [2].

In light of recent federal budget cuts to the USDA SNAP and USDA SNAP-Ed programs and much debate in Congress regarding the effectiveness or even the need of the SNAP and SNAP-Ed, it is crucial that cost-effective, user-centered nutrition education programs be developed and rigorously evaluated to provide evidence for policy makers as to the importance of both the SNAP and SNAP-Ed in the lives of millions of Americans [3]. Exploration of eLearning nutrition education programs is a worthy topic which provides a significant contribution to address food insecurity and nutrition-related health disparities by carefully and systematically developing fiscally sound nutrition education programs that are easily accessible to SNAP-Ed eligible Georgians [4].

A 2015 US Census Bureau Report revealed Georgia is home to a higher proportion of individuals who live at or below FPL than the national average (13.5% and 17.2% respectively) [5]. In 2013, Georgia had a higher proportion of SNAP-eligible individuals (18%) than national average (15%) [6]. Georgia is also 19th in the nation for prevalence of overweight and obese adults as defined by Body Mass Index (BMI), with 34% adults obese[7]. Each state is responsible for developing its own SNAP-Ed programs, and currently Georgia is one of many states with no rigorously evaluated, culturally tailored, evidence-based SNAP-Ed program. The USDA funded SNAP-Ed grantees must aim to help achieve the USDA SNAP-Ed goal: to improve the likelihood that persons eligible for SNAP will make healthy choices within a limited budget and choose active lifestyles consistent with the Dietary Guidelines for Americans and Choose My Plate [1].

The purposes of this dissertation study are threefold, in an effort to explore: 1) the feasibility of eLearning for SNAP-Ed eligible Georgian adults, 2) the development process of creating a tailored and accessible eLearning nutrition education program, and 3) the expectations and experiences of SNAP-Ed eligible adults regarding the newly developed online nutrition

education program, Food eTalk. These findings will serve as a foundation and guide the future development of eLearning nutrition education opportunities for SNAP-Ed eligible adults. Chapter 2 includes a review of the literature, which emphasizes how eLearning is currently being explored for nutrition education and low-income audiences. Chapter 3 includes details of the epistemology, methodology, and methods of this dissertation study. Chapter 4 includes an original research paper (in press) on the key-informant interview needs assessment. Chapter 5 is a report-style paper (in press) describing the complex development process of Food eTalk. Chapter 6 includes findings from the user experience of Food eTalk (to be submitted for publication). Chapter 7 summarizes findings from the entire dissertation project and provides general conclusions and directions for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

Nutrition education involves any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and nutrition behaviors that are conducive to wellness [8]. Research suggests nutrition education specific to low-income audiences can improve intake of healthful foods [3,9]. Nutrition education interventions tailored to learners with limited finances and limited access to healthful foods, and which employ participant-centered pedagogy, are effective in empowering the individual to make healthful food choices [10,11]. As access to the Internet and mobile Internet-accessing devices increases among this population, it is important to consider Internet-based nutrition education programs, as tailored eLearning environments, in order to expand outreach and decrease barriers of attending traditional face-to-face classes [12,13].

The Supplemental Nutrition Assistance Program Education (SNAP-Ed) is one of the largest nutrition education programs available for Americans with low-income and is provided by federal funding. The goal of SNAP-Ed is to improve the likelihood that persons eligible for SNAP-Ed will make healthy choices within a limited budget and choose active lifestyles consistent with the current Dietary Guidelines for Americans and MyPlate [1]. SNAP-Ed programs are delivered by each state, and activities must be evidence-based, delivered through both individual and group-based strategies, and include multi-level interventions [1]. The goal of the University of Georgia (UGA) SNAP-Ed program is to help SNAP-Ed eligible Georgians

establish healthy eating habits and a physically active lifestyle through evidence-based, behaviorally focused, and culturally appropriate nutrition education and obesity prevention interventions based on innovative multi-level approaches, coordination with diverse stakeholders, and collective capacity of UGA. The UGA SNAP-Ed plan focuses on both individual and group-based nutrition education and obesity prevention interventions for SNAP-Ed eligible adult Georgians using existing/augmented infrastructure, network, and practice of the UGA Cooperative Extension Services. The UGA SNAP-Ed program intends to reach and impact SNAP-Ed eligible Georgians across the state by developing comprehensive multi-level interventions and community and public health approaches targeted to unique needs of SNAP-Ed eligible individuals using rigorous systematic evaluations through traditional face-to-face classroom opportunities, online or eLearning options, a comprehensive social marketing campaign, and an early childcare nutrition education intervention. The specific priority audience for the classroom, eLearning, and social marketing program is the SNAP-Ed eligible adult Georgian population ≥ 18 years who are caregivers of children ≤ 17 including all gender, racial, and ethnic groups across Georgia.

SNAP-Ed eligible adult Georgians were likely to be single female-headed households (40.8%), Black or African-American (52.5%), and include at least one working adult in the household in the previous year (76.9%) [14]. Among all Georgians, 13.0% live in poverty (compared to 12.4% in the U.S.) with a higher than national average percentage of elderly (> 64 years old) living in poverty (13.5% vs. 9.9%) [15]. Individuals and families who live in poverty and suffer from food insecurity are more likely to be overweight/obese, less likely to eat the recommended servings of fruits and vegetables each day, more likely to be physically inactive, and suffer a disproportionate rate from weight-related disease comorbidities such as diabetes and

heart disease [16,17]. The USDA's goal to encourage innovative, cost-effective, and extensive statewide SNAP-Ed programming provides an incentive to explore online eLearning nutrition education for Georgia's SNAP-Ed eligible population.

Although there is some supportive literature on the feasibility of eLearning nutrition education programs in low-income populations; small sample sizes and demographic differences, such as a higher percentage of African American individuals in Georgia, make it difficult to extrapolate findings to the SNAP-Ed eligible population in Georgia [18,19]. There are currently no comprehensive, rigorously evaluated, evidence-based eLearning nutrition education programs reported in the literature. Therefore, the primary aims of this dissertation study are to explore 1) the feasibility of eLearning for SNAP-Ed eligible Georgian adults, 2) the development process of creating a tailored and accessible eLearning nutrition education program, and 3) the expectations and experience of SNAP-Ed eligible adults regarding this newly developed nutrition education eLearning program.

To provide a practical and theoretical foundation for this dissertation research, the following literature review focuses on online nutrition education, online nutrition education specific to low-income individuals, low-income individuals' access to the Internet, confidence using the Internet, and qualitative methods for nutrition education program evaluation.

Online Nutrition Education

E-learning (eLearning) is the use of electronic educational technology in learning and teaching [20]. Examples of online nutrition education or eLearning tools include diet trackers, cooking videos, interactive and downloadable recipes, and the USDA Choose MyPlate campaign [21]. Research shows that online nutrition education is an effective way to improve healthful

nutrition habits [9,22–24]. The traditional didactic method computer-based learning typically refers to self-paced learning activities such as disease management or weight control [25–28]. Dunn et al determined that synchronous distance-education technology supported weight loss in adults [26]. Kattelmann et al employed the transtheoretical model of behavior change to support a web-based weight loss intervention, called *Project WebHealth*, to encourage healthy eating habits and weight loss in college aged students. This program was tailored based on learner's stage of readiness to change, and the authors published multiple papers on the process by which this online intervention was developed [27,28]. Research suggests when online nutrition education is tailored, it yields improved behavior change results and participants favorably view it as more personalized [29–31]. Tailoring can occur per individual or per priority population if that population has several large-scale similar needs (e.g., traditional cultural food preferences). Winett et al conducted a randomized controlled trial on the effects of an entirely web-based intervention on physical activity, fruit and vegetable consumption, and body weight. This efficacy study included overweight and obese adult participants (n = 247) who completed three or more education program models, which were either tailored or not tailored. The authors reported given the laborious process of participants filling out long assessments and surveys at the start of a tailored education program, and the insignificant differences between results of the two groups (i.e., individually tailored vs. non-tailored general nutrition) at the end of their 3, 6, and 16 month follow up, a relatively simple, non-individual-tailored, entirely Internet-based program would suffice to help people prevent weight gain [32]. Another randomized controlled trial aimed at evaluating online intervention to improve fruit and vegetable consumption for cancer prevention, compared the efficacy of a tailored online nutrition education program vs. the same tailored program with additional motivational interviewing through email vs. an untailored online

nutrition education program [9]. This large trial (n = 2,540) had an impressive retention rate (80%) and included 1-year follow-up data. The results augmented that of Winett et al in that fruit and vegetable consumption increased significantly in all three groups, and that a well-designed, contemporary, and appealing Internet-based program can effectively impact the eating behaviors of a large number of participants at a relatively low long-term cost [9]. Mouttapa et al reported that among female university staff (n = 307) an online nutrition education tool called *Personal Nutrition Planner* assisted the intervention group (n = 153) in significantly increasing low-fat dairy consumption from 9 servings/week to 11 servings/week ($p < 0.05$). Compared to those in the control group (no treatment) who desired weight loss, the participants in the intervention group who wanted to lose weight (n = 95) had a significantly higher rate of weight loss ($p < 0.05$) and reported the website intervention assisted greatly with their day-to-day motivation to lose weight [23].

Online Nutrition Education for Low-Income Adults

Use of online health education programs tailored for low-income learners using eLearning technology is a relatively new area of research. Several researchers have begun to explore use of the Internet to provide nutrition education to low-income Americans with promising results [11,12,33–35]. In a quasi-experimental design study, Bensley et al determined that Internet-based nutrition education, when compared to traditional classroom education, is a viable and effective means to educate and increase fresh fruit and vegetable consumption among WIC participants [36]. Authors of a well-designed intervention study with female SNAP recipients indicated that longitudinal, indirect follow-up food budgeting education would enhance their face-to-face classes [37]. Researchers in California have recently worked with WIC participants to

explore eLearning opportunities regarding effectiveness and acceptance among the priority audience. These researchers determined eLearning provides comparable increases in nutrition related knowledge to in-person classes, and is an acceptable form of education as perceived by this audience [38,39]. Most online nutrition education eLearning programs for low-income adult learners included videos [35], tailored messages [11], or didactic web-based lessons [12].

Low-Income Individuals' Access to the Internet

Access to the Internet was once considered a barrier to the feasibility of web-based or online nutrition education resources for low-income individuals. However, it is now well documented that this "digital divide" is decreasing, and individuals who live at or below the FPL have increasingly consistent, reliable Internet access [40,41]. A 2013 report reveals that among low-income Americans, the Internet is primarily accessed by mobile device. Among low-income Americans, 85% of those who use the Internet have used mobile devices to access health-related information [42]. Neuenschwander et al (2012) conducted a two-year study (n = 1,620) of Indiana-based SNAP participant's Internet access. This group concluded that approximately 50% of their respondents had a working computer at home and 68% had a mobile phone with 56% of those participants having mobile Internet access [12]. Swindle et al conducted a descriptive cross-sectional study (n = 806) to determine whether technology is a viable and preferred avenue of information delivery across low-income parents and caregivers in the South. Their results showed that low-income families find means to access the Internet and that smartphone use by low-income families is similar to rates of higher socioeconomic families. Further, this group reported that African Americans in the sample were the most frequent users of mobile Internet. They concluded that data from their study suggest technology may be an important tool in

closing the gap between those served by traditional nutrition education programs and those who are not [13]. Atkinson et al (2007) conducted focus group interviews (n = 56) including rural Maryland-based SNAP recipients to assess the target audience's Internet access. Results indicate 66% of this sample had a working computer, with Internet, at home and 41% reported using the Internet on a daily basis [10]. In a similar study, Corda et al assessed Internet access among New Jersey's SNAP-eligible participants. Among those interviewed (n = 93), 51% frequently used the Internet either at home or at the library [43]. Additionally, a 2013 US Census Bureau report indicates that among low-income individuals (household income < $25,000/year), Georgian's smartphone use is significantly higher than the national average rate of smartphone use [2].

Digital Literacy

There are concerns that with an increase of health information available online and growth of online nutrition education programs, there may be a widening disparity among those who benefit from these eLearning opportunities, despite ample access to the Internet [44,45]. The Patient Protection and Affordable Care Act of 2010, Title V, defines health literacy as the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions [46]. Digital literacy is defined as the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet [44]. Low-income individuals with limited digital literacy skills may not benefit from online nutrition education if the program is not tailored to their specific literacy needs [47,48]. Adults with low-literacy skills are less likely to seek health information online, and more likely to use audio features (voiceover) in lieu of reading text online [49]. Customizing health education for an audience with low health and digital literacy skills using mobile devices

has shown promising results. Two e-health interventions using mobile devices were piloted for participant acceptability among adults with low health literacy skills, and both were well received and utilized by the priority low-income adult audience, aside from concerns about the logistical complications of a small screen size [50]. Atkinson et al (2010) reported using a user-centered design is imperative in creating online nutrition education programs specific to the literacy needs of the intended audience. As Internet and device access becomes increasingly available among low-income Americans, Atkinson suggests addressing the digital literacy is a key aspect of increasing effectiveness of an online nutrition education program specific to an audience with low-literacy skills. This group used semi-structured interviews and a series of three focus groups to both observe how well users were able to navigate the website as well as ask questions regarding ease of registration, difficulties finding sought-out information, and aesthetics of the website [41].

An 10-item measure of eHealth literacy and confidence using the Internet, titled *eHealth and Literacy Scale* (eHEALS) was developed to measure consumers' combined knowledge, self-efficacy, and perceived skills at finding, evaluating, and applying electronic health information to health problems. This scale was initially validated with young adults aged 13-21 (n = 664) [51] and has subsequently been validated with Dutch adults (n = 277) [52]. The eHEALS measures consumers' perceived skills and self-efficacy with eHealth, not the skills directly. The eHealth literacy model includes six types of literacy (including health, media, and computer) and to evaluate actual literacy skill on each of the six tenants that make up eHealth literacy, each skill would require independent measurement, such as rigorous usability tests of standard computer equipment for computer literacy. For research participants such detailed assessment would be burdensome as measures are typically 50-75 questions per literacy skill. Therefore, the 10-item

eHEALS has been developed to address the need to assess self-efficacy and eHealth literacy for a wide range of populations and contexts. The instrument is designed to provide a general estimate of consumer eHealth-related skills and self-efficacy that can be used to inform clinical decision making and health promotion planning with individuals or specific populations [51].

Qualitative Evaluation and Case Study Methodology

When developing a new nutrition education intervention, it is essential to conduct both a needs assessment and rigorous formative evaluation. Researchers can form hypotheses based on literature reviews and speculate as to the efficacy of a new program; however, eliciting formative feedback from members of the intended audience will offer insight that may have otherwise been overlooked [18,41,53,54]. The first of four levels of the Kirkpatrick model of evaluation in instructional design includes participant reactions with the intent to assess learners' reactions and attitudes towards the learning experience, and generally whether or not they like the instruction [55]. In the case of this dissertation project, it is innovative to dedicate comprehensive time and attention to the formative evaluation of this eLearning nutrition education program, as the concept of eLearning nutrition education among SNAP-Ed eligible Georgian adults is novel. One concern that arises with the evolution of technology and increasingly commonplace access to the Internet is the decrease in 'human' interaction, and it is important to incorporate 'user buy-in' early in program development by collaborating with members of the intended audience throughout program development, as to tailor the eLearning program with the voices of the audience. The user-centered design approach is most practically employed by facilitating focus group interviews or individual interviews with the intended audience [41]. This is a specific gap in current research, as prior to this dissertation project, SNAP-Ed eligible Georgians had yet to be

questioned regarding their perceptions of accessibility, digital literacy, content, expectations, and experience regarding an online nutrition education eLearning program. A project similar to this dissertation project conducted in Oregon targeted a demographically different low-income audience and found focus group interviews indispensable as a method of formative evaluation [18].

Case study methodology as in-depth formative evaluation of a new education program allows researchers to view problems from multiple perspectives and aides to enrich the meaning of a singular perspective. Case study inquiry copes with technically distinct situations, with many more variables of interest than data points [56]. Two of the purposes of case study inquiry are to describe an intervention and explore situations where invention has no single output [56]. Specific to nutrition education programs, qualitative interview data provides a richer, deeper level of data regarding participants' expectations of (before using) and experience with (after using) the program which augments quantitative descriptive and pre/post knowledge or behavior data [27,57–59]. An instrumental approach to case study methodology is often used to accomplish something other than understanding a particular situation. The case is actually of secondary interest; rather it plays a supportive role in facilitating understanding of something else. In this dissertation project, Food eTalk is the case, but understanding the feasibility and experience of eLearning nutrition education programs in general is the broader purpose of the project – which will serve as a foundation in the literature for other researchers interested in exploring eLearning nutrition education programs for their low-income audiences. An instrumental case study is often looked at in depth, its contexts scrutinized, because it helps the researcher pursue the external interest [60]. As stated by Patton (1980), case studies are particularly useful in depicting a holistic portrayal of a client's experiences and results regarding a program [61]. Yin (2003) suggests case study approach is valuable for health science researchers to evaluate programs and

develop interventions because of the approach's flexibility and rigor. As is unique to case study methodology, multiple methods of data collection were employed in this dissertation project, in order to enhance data credibility [56]. These multiple data collection methods were used to provide a more complete account of SNAP-Ed eligible individuals' expectations and experiences with Food eTalk [56]. As is unique to case study research, this dissertation project included quantitative self-administered surveys including: demographics, self-efficacy of eHealth Internet research, baseline Internet habits, as well as an automated user tracking system (learning management system, or LMS) data from each interviewee to facilitate a more holistic understanding of their expectations of and experiences with Food eTalk.

Formative Evaluation and Nutrition Education eLearning Programs

Several researchers have conducted focus group and individual interviews with SNAP-Ed eligible adults as formative evaluation regarding content and literacy issues in development of online nutrition education programs [9,10,18,41]. Buller et al conducted a formative focus-group based research study including descriptive quantitative survey data of a sample of low-income adults (n = 200) in southwest United States. Data included: descriptive surveys on computer use, focus group interviews on nutrition behavior, preferred nutrition education content regarding fruit and vegetable intake, and self-administered surveys on access to the Internet and self-efficacy in using the Internet [57]. Given the rapid advance in access to the Internet, this project is now dated (2001), but the mixed-methods, formative evaluation nature of the project lends itself as a resource for this dissertation project. One of Buller's key findings indicates the importance of locally relevant nutrition content and reflection of local attitudes and acceptability of nutrition education content [57]. These studies and projects varied in size, structure of focus group

interviews, and demographics/cultural background of the participants. This is a gap in the current literature as research of this nature has yet to be conducted with SNAP-Ed eligible Georgian adults. No rigorous evaluation of eLearning using smartphone technology has been conducted among SNAP-Ed eligible or low-income adults in the southeast region of the United States. This literature review supports the methodology of this dissertation project and expands on it will contribute to the literature.

Statement of Purpose and Rationale

This dissertation project focuses on the needs assessment and formative evaluation of a newly developed online, smartphone-based, nutrition education eLearning program, titled Food eTalk. The purpose of this dissertation project is to address the feasibility of eLearning for SNAP-Ed eligible Georgians, to understand user expectations of and experience with Food eTalk, and to inform future eLearning program development endeavors. The specific research questions answered in this dissertation include:

1. What is the feasibility of eLearning for SNAP-Ed eligible Georgian adults?
2. How does the development process of a tailored eLearning nutrition education process look?
3. What are SNAP-Ed eligible Georgians' expectations and experience of a nutrition education eLearning program?

CHAPTER 3

THEORETICAL FRAMEWORK AND METHODOLOGY

Theoretical Foundation

A constructivist case study approach was used to frame this research project. Stake (1995) describes the qualitative case study approach with an interpretive/constructivist paradigm. He suggests that case studies explicitly seek out multiple perspectives from different cases, with the ontological belief that reality is local and specifically constructed [62]. Constructivists claim that truth is relative and that it is dependent on one's perspective, and this paradigm recognizes the importance of the subjective human creation of meaning [62]. Constructivism is built on the premise of a social construction of reality and one of the advantages of this approach is close collaboration between the researcher and the participant as to enable the participant to tell about his/her experiences. It is through this discourse the participant is able to describe his/her views of reality and this enables the researcher to better understand the participants' actions [60]. The social constructivist perspective suggests that people are continuously developing meanings and understandings in social, cultural, and historical contexts. From this paradigm, people construct, form, and negotiate subjective, complex understandings of food, eating, and health through their personal experiences and interactions with other people and their contextual environment [63].

Further, constructivism is one of the multiple theories that guided the macro-level design process of Food eTalk. The 5-phase instructional design systems model, ADDIE (Analysis,

Design, Development, Implement, Evaluate) is shaped by multiple theories, one being constructivism learning theory, which helps to frame and design the outcome of online instructional materials [64]. Constructivism as an educational theory also guided the development of each of the Food eTalk lessons, with the assumption that knowledge is individually constructed and socially co-constructed by learners based on their interpretations of experiences in the world. Prescriptive principles from constructivism include: embedded learning in realistic and relevant environments, encouragement of ownership in learning, support for multiple perspectives with various modes of representations, and nurturing self- awareness [64].

The Health Belief Model (HBM), a psychological health behavior change model, also served as a theoretical framework for Food eTalk lessons. The HBM suggests that peoples' beliefs about health problems, benefits/barriers to action, and self-efficacy, explain engagement or lack thereof in health behavior [65,66]. The Food eTalk lesson content is grounded in the HBM of behavior change and the design of the lessons is supported in the fundamental instructional design events proposed by Robert Gagne [64]. These events include: gaining learner attention, informing learners of the objective, stimulating recall of prior learning, presenting the content, providing guidance for learning, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer [64]. Self-regulated learning in an asynchronous eLearning environment explains that eLearning courses should offer opportunities to practice strategies and skills. Situated learning refers to learning that takes place in the same context in which it is applied – such as in a supermarket or at a restaurant, when learning how to make healthful food purchasing choices. This adult learning principle is especially applicable to Food eTalk as the primary intent of this learning program is to utilize mobile-based devices to encourage learners to refer to short, interactive lessons at their point of nutrition related decision

making [55,64]. The informal and flexible use of mobile technology can facilitate learning in short bits, without restriction of time or location [67].

Research Design

The constructivist case study methodology used in this dissertation project allows health education researchers to study complex phenomena within their contexts and develop interventions and education programs [60]. The single instrumental case study design was chosen to provide a thick, rich description to help understand the multifaceted issues of user expectations and experience of Food eTalk [62]. The unit of analysis is defined as the Food eTalk program [68]. The case was bound by the length of time it took to conduct needs assessment, develop Food eTalk, and complete the formative evaluation. Altogether this process began in September 2014 and analysis was completed in December 2016; therefore the case was bound by this length of time [68].

Semi-structured focus group and individual interviews allowed the interviewer to refer to a prepared moderator guide which included a number of open-ended questions, but provided room for follow-up questions and probes which varied depending on the response of the interviewee(s) [69]. Moderator guides for interviews and focus groups can be found in **Appendix A.1 - A.3**. Focus group and individual interviews are well suited as a method for a constructivist case study project in order to help the researchers generate ideas and develop interventions [69] and interviews are usually the most important type of data collected in case study research [68]. Prior to data collection commencing, all interview questions were piloted with a small group of members from the priority audience for readability and understandability testing. This provided

the researcher a better understanding of how the participants would understand and comprehend the interview questions.

Formative evaluation included focus groups (n=16), which were conducted with members of the priority audience with a total of 45 participants who participated in 2 groups each (1 person participated in only the first of two in the focus group series). At the initial focus group, the participant/researcher first completed the informed consent process and each participant signed a consent form. The consent forms used for all interviews can be found in **Appendix B.1 - B.2**. Next, self-administered questionnaires assessing: sociodemographic variables, self-efficacy of using the Internet for eHealth research, and typical Internet habit surveys were completed. These questionnaires can be found in **Appendix C.1 - C.2**. At this initial focus group, participants were interviewed about their expectations of Food eTalk as well as their typical Internet habits. At the end of each of these initial (first in a series of two) focus groups, each participant was provided a loaned smartphone including a pre-paid data plan and were instructed to engage in the six Food eTalk lessons over the following ~3 weeks. After this time, the participants returned for a second focus group to discuss their experience with Food eTalk, and to return the loaned smartphone. From September 2015 - December 2015, focus groups were conducted across the state of Georgia to include a diverse understanding of the experience of both rural and urban living individuals. Participants each received a $20.00 gift card for each of their focus group interviews (total of $40.00 per participant).

In January 2016, nineteen individuals were recruited to engage in a series of 3 semi-structured individual interviews. At the initial meeting, the participant/researcher completed the informed consent process and each participant signed the consent form. Next, the participant completed the same self-administered surveys as delineated in focus group series protocol above.

Also at the initial interview (first in a series of three), a ~45 minute discussion regarding the participants' expectations of their Food eTalk experience was conducted. After this initial interview, participants were encouraged to use Food eTalk for ~ 3 weeks. After these three weeks, each participant then attended another ~ 1 hour semi-structured individual interview with the same researcher. In this second interview, participants were asked to discuss their experiences using Food eTalk. The third and final semi-structured interview in the series occurred 3 weeks after the second interview (6 weeks after the initial interview), with the focus at this interview to discuss participants' extended experience using Food eTalk. Participants received a $20.00 gift card for each of their individual interviews (total $60.00 per participant). A graphic representation of the study design can be found in **Appendix D**.

Sample and Sample Selection

Criterion-based network selection of participants defined inclusion as: ≥ 18 years of age and eligible for SNAP-Ed. SNAP-Ed eligibility is defined as people who live in households with income at or below 185% of the federal poverty level (FPL) or other means-tested inclusion criterion, such as participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). All races, ethnicities, and genders were included, and there was no upper age limit. Participants varied in whether or not they were actually receiving SNAP benefits, as well as the monthly amount they received in benefits and the duration of their SNAP participation. Some individuals were not actually receiving SNAP benefits; rather their SNAP-Ed eligibility (gross income ≤ 185% FPL) to do so established eligibility for this research study. Several participants had previous experience with the classroom-based Food Talk curriculum.

Sampling technique involved purposive maximum variation sampling [61,70] in order to include participants from diverse background (example: various years receiving SNAP benefits, children/no children at home, race/ethnic backgrounds). Recruitment focus was on SNAP-Ed eligible adults with children (≤18 years old) living with them, as this mirrors the priority audience as stated by SNAP-Ed Guidance [1]. Participants were recruited primarily by verbal recruitment. Key individuals who helped with recruitment across the state included: The University of Georgia Cooperative Extension Service staff, the UGA SNAP-Ed Recruitment Coordinator, and the UGA SNAP-Ed Assistant Nutrition Educator. Personnel at Mercy Health Center (Athens, GA), educators at several GED prep organizations, Head Start programs, and parenting support groups also served to recruit by word-of-mouth.

Sites of Research

Focus group participants were recruited across Georgia in order to understand user experience with Food eTalk in both rural and urban areas, as well as different geographical locations within the state. Five rural counties and seven urban counties served as research sites. Focus groups were primarily held at UGA Cooperative Extension offices and partner affiliates with UGA Cooperative Extension, such as GED training sites, community centers at public housing complexes, elementary schools with Head Start programs, and public libraries.

Recruitment for the individual interviews occurred in four counties (city): Fulton and DeKalb (Atlanta), Clarke (Athens), and Baldwin (Milledgeville). These counties were the focus for the individual interview series because of their proximity to the University of Georgia and for the former three, their urban classification. The majority (81%) of SNAP-eligible Georgians live

in urban areas [5]. UGA Cooperative Extension and UGA SNAP-Ed faculty and staff assisted in recruitment of these individual interview participants.

Food eTalk – The Case

The case of interest in this research study was that of the newly developed eLearning nutrition education program, titled Food eTalk. The content of Food eTalk was adapted from a Georgia-based, validated nutrition education curriculum [71]. Since 2009, the UGA Cooperative Extension Expanded Food and Nutrition Education Program (EFNEP) has offered a classroom-based nutrition education classes for low-income Georgian families across the state using this validated nutrition education curriculum, titled Food Talk. Peer educators, or para-professionals, lead this series of six 60-minute face-to-face Food Talk classes in various community settings such as: public libraries, housing authorities, and community centers. Each Food Talk class includes a didactic lesson, interactive activities, and a cooking demonstration/food tasting opportunity. This six-session curriculum was tailored to low-income Georgian families guided by the HBM [72] to help improve the nutrition of low-income families in Georgia [71]. The nutrition content in Food Talk is based on principles of the Dietary Approaches to Stop Hypertension (DASH) diet including: increasing fruits and vegetables, increasing low fat milk consumption, and limiting dietary sodium [73]. In order to facilitate future outcome evaluation across thee two different methods of nutrition education (classroom based vs. online eLearning), the intent of the Food eTalk curriculum was to mimic that of the Food Talk curriculum.

Traditional academic eLearning systems used in higher education, such as Desire2Learn, Canvas, and BlackBoard are not well designed for audiences who may have limited literacy,

limited digital literacy, or who may primarily access the Internet using mobile devices. Therefore, guided by instructional design experts in the UGA College of Education, an eLearning authoring tool that fulfilled these unique eLearning needs of SNAP-Ed eligible Georgians was used to develop Food eTalk. Articulate Storyline (https://articulate.com) is an eLearning development tool that specializes in interactive games, mobile friendly interface, and user-friendly design and was used to develop Food eTalk. **Figure 3.1** provides examples of a lesson and interactive activities. **Figure 3.2** provides examples of the two types of videos included in Food eTalk, cooking videos and 'just in time' learning videos. **Figure 3.3** provides examples of Food eTalk interface on a typical mobile device. Using Articulate Storyline as an eLearning authoring tool, Food eTalk lessons were technically developed and designed by collaboration between the UGA College of Education and a professional eLearning instructional design group, Yukon Learning (http://www.yukonlearning.com).

Video production for cooking demonstrations videos and augmenting 'just in time' learning videos was developed with videography expertise from UGA College of Education Media Specialist, UGA Cooperative Extension Services, and the UGA Marketing and Communications Multimedia Department. The cooking demonstration videos were embedded within each Food eTalk lesson, and the recipes featured in the cooking demonstrations paralleled those included in Food Talk classes. Two versions of the same recipe were included in each Food eTalk lesson – a full-length "Meals in Minute" (8-12 minutes) and a truncated "Hands-On" (2-4 minutes) version, as to assess which length and style was preferred by the formative evaluation participants. The "just in time" videos were offered in conjunction with the Food eTalk lessons and highlighted very specific 'how to' nutrition education principles. These videos were 2-3 minutes in length and included topics: Buying Bread, Buying Milk, Food Safety at

Home, and Meal Planning. All nutrition education content was based on Food Talk and guided by the author (a registered dietitian) of this dissertation.

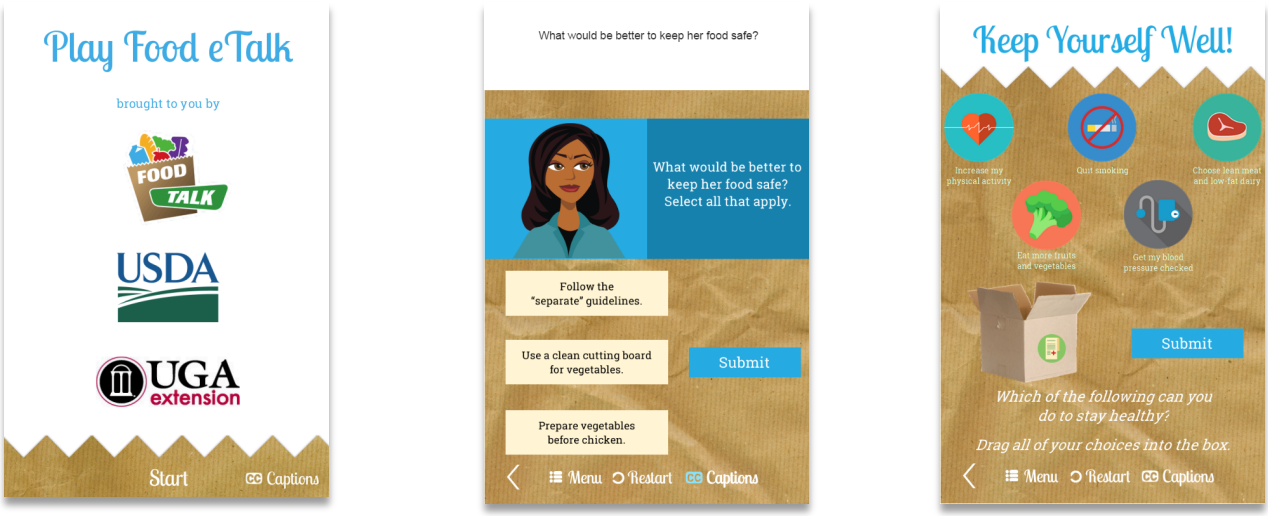

Figure 3.1. Examples of Food eTalk Lessons and Interactive Activities

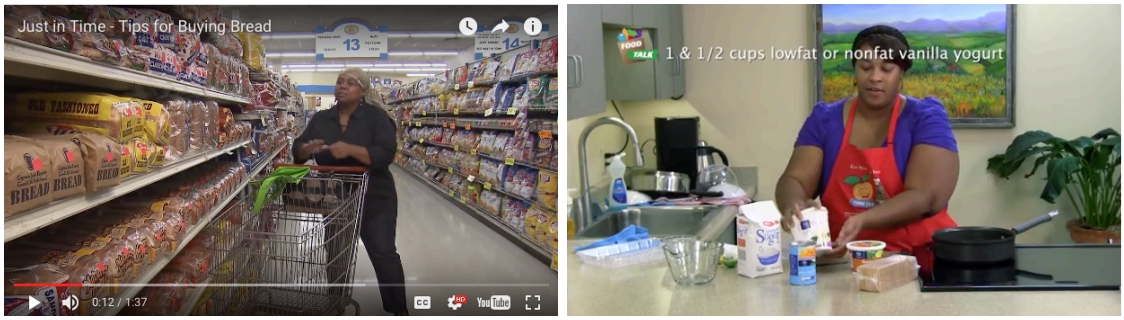

Figure 3.2. Examples of Food eTalk Videos

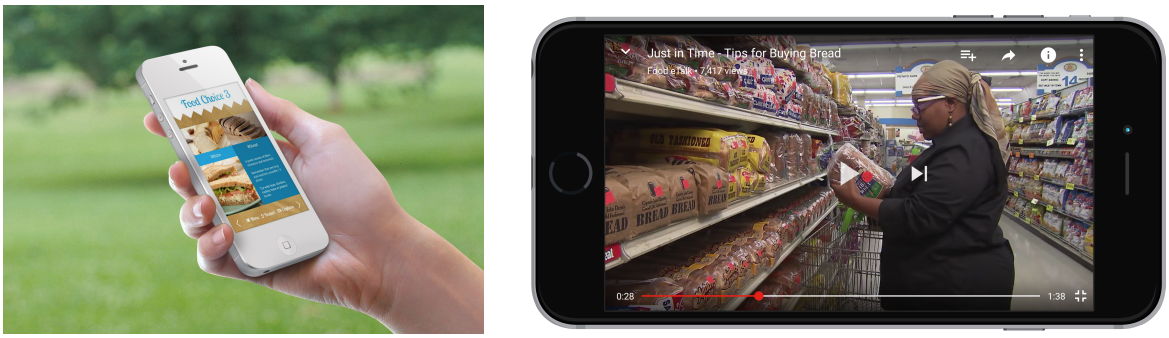

Figure 3.3. Examples of Food eTalk Interface on a Mobile Device

Data Analysis

Data from the interviews was analyzed using a note-based constant comparison method [74] including field notes, memos, debriefing notes, and verbatim transcriptions [61]. A combination of inductive and deductive coding approaches was employed. The deductive coding approach was guided by interview guide themes: access, literacy, and content related to both expectations of and experience with Food eTalk – which were informed by the literature review and theoretical framework. Inductive coding, because of the researcher's limited and fragmented knowledge and understanding of the phenomenon under investigation (i.e., low income Georgians expectations and experience with eLearning) also served in analysis [75,76]. The constant comparison coding approach included coding data, categorizing the codes, and reorganization of the categories into thematic representation through a series of assertions and interpretations [69,74]. Using this method, data was compared across transcriptions to find similarities and differences, recognizing too, the researcher's own observations, ideas, and intuitions influenced this process [74]. Coding strategy did not include line-by-line coding as this level of abstraction did not best represent the data. Rather, coding recognized incident by incident in order to best interpret what was being

said in terms of fully developed thoughts/sentences/ideas as to participants' shared expectations and experiences [74]. The first level coding involved inductive free coding, which was narrowed by collapsing and integrating codes for redundancy during the second pass. Describing and defining each code preceded the second level coding, facilitated by using the "code definition memo" feature of Atlas.ti (Mac Version 1.0), to carefully describe each code as it had been used in the first pass coding. This analytical technique allowed the researcher to collapse redundant codes, merge like-codes, and begin to see relationships between codes for preliminary category development. The deductive approach to categorize codes based on the topics (access, literacy, content, expectations, experience) was used both during the code-definition process and the second pass coding. Using Atlas.ti (Mac Version 1.0), code maps served as visual network representation of the coded data, and facilitated construction of categories across the different interviewees perspectives, which eventually lead construction of the overarching main themes. This illustrated representation made it clearer to see relationships between categories and allowed the researcher to remain close to the data as key themes were constructed. Qualitative data analysis and data organization was digitalized using Atlas.ti (Mac Version 1.0). This qualitative data analysis program assisted the researcher in organizing, sorting, coding, and storing data and helped to facilitate a transparent analytical process [77].

Use of Atlas.ti

Atlas.ti is a digital qualitative management tool that serves to facilitate organization, coding, memoing qualitative data. It is among several other programs known as Computer Assisted Qualitative Data Analysis Software or CAQDAS. Atlas.ti allows the researcher to systematically organize and analyze qualitative data [77]. CAQDAS have been used for over two

decades are considered one of the most innovative tools to develop qualitative data analysis [78]. For this dissertation project, Atlas.ti (Mac version 1.0) was used to store transcribed documents, code data, memo, write field notes, as well as develop code maps to serve as visual network representation of the coded data. Atlas.ti allowed for flexible, secure, and mobile access to the data and analysis. Use of Atlas.ti provided a level of security to all documents, as the web-based program requires login for access. Atlas.ti easily allowed the researcher to merge/collapse codes as well as unlink codes from one another, a process that prior to CAQDAS technology had not been as simple [79]. Use of Atlas.ti allowed the researcher to quickly and easily sort all quotes attached to a code, or all memos attached to a document, as well as listen to audio as it was time stamped and linked within the file containing the transcript. Of note, the researcher used Inqscribe (Version 2.2) to timestamp and proof transcriptions, as the original transcription was outsourced. The task of making connections between documents, codes, memos, and notes was simplified only from a logistical standpoint, as the researcher still needed to make all analytical decisions - CAQDAS offers no automation of data analysis.

Survey-based quantitative data was used to describe the participants. Descriptive statistics and proportions were used describe the participants with regard to demographics, baseline Internet habits, and self-efficacy using the Internet. Learning management system (LMS) user tracking data was used to describe participants based on length of engagement in Food eTalk lessons and number of sessions initiated in each lesson.

IRB Approval

The University of Georgia Institutional Review Board on Human Subjects approved all methods and procedures of this research project (UGA IRB ID # MOD00003724).

Establishing Quality

Establishing quality and rigor is especially important area in scientific fields where quantitative inquiry is dominant. Concerns are often that qualitative research is simply too contextually situated to comply with preexisting, traditional (quantitative) measures of quality and that within qualitative research, the question of quality may differ across theoretical perspectives and epistemologies. However, using Tracy's Eight Big Tent Criteria of Qualitative Research (2010) as a model, I have addressed many of the hallmarks she indicates as essential to assure quality in qualitative inquiry. First, by reflecting on and writing a subjectivity statement, I am able to situate myself and increase transparency to my reader as to my subjectivities in relation to the research topic [69]. This subjectivity statement as well as documented reflexivity memos is a start to sincerity as an indicator of quality. I view this marker as intricately linked to the ethical component of quality. I feel very strongly in the moral and ethical responsibility of being situated as a researcher, as ensuring the confidentiality and respectful treatment of my research participants as an end in and of themselves, and not the means to an end of a larger project [80]. In addition to analytic logistic memos, I wrote reflexivity memos, as a reflexive statement written at the start of a project is not comprehensive enough to capture and notice all of the dynamic ways in which researcher assumptions, interactions, and thoughts could impact the data and analysis. I firmly believe this topic is worthy, timely, and relevant as explained in my statement of the problem at the start of this dissertation. I am striving to develop a fiscally sound nutrition education program for low-income Georgians that can serve as a model for other states to adopt and culturally tailor for their constituents. This enhances the quality of this project, in terms of transferable findings. The federal government needs evidence that SNAP-Ed

nutrition education programs help eligible beneficiaries meet the Dietary Guidelines for Americans and My Plate recommendations, and this formative evaluation can provide a significant contribution to the understanding of fiscally responsible, innovative nutrition education for low-income individuals. The rigor of this project is established by my theoretical grounding and robust data including 19 individual interviewee participants (54 interviews) and 45 focus group participants (16 focus groups), and I strived to understand the nuanced complexity of user's experience with Food eTalk through thick descriptions of their experiences. Thick description means providing enough detail to illustrate a story, including culturally situated meanings and abundant concrete details. This is especially important in case study research, by *showing* what happened though examples rather than *telling* what happened though speculation or insinuation. I edited all transcriptions for errors prior to coding, by listening to audio, time stamping, and checking transcriptionist's work simultaneously. Using Atlas.ti (Mac Version 1.0) allowed my field notes, memos, transcriptions, and coding to be transparent and credible for my committee members and my major professor to review, as sharing these documents digitally is exceedingly simple with a qualitative digital data management program such as Atlas.ti. My analysis and findings are made credible by use of crystallization of my multiple data types (focus groups, individual interviews) and multiple theoretical frameworks in order to provide multivocality to my data – different viewpoints on the same topic, synergistically working to provide a rich understanding of user experiences with Food eTalk. I was able to engage in member reflections with my individual interview participants as I saw them each for multiple interviews. Finally, I have situated this research project in the literature, grounded the design in a conceptual framework based on a constructivist epistemology with instructional design and health behavior change constructs, and have utilized data collection

methods that are supported by case study methodology to ensure meaningful coherence of the overall project [4].

Subjectivity Statement

In relation to my research participants, I was viewed as a nutrition graduate student at the University of Georgia. I had no prior relationship to the participants, and at the first interview I disclosed to them that I am a registered dietitian (RD) and a graduate student who has an interest in developing an online nutrition education program for SNAP-Ed eligible Georgians. I disclosed that I played a role in the development of Food eTalk, but I did not elaborate on to what extent I was involved in the development, as to mitigate any bias they may perceive me to have regarding their 'approval' of Food eTalk. Though I was intricately involved in all aspects of Food eTalk development, I felt my primary responsibly as a researcher is not to 'prove' that this mode of nutrition education is effective with the priority audience, rather to employ a participant-centered approach to needs assessment, feasibility evaluation, by inductively exploring participants' individual Food eTalk engagement experiences to comprehensively evaluate this eLearning program.

I have been a clinical dietitian and diabetes educator for over 15 years. Throughout my professional career I counseled patients on nutrition and diets related to diabetes, weight loss, cardiovascular disease, amongst other nutrition-related chronic diseases. I have worked as an inpatient and outpatient dietitian serving primarily under-insured indigent populations in Missouri, California, Colorado, and Georgia. Through these experiences, I have developed subjectivities such as what type of nutrition education is relevant and practical for individuals

who live with poverty, food insecurity, and compromised access to healthcare. Being that I have very little in common with my target audience demographically (at the time of data collection I had lived in the southeastern USA for < 3 years, I have never been eligible nor utilized any federally funded food aid programs, and I have never been responsible for feeding children), I recognize my own gaps in understanding of the needs of the audience for whom I hope to serve. I value collaborating with members of the priority audience when developing nutrition education resources and programs because of their unique perspective and input to ensure relevance and engagement of the nutrition education program. I recognize the need for nutrition professionals to develop nutrition education interventions with basic nutrition principles at the core of the program, however, I feel strongly that what an individual or intended audience needs with regard to tools, education, and resources to improve his/her nutritional health is not a universal truth, and that there are unique perceived needs and barriers that require informed tailoring of a nutrition education program. Based on this, and following both Yin (2003) and Stake's (1995) constructivist paradigm, I agree with the constructivist claim that truth is relative and that it is dependent on one's perspective and so I strive to incorporate this approach into my research.

CHAPTER 4

THE FEASIBILITY OF AN eLEARNING NUTRITION EDUCATION PROGRAM FOR LOW-INCOME INDIVIDUALS[1]

[1] Stotz SA, Lee JS, Rong R, Murray D. (2017). *The Feasibility of an eLearning Nutrition Education Program for Low-Income Individuals*. Health Promotion Practice. January(18)1; 150-157.

Abstract

Background: Online eLearning may be an innovative, efficient, and cost-effective method of providing nutrition education to a diverse low-income audience.

Aims: The intent of this project is to examine perceptions of nutrition educators regarding the feasibility of an eLearning nutrition education program tailored to low-income Georgians.

Method: Semi-structured individual interviews were conducted and guided by the constructivist theory. The interview guide focused on three themes: accessibility, literacy, and content. A prototype of the program also served as a talking point. Interviews were conducted in two urban Georgian counties in a location chosen by each participant. We recruited a convenience sample of Georgian nutrition educators (n=10, 100% female, 50% black). Interviews were transcribed and analyzed using constant comparative method.

Results and Discussion: Motivation is considered the primary barrier to program feasibility. Neither access to the Internet nor literacy are considered significant barriers. Inclusion of skill-based, visual education methods such as: cooking videos, recipes, and step-by-step teaching tools were highlighted. Nutrition educators perceived this program would be a feasible form of nutrition education for the priority audience.

Conclusions: Findings from this study will inform the user-centered development of the program.

Key words: eLearning, low-income, nutrition education, Food eTalk, SNAP-Ed

Introduction and Background

In light of recent federal budget cuts to the USDA Supplemental Nutrition Assistance Program (SNAP) and much debate in congress regarding the effectiveness or need of the SNAP and Supplemental Nutrition Assistance Program Education (SNAP-Ed), it is prudent that cost-effective, user-centered nutrition education programs be developed and rigorously evaluated to provide evidence for policy makers as to the need and efficacy of both programs [3]. As access to the Internet and mobile devices increases among low income populations, we should consider online nutrition education programs in order to expand outreach and decrease barriers of attending traditional face-to-face classes [12,13]. Internet access for low-income individuals is increasingly commonplace because of free WiFi in many public spaces and affordable Internet accessing devices such as smartphones [2]. Several researchers have already begun to explore use of the Internet to provide nutrition education to low-income Americans with promising results. Online nutrition education varied from use of videos [35], to tailored messages [11], to self-paced didactic lessons [81,82]. Evaluation of free self-paced online nutrition education courses offered in a non-academic setting, suggests encouraging positive changes in participant's self-reported eating behaviors [83]. The most common content topics offered through online nutrition education courses for low-income adults include weight loss and chronic disease prevention and have been widely well-received, yet researchers indicate more long-term behavior change research is needed [25–27]. Nutrition educators who work with low-income Georgians have unique insight as to the feasibility of an eLearning nutrition education program, and can help develop a user-centered, culturally tailored, and relevant eLearning program for SNAP-Ed eligible Georgians.

The purpose of this study is to inform the development of an innovative eLearning program tailored to low-income Georgians, titled Food eTalk. This study describes findings from the first step in the development Food eTalk as an innovative education program and serves as the basis for an evidence-based nutrition education practice model. We chose to interview practitioners with specific expertise in serving Georgians with low income as a means to link program developers/researchers with nutrition education practitioners in Georgia. A constructivist case study approach was used to frame this research project [62]. A review of the literature aided to develop research questions and the focus on accessibility, literacy, and content is grounded and supported in similar research projects during the needs assessment and formative evaluation phase of nutrition education programs [10,18,81]. Research questions focused on interviewees' concerns and suggestions regarding eLearning for SNAP-Ed eligible Georgians as well as their opinions of a prototype of Food eTalk.

Methods

An instrumental, single case-study design was employed for this project and the unit of analysis is defined as the eLearning program, Food eTalk [62]. Case study methodology as in-depth formative evaluation of a new education program allows researchers to view problems from multiple perspectives and aides to enrich the meaning of a singular perspective.

The case of interest in this research study is that of the newly developed, eLearning nutrition education program, Food eTalk. The content of Food eTalk was adapted from a Georgian classroom-based, validated nutrition education curriculum, titled Food Talk [71]. Each class includes a didactic lesson, interactive activities, and a cooking demonstration/food tasting

opportunity. The Food Talk curriculum was developed specific to low-income Georgian families guided by the Health Belief Model (HBM) [72] to help improve the nutrition of low-income families in Georgia [71]. We collaborated with eLearning design experts to design a prototype of Food eTalk specifically for the formative evaluation phase of this project. We chose to use an eLearning authoring tool which supports interactive games and a user friendly design. The protocol was approved by the University of Georgia Institutional Review Board.

Participant Selection

Purposive maximum variation sampling method [61] was used to recruit 10 female nutrition educators who provide nutrition education to low-income Georgians at the state and local levels (mean age ±SD 51 ±13 years, 50% black). Interviewees ranged in teaching experience from 7 – 35 years, and 3 participants were registered dietitians (RDs) currently involved in writing nutrition education materials and curriculum for low-income Georgians. Six of the interviewees who were not RDs have been directly involved with teaching Food Talk in the classroom, and 1 participant was a health educator with over 20 years of experience educating Georgians with low-income.

Data Collection Procedures

Semi-structured key-informant interviews [84] served as the data collection method. The first author of this paper conducted the interviews, and she is a graduate student with PhD-level training in qualitative inquiry. The participants had no previous relationship with the

interviewer, and understood the intention of the interviews was to provide insight as to the feasibility of an eLearning program tailored to SNAP-Ed eligible adult Georgians. Interviews were conducted at the participants' place of employment by all but 1 participant, and she chose to meet at a local coffee shop. The interview guide included three basic themes: access, literacy, content. Issues of Internet access and digital literacy are especially important as these may serve as barriers to feasibility of eLearning for the intended audience [12]. The third theme explored perceived preferences in content, to better understand what specific nutrition education content the learners would most prefer. A prototype two Food eTalk lessons was used as a point of conversation during each interview. The interview guide had been previously pilot tested by the first author with two peer-nutrition educators who were not included in the sample of this project. Each interview was recorded.

Analytical Process

Atlas.ti was used as a digital qualitative management tool to facilitate organization, coding, and memoing the data [77]. The first author kept digital field notes that were included as part of the analysis and coding was reviewed by two qualitative methods professors. The interview transcriptions were coded using the constant comparison method [74] which helped compare opinions across the different interviewees and to construct key themes. A code map was developed with Atlas.ti to assist in construction of themes across the interviews.

Findings

Findings from the key informant interviews are organized by themes, including both deductive themes from the original research questions regarding access, literacy, and content and from inductive emergent themes.

Access to the Internet and Devices

The interviewees do not consider accessibility or literacy to be significant barriers to the priority audience's use of Food eTalk. Smartphones were commonly mentioned as the way low-income Georgians would access the eLearning program and were essentially considered commonplace among the priority audience. One interviewee commented:

I think probably their access to the Internet would probably be through their phone - because a lot of people don't have Internet in their homes - so a lot of people do have smartphones, so lots of them will go through their smartphone. So if we going to do this online, it has to be mobile compatible. #4.

Several interviewees also mentioned that many low-income Georgians use the public library and could easily access the Internet there as well, but long lines, limitations in transportation, and inconvenient library hours typically made smartphone Internet access easier and more reliable.

Literacy

Literacy was discussed regarding general literacy and in relation to digital literacy in terms of navigating a particular website. The latter was discussed more regarding whether a potential user was motivated enough to access a website, rather than his/her inability to access the website from a technical-skills standpoint. Literacy was referenced regarding reading level, but navigating the website or eLearning lessons, was not considered a potential barrier. One participant noted that the voiceover audio feature of Food eTalk as shared though the prototype would mitigate literacy issues:

I just think with regard to literacy, again, having it very basic - on the level of an elementary school - fifth, sixth grade. With regard to the narrator, or the voice, - I… that was perfect, I think it was very, just perfect. #9

Several participants noted language at less than a 6th grade level was important, but a voiceover with a 'relatable' voice, such as a Georgian based accent, was suggested to be the most important way to connect with low-literacy learners.

Navigation: registration and passwords.

Interviewees suggested making the eLearning lessons user friendly and easy to navigate. When presented with the prototype of Food eTalk, most indicated the prototype was set up already as user friendly and intuitive. The most prominent barriers regarding accessing or logistically using a smartphone for eLearning included initial registration for Food eTalk access and remembering their login information. Interviewees suggested many individuals are wary of

entering information online such as their name, address, or phone number and will likely disengage from the program if prompted to provide this information. This barrier is not related to literacy issues, rather wariness of government sponsored programs and distrust in providing personal identifying information.

Regarding navigation barriers, remembering one's password was indicated a potential barrier, however, this was not specific to literacy issues or even specific to the priority population. Several interviewees suggested their own frustration with remembering passwords and many interviewees discussed as to how easily anyone will disengage from a website simply because s/he can't remember a password. One interviewee said:

I write my passwords down all the time and then I can't remember what I did with them….But you know, I think it is a barrier. Because it's a barrier for everybody - and, I'll tell you, it has absolutely nothing to do with low literacy, has nothing to do with low income, has nothing to do with education level. #10

Solutions to remembering passwords included linking the registration to FaceBook or another website in which the participant would already be logged in, allowing the Food eTalk program to automatically remember passwords when accessed on the same device, and eliminate the need for password/registration all together.

Barrier: Motivation

The most frequently discussed barrier to low-income Georgians using a Food eTalk was that of lacking the motivation to do so. Motivation was also discussed in context of drive to actually implement and make behavior changes based on Food eTalk content; however, this is not a barrier specific to eLearning, as direct nutrition education, both in individual and group settings, suffers the same dilemma of knowledge often failing to result in healthy behavior change. Motivation to engage in Food eTalk was discussed regarding limitations in time, self-efficacy in implementing changes, and perceived benefits from nutrition education. Addressing a question to elaborate on what she meant by 'motivated enough to use it' ("it" meaning Food eTalk) one interviewee said:

I think they are being motivated in understanding that they, "yes you"… can do this - and you can be successful at this. I think is a message that needs to get across to them - and I think once they feel, I don't know if empowered is the word but maybe it is, empowered they can certainly … Internet access is out there I think for them, they just have to…. be willing to go and motivated enough to go get it. #10

In addition to suggestions to offering financial incentives (gift cards and grocery store coupons) interviewees discussed ways mitigate low motivation to use Food eTalk by making the eLearning program engaging and interactive, keeping all lessons < 10 minutes in length, offering an official certificate of completion, providing positive feedback, and including interactive games. A combination of external incentives and intuitive, easy-to-use interface was suggested

by one interviewee, whom had experience developing an engaging web-based program for a similar priority audience.

Content

Interviewees discussed both content and design for most effective user engagement. While looking at the prototype of Food eTalk, several participants elaborated on how the presentation of content would engage individuals both to enhance learning and engagement with Food eTalk. These findings are organized by content topic and content delivery method.

Nutrition content topics. The majority of ideas for nutrition content overlapped considerably between the different nutrition educator interviewees. Topics included: label reading, portion control tips, cooking tips, recipes, grocery shopping tips, and ideas on food resource budgeting. Additionally, interviewees discussed how dispelling myths around the cost of healthy food is important, in order to decrease perceived barriers of what it 'costs' to eat healthful foods, and the need for tips on how to stretch a food budget. Many of the nutrition educator interviewees mentioned that their patients/clients/students frequently ask for recipes, recipe modification, and ingredient substitutions. One interviewee explained:

What I am finding is that people want recipes - and they want to know how to modify a recipe that they currently use and in the South we use, we eat a lot of vegetables, but you know, people cook them with sugar - they use they use lots of fats and oils, so how can they modify what they are eating, because most of them have some sort of chronic disease - so they are trying to figure out how do I maintain this and how do I manage that? #5

Disease specific nutrition information was discussed frequently. Interviewees indicated that many low-income individuals want more than basic nutrition information; they are interested in disease-specific topics such as diabetes.

Nutrition related decision-making. The need for education on decision-making including: food budget management, choices when dining out, meal planning, time management, and grocery shopping decisions were frequently discussed. Organization and planning were among the most frequent suggestions to educate low-income learners with regard to stretching their food dollars both prior to, and during a grocery-shopping trip. In response to a question about resource management and eLearning, one interviewee discussed both financial and time resource management:

I think that the best thing the online learning can do is to help people understand that it doesn't take an hour or more in the kitchen, we can prepare things healthfully, quick and easy - in 15-20 minutes - so I think that piece, and maybe even showing a quick demonstration online will really help people to understand - it can be healthy, it can be inexpensive and it doesn't have to be time consuming. #9

Methods of providing education. Within the context of online learning, educators had many ideas as to what form of learning might engage low-income Georgians. Categories included step-by-step instructions, videos, and benefits of mobile access.

Step-by-step instruction. Interviewees discussed the need to provide step-by-step instructions on how to employ effective decision-making regarding meal planning, organization, and food

shopping. The need for step-by-step instructions opposed to theoretical or 'big-picture ideas' was highlighted. For example, specifics such as: take inventory of the pantry, write out a menu for the week, and make a grocery list based on the menu and what you already had in the pantry, instead of a less specific directive to "plan your meals" was suggested as essential to assist the learner into transferring new information into practice, or behavior change.

Visual learning. Many interviewees suggested the priority audience preferred visual learning and one interviewee noted that 'screens' are inherently visual and therefore provide tremendous learning opportunities. Interviewees suggested videos and interactive activities would engage learners, and those videos are a great way to both entertain and educate learners. Interactivity was also mentioned as a way to 'hook' learners, and the interactive quizzes or 'games' shown in the prototype were well received by the interviewees as ways to provide casual learning evaluation and link information intimately to the learner. Educators noted that videos would likely be the best way to engage, entertain, and provide education as many members of the priority audience already regularly watch videos on their smartphones through YouTube and FaceBook. Though cooking videos were the most commonly discussed video-content item, some educators also mentioned videos in the form of short vignettes and testimonial stories of Food eTalk successes.

Benefit of Mobile Access. Several participants commented on the inherent mobility of smartphone-based eLearning. Point of decision-making cues was mentioned as a highlight of mobile-based learning, and one interviewee discussed the importance of point of purchase education in a supermarket:

I think most people make a decision in the moment - and that, that is what they would call a "hot state" - so most people, I think the majority of people, they are at the grocery store making a decision, or at the vending machine - and so I do think those point of sale decision prompts become very important. #3

Another interviewee suggested that mobile learning mitigates 'time restriction' barriers as learners could engage in Food eTalk while they're waiting for something:

Yeah, I think you know people can fit that in, in their day, when it is convenient, when they are waiting for a prescription to be filled, and that kind of thing, just put their ear buds in and they could - it would be great to have that on the go, that it doesn't have to be something that you are carving time out for it could be something that you just pop in and out of when you have 10 minutes here or there, so I think that makes it more accessible. #4

Though the inherent mobility of smartphone based nutrition education was not discussed in every interview, the dual benefit of accessibility of low cost smartphone-based Internet and its mobility was emphasized as a significant strength of Food eTalk by the interviewees who mentioned it.

Discussion

As supported by the literature, access to the Internet has become essentially ubiquitous among even low-income individuals [40,41] and this audience primarily accesses the Internet via a

mobile device [42]. Interviewees would have perhaps not even discussed Internet access as a barrier had they not been directly asked this question from the interview guide, as the barriers of lack of motivation to use the eLearning program and follow-through with behavioral change were discussed as far more formidable.

Motivation was discussed in two different contexts. Participants suggested there may be low motivation for eligible individuals to log into, register for, and use Food eTalk and indicated that even if an individual were to use Food eTalk, there are still concerns with motivation to actually engage in behavior change based on what the individual learned in Food eTalk. The latter is not unique to online nutrition education, as health educators have used various health behavior theories and education techniques to grapple with how knowledge translates into behavior change for years. Participants' suggestions to alleviate low motivation included: external incentives, entertaining interactivity, and a very easy registration process. Financial incentives such as: supermarket gift cards, additional funds added to monthly Electronic Balance Transfer (EBT) accounts, or special coupons/food vouchers are all potential ideas to increase motivation and engagement among low-income individuals in nutrition education programs. Currently these types of incentives are not allowed under USDA SNAP-Ed funding.

We based Food eTalk on a previously validated face-to-face curriculum (Food Talk), which is grounded in the HBM. We plan to emulate Food Talk as closely as possible in our Food eTalk design, as that we may eventually compare behavior change outcomes between the two delivery methods, which is why we've employed the HBM constructs as our primary behavior change theory supporting Food eTalk. The HBM is a psychological behavior change model that attempts to explain and predict health behaviors, and has been widely used in the field of nutrition education since the 1950's. The HBM suggests that if a person feels that a negative

health condition can be avoided and has positive expectation that s/he can make change to prevent this health condition, that health-related action will occur [72]. Drawing on three of the HBM constructs: self-efficacy, perceived barriers, and perceived severity - interviewees discussed the need to empower low-income Georgians to feel capable of making change in spite of limited food budgets. Interviewees indicated that if an individual had a severe 'health condition', which required a special diet, s/he might be more motivated to learn about nutrition. Since many Georgian adults are already overweight and obese [85], more emphasis in nutrition education content needs to be on weight loss instead of obesity prevention, or specifically on chronic disease prevention and diet-related management of chronic disease, as this might heighten perceived severity of a weight-related health condition. Currently SNAP-Ed funding does not support medical nutrition therapy or disease specific diet education, but evidence from this study suggests low income Georgians may benefit from and be interested in more than general nutrition education, in a more chronic-disease specific context. Diabetes, hypertension, and heart disease would likely be the disease-specific topics of most interest.

Adult learning and eLearning theories support findings from this study in terms of best practices to develop an effective Food eTalk program. Malcolm Knowles explains that adult learners are motivated when they can see the need to acquire knowledge to address a real life problem or situation, and when they can relate the learning task to their own goal of what they practically want to achieve [86]. Findings here indicate that low-income adult Georgians would be most engaged in online nutrition education if it provided step-by-step instructions to answer a real dilemma or problem in their lives. An example of this would be a cooking video with basic instructions for food preparation and a recipe included. A mobile screen-based (smartphone) program also offers these skill-based contextual learning opportunities, at the point of nutrition-

related decision-making, such as in the supermarket [64,67]. Additionally, eLearning theory suggests interactive components with feedback for immediate performance assessment enhance user feelings of engagement [87]. Findings from this project suggest that interactivity will engage as well as entertain learners, and that immediate feedback may also serve as motivation in order participate in Food eTalk.

Adding to this, the instructional design principle of 'just in time learning' (JIT learning) provides a learning solution when it is actually needed, rather than on a deferred basis. JIT learning has pedagogical roots in the "job aide", which provided step-by-step instruction for performing a specific task, at the time when the learner needed the information. Now, with mobile technology, JIT learning has expanded from the traditional job-aide notecard format to include mobile technology [88]. Several interviewees recognized the novel and unique benefit of mobile eLearning education, and that supporting healthy nutrition behavior decision-making in context, may be very a powerful teaching tool for this audience.

Strengths of this formative qualitative project include the study sample with exceptional expertise in providing nutrition education to intended audience; 50% of our participants have over 15 years of direct education experience with our audience. Another strength was the use of the Food eTalk prototype to provide a visual to prompt discussion on aesthetics and design of an eLearning program. Limitations include potential bias of our participants based on their higher education and inherent speculation as to the feasibility of online learning among an intended audience of which they are not directly a part. We have mitigated this limitation by conducting focus groups with SNAP-Ed eligible Georgians using the Food eTalk prototype as a second phase of formative evaluation, prior to developing the entire Food eTalk program. Further, we

are currently conducting a statewide mixed-methods formative evaluation with SNAP-Ed eligible Georgians with the completed Food eTalk program.

Conclusion

This research project serves as a step in the iterative development process of building a user-centered and innovative eLearning nutrition education program for low-income Georgians. Grounded in the HBM, adult learning, and eLearning theory, and drawing upon the literature, Food eTalk is currently being tailored to low-income Georgians' specific nutrition education needs.

CHAPTER 5

DEVELOPMENT OF AN ONLINE SMARTPHONE-BASED eLEARNING NUTRITION EDUCATION PROGRAM FOR LOW-INCOME INDIVIDUALS[2]

[2] Stotz SA, Lee JS (2016). *Development of an Online Smartphone-Based eLearning Nutrition Education Program for Low-Income Individuals.* Journal of Nutrition Education and Behavior. (In Press)

Abstract

The objective of this report is to describe the development process of an innovative smartphone-based eLearning nutrition education program targeted to SNAP-Ed eligible individuals, titled Food eTalk. The lessons learned from the Food eTalk development process suggest that it is critical to include all key team members from the program's inception using effective inter-team communication systems, understand the unique resources needed, budget ample time for development, and employ an iterative development and evaluation model. These lessons have implications for researchers and funding agencies in developing an innovative evidence-based eLearning nutrition education program to an increasingly tech-savvy low-income audience.

Key words: eLearning, nutrition education, low-income

Introduction

Nutrition education involves any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and nutrition behaviors that are conducive to wellness [8]. Literature suggests nutrition education specific to low-income individuals can improve intake of healthful foods such as fruit and vegetables and increase food resource management skills [9,82]. Electronic learning (eLearning) is the use of electronic educational technology in learning and teaching [20]. Research shows eLearning is an effective way to improve nutrition-related habits such as increasing fruit and vegetable intake and adherence to a diabetes diet or weight management diet [9,26,89]. Nutrition education through eLearning includes: diet trackers, cooking videos, interactive recipes, the USDA MyPlate campaign[21], and didactic self-paced slideshows [25,26,28]. To expand on preliminary exploration of eLearning methods in nutrition education among a low-income audience, more rigorous evaluation regarding the use of eLearning nutrition education programs tailored for learners with low-income is needed.

Internet and device access was once considered a barrier for low-income individuals to regularly access the Internet, but inexpensive mobile devices and WiFi in public spaces is alleviating this digital divide [90]. A 2015 report reveals 74% of low-income Americans use the Internet and 50% of low-income Americans who use the Internet are considered smartphone-dependent and exclusively use smartphones to access the Internet [90,91]. Needs assessment data suggests Georgians eligible for the Supplemental Nutrition Assistance Program Education (SNAP-Ed) have regular and reliable Internet access [92]. It is not always feasible for individuals to attend a face-to-face class, as issues with transportation, childcare, and fluctuating work schedules often make it difficult to attend in-person classes [12,13]. As access to the Internet and

mobile devices increases among this population, it is important to consider nutrition education eLearning programs, in order to expand outreach and decrease barriers of attending traditional face-to-face classes.

One viable opportunity for eLearning nutrition education programs is SNAP-Ed. This is a federally funded nutrition education program directed to low-income Americans. The goal of SNAP-Ed is to improve the likelihood persons eligible for SNAP will make healthy choices within a limited budget and choose active lifestyles consistent with the current Dietary Guidelines for Americans and MyPlate [93]. SNAP-Ed programs are delivered by each state, and activities must be evidence-based while using comprehensive and multi-level interventions [93]. eLearning is a novel and innovative education tool, and has yet to be evaluated as a part of a comprehensive SNAP-Ed program. The purpose of this report is to share the lessons learned and experiences in development and evaluation of a smartphone-based eLearning SNAP-Ed program tailored for low-income adult Georgians, and to serve as a guide for researchers who may be interested in developing similar eLearning programs for their audiences.

Discussion

Iterative Design Approach

As a model to developing a new eLearning program, we found a non-linear, iterative design approach best facilitates this complex process (**Figure 5.1**). Though the curriculum (content) will serve as the basis for program development, it is important to include instructional design and videography experts early in curriculum development. The delivery method of

providing education via a smartphone includes factors such as: realistic length of a lesson, contextual learning opportunities, and pragmatic logistics of interactive approaches to eLearning. This iterative process is essential to maximize the potential of a smartphone-based eLearning program, and to ground the program in health behavior change, eLearning, and adult learning theories. During the development of this eLearning program, titled Food eTalk, the content expert worked closely with eLearning designers and videographers in order to integrate curriculum content with eLearning authoring tool features, and augment with videos for an optimal user experience. The eLearning designers will assist in developing an eLearning program guided by fundamental eLearning design principles and theory to assure the program does not overwhelm the learner with technicalities and extraneous features [64,94,95].

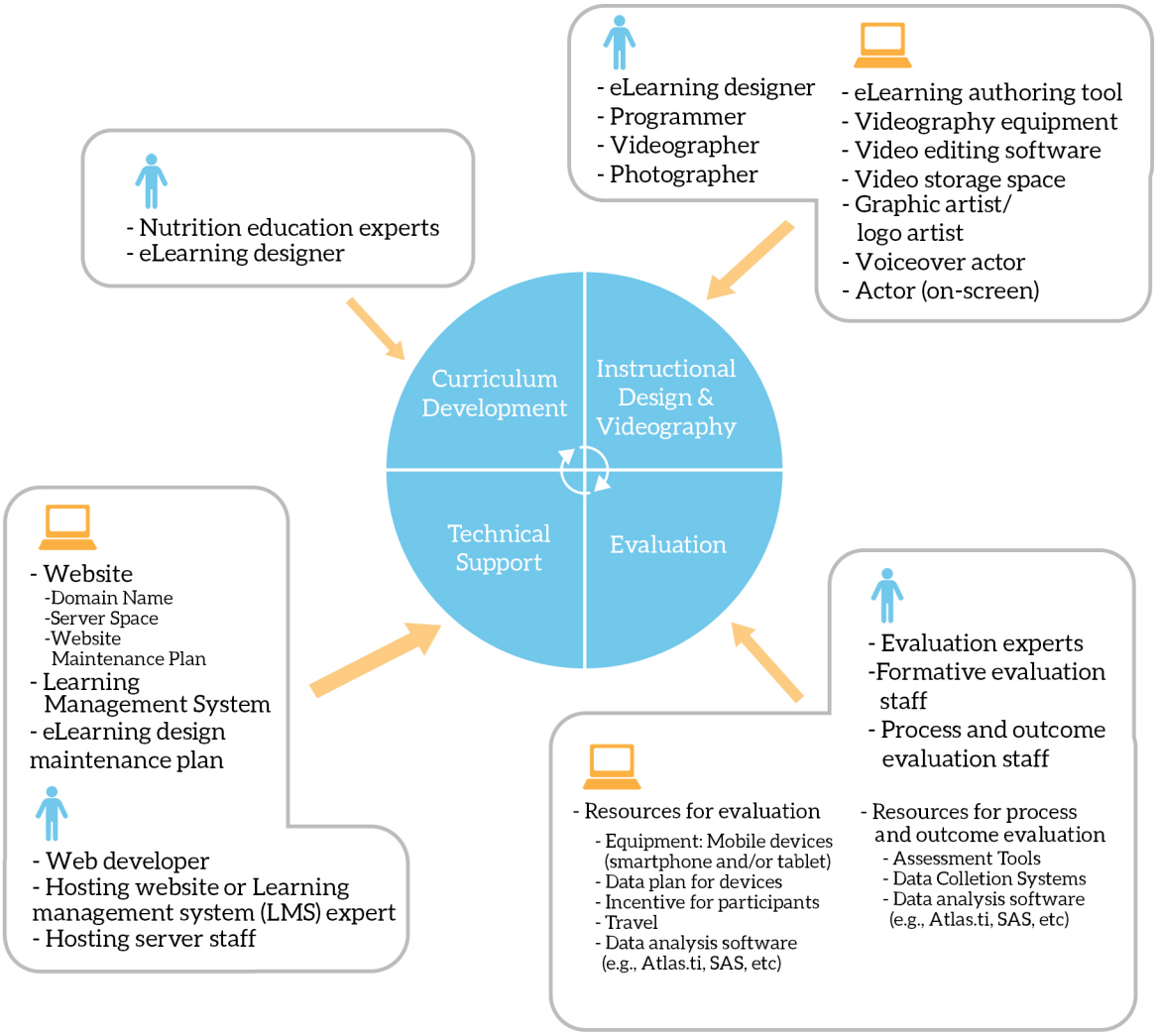

Figure 5.1. Iterative Development Process of Evidence-Based Nutrition Education eLearning Program and Key Personnel/Resources Needed

The Food eTalk eLearning program is based on the previously validated face-to-face Food Talk curriculum [71]. This six-session curriculum is currently offered in a classroom-based setting for the Georgia SNAP-Ed and Expanded Food and Nutrition Education Program (EFNEP) and was developed for low-income Georgian families guided by the Health Belief Model (HBM) [72] and Dietary Approaches to Stop Hypertension (DASH) diet principles. Food eTalk emulates the DASH-diet based content in Food Talk lessons and is grounded in the HBM,

eLearning theory, and adult learning theories [64]. Knowles' adult learning theory supports self-regulated learning in an asynchronous eLearning environment and explains eLearning courses should offer opportunities to practice learned strategies and skills. Situated learning, or immediate relevancy, refers to learning that takes place in the same context in which it is applied – such as in a supermarket or at a restaurant. This adult learning principle is especially applicable to Food eTalk as the primary intention of this learning program is to utilize mobile devices to encourage learners to refer to short lessons at their point of nutrition related decision making [16, 17]. Community based peer educators lead 1-hour Food Talk classes, which include topics such as: decreasing sodium, increasing fruit, vegetable, and low-fat dairy consumption, food resource budgeting, and food safety practices. The scripted lesson plan used by Food Talk educators served as a basis for the voice-over script in the Food eTalk lessons. Food eTalk employs a mobile-first design, interactive learning games, short lessons, a user-friendly interface, and Southern influence. Southern influence includes culturally relevant recipes, examples of healthy food choices, images representing members of our priority audience, and Southern-accented voiceover feature.

The 6 Food eTalk lessons are titled: Your Food and Your Choice, Keep your Pressure in Check, Color Me Healthy, Eat Well on the Go, Keep Yourself Well, and Keep Your Health Out of Jeopardy. The length of each Food eTalk lesson varies, depending on the amount of time a user spends on the interactive activities, but on average each lesson takes ~8-12 minutes to complete. For example, the ~10 minute Food eTalk Lesson 3 "Color Me Healthy" focuses on increasing fruit and vegetable intake from the participant's baseline intake **(Figure 5.2)**. Guided by the HBM [72], this lesson educates the learner how to add more fruits and vegetables to the family diet (cues to action), the importance of doing so (perceived benefit), and addresses some

of the perceived barriers to increasing fruit and vegetable consumption when a family is on a limited budget and has limited access.

Each of the 6 Food eTalk lessons includes two cooking videos, which include educational tips such as food safety practices and ways to cut sodium while preparing meals. In order to capitalize on the inherent mobility of smartphone-based learning, several "just in time" (JIT) learning videos were also developed [95]. These short videos (< 2.5 minutes) are intended to educate the learner on a specific skill s/he may need at the point of decision-making or break down abstract concepts such as "meal planning" to simple step-by-step process. For example, one JIT video explains how to select healthy bread in the supermarket, based on reading the food label for whole grain as a first ingredient and ideal amount of sodium, fiber, and calories per slice.

eLearning programs require continual technical support during both development and long-term maintenance. Technological capacity, such as playback speed, can greatly impact the user experience and needs to be addressed as the eLearning program is developed. It is advised an ongoing technical support contract is established with someone capable of maintaining the website (portal) and updating eLearning program as needed.

Figure 5.2. Examples of Food eTalk Lesson and Interactive Activities. This Lesson Focuses on Increasing Self-Efficacy in Fruit and Vegetable Consumption

Key Personnel Needed

Unlike traditional face-to-face nutrition education programs, where the primary personnel needed is a content (nutrition) expert; eLearning nutrition education programs require a significantly larger development team. The content expert needs to work closely with professional eLearning design/instructional designers as well as with the videographer. The University of Georgia (UGA) SNAP-Ed team collaborated with a professional eLearning design group, primarily because of their emphasis on smartphone-first design methods. The videographer team includes both production and video editing experts. A web-developer is needed, as the eLearning program will likely need to be hosted on a web-based portal so users can easily access and find the program. The professional web-developer needs to work closely with the eLearning design team and videographer to ensure issues such as server space, download speed, and outages in the server are addressed efficiently. The web-developer also needs to collaborate with the recruitment and social marketing staff in order to strategize such issues as optimal search engine keywords so users can easily find the program online.

In order to create an aesthetically pleasing and engaging eLearning program, additional team members include graphic artists and photographers. These individuals will help incorporate engaging images to both enhance learning and motivate users to continue using the program. Additionally, actors need to be employed for video production as well as for voice-over of the program. Actors who are relatable to the intended audience are best received [92]. The social marketing expert and recruitment coordinator are especially key for the success of an innovative delivery method such as smartphone-based eLearning program, as we want to optimize visibility of Food eTalk and establish unique ways to attract users from the intended audience [96]. Utilization of social media, e-newsletters, and developing community partnerships has been productive means of marketing Food eTalk.

Resources Needed

The necessary resources for eLearning program development are unique and traditional nutrition education program funding sources had reservations about approving budgeted items that are exclusive to online program development. The eLearning authoring software is what enables eLearning designers to create engaging, interactive, professional eLearning programs. Articulate Storyline 2 (https://articulate.com) was used to develop Food eTalk, as it provided user-friendly and engaging interface, without an overly 'academic' feel, as to best serve the intended audience. Articulate Storyline 2 has an emphasis on interactive learner elements with many different 'learning game' opportunities. Professional eLearning designers were able to adapt Articulate Storyline 2 to be especially well designed and responsive for smartphone screen size.

One way to track user participation and detailed usage of the eLearning program is to employ a learning management system (LMS). The integration of the eLearning program, the website, and LMS is important for a seamless user experience. Such caveats to these components not being fully cohesive include: user being asked to sign on more than once or failure of the LMS to capture important tracking data. This user tracking data will support the evidence-based program evaluation by allowing researchers to understand, for example, intricacies of how a user navigates though a series of lessons. This information will allow developers to continue to improve the program based on quantitative program usage and navigation data. The LMS is likely the most prohibitive cost-barrier to development of a nutrition education eLearning program, and most offer incremental pricing based on number of enrolled participants. A website (portal) is typically required to provide users access to the eLearning program. Web development software, a domain name, and server space are a few of the required resources for a new eLearning program portal. It is important to carefully consider server space, as eLearning programs will likely need considerable space because of their interactive design and videos, especially if usage is high. A multitude of video production elements are needed, and it is likely most cost efficient to hire a video production team who has the necessary equipment, including video editing software. Additional costs included: actor wages, location (set) fees, and cost of food for cooking videos.

Finally, some evaluation resources such as devices with data plans, are unique to eLearning program development as it is important to frequently evaluate Food eTalk with members of the intended audience to understand the user experience regarding content, functionality, and design – without burdening the participants with using their own data plan. This type of evaluation is essential in order to establish an evidence-based and relevant

eLearning nutrition education program, to identify challenges of utilizing the program, and to inform future design and content. An example of the budget for initial program development and 1-year of pilot testing is included in **(Table 5.1).**

Table 5.1. Total Costs for Initial eLearning Program Development and Pilot Program Evaluation

Item	Unit	Unit Cost	Total Cost
Personnel			
Content expert (RD 0.5FTE)	1	$25,000	$25,000
Graduate students with eLearning content and development support (A total of 0.75 FTE)	3		$37,000
eLearning design Faculty expert (0.1 FTE)	1	$8,000	$8,000
Website Developer (contract 1 year)	1	$20,000	$20,000
Professional eLearning design contract	1	$10,000	$10,000
Video production (personnel)	1	$6,000	$6,000
Personnel total			**$106,000**
Equipment			
eLearning authoring tool (Articulate Storyline 2.0)	1	$1,846	$1,846
Website domain name purchase	1	$30	$30
Video production (location, actors)			$3,200
Video storage equipment	1	$2,500	$2,500
Learning management system	5 months		$2,000
Equipment total			**$9,576**
Evaluation			
Evaluation equipment (smartphones/tablets/cases)	20	$80	$1,600
Device data plan (monthly fee for 20 devices (12*20)	240	$40	$9,600
Incentive gift card for evaluation participants	60	$20	$1,200
Evaluation total			**$12,400**
Total			**$127,976**

Timeline

Much of Food eTalk development followed a 'trial and error' method, as there was no succinct guide as to how to create an eLearning program with a smartphone-first design tailored to low-income individuals. As shown in **Table 5.2**, Food eTalk development experienced several unanticipated delays. Most noteworthy was a delay in funding from USDA SNAP-Ed during the initial year of the project. Hiring professional eLearning designers is strongly recommended. Our initial efforts in development employed instructional design graduate students, and though these students created a preliminary prototype of Food eTalk, it was significantly more time efficient to employ professional eLearning designers. The next most noteworthy delay included the complex process of integrating the website, Food eTalk, and LMS for a seamless user experience. Issues with frame sizes, routing users to/from the website, and accurately collecting LMS user tracking data delayed this process significantly.

Table 5.2. Actual Timeline for Development of the eLearning Program, Food eTalk

Task	Time	Comments
Curriculum development	~ 1 month	Food eTalk is based on a validated classroom-based nutrition education program titled Food Talk
Hire project team	~ 2 years	Experienced delays due to delayed SNAP-Ed funding approval process
eLearning program development	~1.5 years	Food eTalk development was an iterative process between the nutrition education and eLearning design experts. This phase started with our needs assessment using a prototype of Food eTalk
Prototype testing with target audience	~ 3 months	Collaboration with UGA Cooperative Extension and community partners expedited this step
Revision of eLearning program	~ 4 months	Contracted with a professional eLearning design group to redesign Food eTalk based on findings from the needs assessment and prototype evaluation
Integration of eLearning program, website, LMS	~ 6 months	There is no established guide as to the most cost-efficient and effective means to provide eLearning

		program to low-income audience with user-tracking abilities. This step is crucial so we can quantitatively evaluate Food eTalk usage to establish an evidence-based program.
Internal beta-testing for program functionality	~ 2 months	Graduate students and administrative staff provided feedback on Food eTalk functionality prior to going 'live'
Program launch and maintenance	Ongoing	The web developer, server support staff, and marketing team continually monitors Food eTalk for technical glitches that may arise

Evaluation

In order to ensure the development of evidence based programs are cost-effective and best serve our intended audience, it is important to begin with a needs assessment. A mixed-methods needs assessment was conducted prior to the development of Food eTalk, which focused on Internet access, desired content, and digital literacy [92]. We completed key informant interviews (n = 10) with nutrition educators who have specific expertise working with low-income Georgians as well as focus groups (n = 4) with peer nutrition educators and SNAP-Ed eligible Georgians. All participants completed a short survey about their typical Internet habits and demographics, and the interview guides included questions about access to the Internet, devices used to access the Internet, what content should be included in an eLearning program, and issues regarding digital literacy. Prototype screen-shots of Food eTalk were used to facilitate conversation regarding aesthetics and design during each interview. Findings from this needs assessment provided guidance on the development of Food eTalk, including insight as to how SNAP-Ed eligible Georgians currently access the Internet, their confidence using the Internet, design ideas, and content they hoped to see as a part of nutrition education eLearning programs [92].

UGA SNAP-Ed is currently conducting a mixed-methods formative evaluation of Food eTalk by conducting statewide focus groups and individual interviews to better understand the user experience of Food eTalk. Quantitative survey-based demographics, Internet use habits, and self-efficacy using the Internet data are being collected. Further, a data collection and management system is being built to assess participant satisfaction of Food eTalk, dietary intake and diet quality, and eating behavior via surveys and usage patterns via our LMS.

Implications for Research and Practice

The intention of this report is to share lessons learned, to serve as an example development model, and to provide suggestions and resources as to how develop a nutrition education eLearning program. A registered dietitian should serve as the content expert and be intricately involved in program development management. Ideally all team members should be hired at the program's inception and a timeline should be developed collectively. The team should build in time for unexpected development delays. It is important to include needs assessment, formative, and process evaluations and to develop the outcomes evaluation plan and program congruently, as a means by to establish an evidence-based program. Grant programs and funding agencies related to nutrition education need to consider eLearning as a delivery method and allow more unique budget items including development and evaluation resources. Finally, in order to best serve the intended audience, it is crucial to elicit feedback from a diverse sample of individuals as to their expectations, desires, and experience with the eLearning program. The inclusion of desired and relevant content with an intuitive, user-friendly design is key to motivating individuals to utilize the program.

CHAPTER 6

SNAP-ED ELIGIBLE GEORGIANS' EXPECTATIONS AND EXPERIENCE WITH A SMARTPHONE-BASED NUTRITION EDUCATION eLEARNING PROGRAM[3]

[3] Stotz SA, Lee JS, Hall J. To be submitted as a Research Article in the *Journal of Nutrition Education and Behavior*.

Abstract

Objective: Formative evaluation specific to users' expectations and experience of an innovative eLearning nutrition education program for SNAP-Ed eligible adults

Design: Longitudinal mixed-methods case study including series of 2 focus groups, series of 3 individual interviews, demographic and Internet habits surveys, and user tracking data

Setting: Selected rural and urban communities in Georgia

Participants: 64 participants (45 for focus groups and 19 for individual interviews)

Phenomenon of Interest: Feasibility and user perspectives of an eLearning nutrition education program for SNAP-Ed eligible adults

Analysis: Constant-comparison coding, construction of themes, descriptive statistics

Results: Participants found Food eTalk easy to navigate and better designed than they expected. Primary themes included: motivation, format, and content. Lack of motivation to engage in Food eTalk was determined a formidable barrier. Enhancing motivation through extrinsic incentives can mitigate barriers to eating healthfully and engaging in Food eTalk. To enhance motivation, format should highlight interactive games, videos, and be short in length and content should be relevant and perceived important by the priority audience, such as recipes and tips to feed 'picky' children.

Conclusion and Implications: Voluntary nutrition education eLearning programs need to facilitate quick answers to specific nutrition questions and highlight solutions to barriers to healthful eating.

Key Words: eLearning, Food eTalk, nutrition education, SNAP-Ed

Introduction

As access to the Internet and Internet-accessing devices such as smartphones and tablets becomes increasingly available, it is inevitable more educational opportunities, programs, and classes will be offered online. Online or eLearning is not a novel concept in academic or workplace settings among moderate-income and affluent populations, however eLearning tailored for individuals with low-income and who access the Internet primarily through mobile devices is a relatively new practice. The "digital divide" refers to the disparity between those who have consistent access to the Internet and those who do not, and this divide is decreasing even among individuals who live at or below the federal poverty line (FPL) [91]. This decrease is largely a result of commonplace free WiFi access in many public spaces and Internet- accessing devices becoming more affordable [2]. With this increased access to the Internet, it is important to consider nutrition education programs, in the form of eLearning environments, in order to expand reach and decrease barriers of attending traditional face-to-face classes [12,13].

Several researchers have already begun to explore use of the Internet to provide nutrition education to low-income Americans with promising results [34,35,81,97]. However, there is very little literature on the comprehensive evaluation of a smartphone-based eLearning classes tailored to the unique needs of low-income populations, such as those eligible for the Supplemental Nutrition Assistance Program-Education (SNAP-Ed). SNAP-Ed is a USDA funded grant program that supports evidence-based nutrition education and obesity prevention interventions for individuals who live at or below 185% FPL or who are eligible for SNAP (formerly known as food stamps) and other means-tested federal assistance programs [98]. Since 2012, the USDA SNAP-Ed grant program has increased emphasis on innovative, cost-effective

evidence-based nutrition education interventions and rigorous program evaluation [93]. The purpose of this study was to conduct formative evaluation specific to the users' expectations and experience of an innovative eLearning nutrition education program tailored for SNAP-Ed eligible adults, titled Food eTalk.

Methods

Methodology

A constructivist, instrumental, longitudinal, single-case study design was employed for this project [62]. One of the advantages of this approach is close collaboration between the researcher and the participant so the participant may share his/her detailed experiences. It is through this discourse participants are able to describe their views and this enables the researcher to better understand the participants' actions [60]. The case study unit of analysis is the eLearning course, Food eTalk [62]. Case study methodology as in-depth formative evaluation of a new education program allows researchers to view problems from multiple perspectives, aides to enrich the meaning of a singular perspective, and facilitates evaluation of an intervention where there is no single output [56]. Qualitative interview data provides a richer, deeper level of data regarding participants' experiences and perceptions of the program which eventually augments quantitative descriptive and pre/post knowledge or behavior data [27,57–59]. An instrumental approach to case study methodology is often used to accomplish something other than understanding a particular situation. The case, Food eTalk, is of secondary interest; rather it plays a supportive role in facilitating understanding of the concept of eLearning nutrition education programs for SNAP-Ed eligible adults. Because of its flexibility and rigor, case study

methodology is valuable for health science researchers to evaluate programs and develop interventions [56].

Food eTalk – The Case

The case in this research study is Food eTalk, a new eLearning nutrition education program developed for SNAP-Ed eligible Georgian adults. Supported by the new direction of the USDA SNAP-Ed guidance with heightened emphasis on innovative, cost-effective, evidence-based nutrition education interventions and rigorous program evaluation [93], the development and evaluation of Food eTalk aims to lead and provide an evidence-based foundation for SNAP-Ed implementing agencies and nutrition educators interested in eLearning opportunities for low-income audiences. The content of Food eTalk was adapted from a Georgia-based, validated nutrition education curriculum titled Food Talk [71]. Since 2009, the University of Georgia Cooperative Extension Services (UGA CES) has offered face-to-face Food Talk nutrition education classes for low-income Georgian families. Peer educators teach Food Talk in various community settings such as: public libraries, housing authorities, and community centers. Each Food Talk class includes a didactic lesson, interactive activities, and a cooking demonstration/food tasting opportunity. Guided by the Health Belief Model (HBM) [72] these six-60 minute sessions were tailored to help improve the nutrition of low-income Georgian families [71]. Food Talk is based on principles of the Dietary Approaches to Stop Hypertension (DASH) diet including: increasing fruits and vegetables, increasing low-fat milk consumption, and limiting dietary sodium[73]. In order to facilitate evaluation across methods of nutrition education (classroom based vs. online), the intent of Food eTalk was to mimic the Food Talk curriculum.

A mixed-methods needs assessment including key informant interviews (n=10) with Georgian nutrition educators, focus groups (n=4) with SNAP-Ed eligible Georgian adults, and self-administered demographic and Internet use surveys was conducted prior to Food eTalk development. The needs assessment focused on eLearning access, literacy, and content using a semi-structured moderator guide and prototype of Food eTalk. Participants suggested access to the Internet was easily available, primarily through mobile (smartphone) devices. Digital literacy was not a barrier; however an intuitive and user-friendly design is important to encourage use of the program. Motivation to engage in Food eTalk was speculated as a formidable barrier to the program's success, so interactive eLearning games and videos were said to be important for 'entertaining' education, and nutrition education extenders are provided for participants as they complete each lesson. Needs assessment data revealed members of the priority audience regularly use their smartphones to communicate, to watch videos, and play games and often ask their nutrition educators for healthy recipe ideas [92].

Using findings from the needs assessment, development of Food eTalk included an iterative approach with unique team members and resources. Key members included: content (nutrition) experts, eLearning designers, technical support, videographers, and marketing professionals. Unique resources included: eLearning authoring tool, portal (website), server space, and evaluation tools such as smartphones with data plans [99]. Traditional learning management systems (LMS) and eLearning authoring tools used in higher education, such as Desire2Learn and BlackBoard, are not designed for audiences who may have limited literacy, limited digital literacy, or who may primarily access the Internet using mobile devices. Therefore, an eLearning-authoring tool that satisfied these unique needs of SNAP-Ed eligible Georgians was used to develop Food eTalk. Articulate Storyline (www.articulate.com) is an

eLearning development tool that specializes in interactive games, mobile-first interface, and user-friendly design, and was used to develop Food eTalk. To obtain individual user tracking data, an LMS was employed. This LMS served as the portal by which users accessed Food eTalk lessons, and as a means to manage individual user tracking data for evaluation purposes [99].

Each Food eTalk lesson includes a didactic component, interactive learning games, and two cooking videos, all of which are based on the Food Talk curriculum. The cooking videos demonstrate the same recipe, one in a full length (8-10 minute) version and one in a truncated (2-3 minute) version as a means to assess which length participants preferred. Food eTalk is narrated with a Southern-accented voiceover, includes a closed captioning option, and is augmented by four 'just-in-time' (JIT) learning videos, each of which focuses on a very short and specific nutrition education topic such as reading a food label specifically to purchase healthy bread.

Study Design

Participants of all races, ethnicities, and genders were recruited in 5 rural and 7 urban counties from all four UGA CES quadrants (**Figure 6.1)**. UGA CES county agents and the UGA SNAP-Ed recruitment coordinator assisted in recruitment, primarily through word-of-mouth. Purposive maximum variation sampling was used to recruit participants from diverse backgrounds [61]. Criterion-based network selection of participants required participants must be ≥ 18 years of age and eligible for SNAP-Ed. SNAP-Ed eligibility is defined as people who live in households with income at or below 185% of the FPL or who are eligible for SNAP and other means-tested federal assistance programs [98].

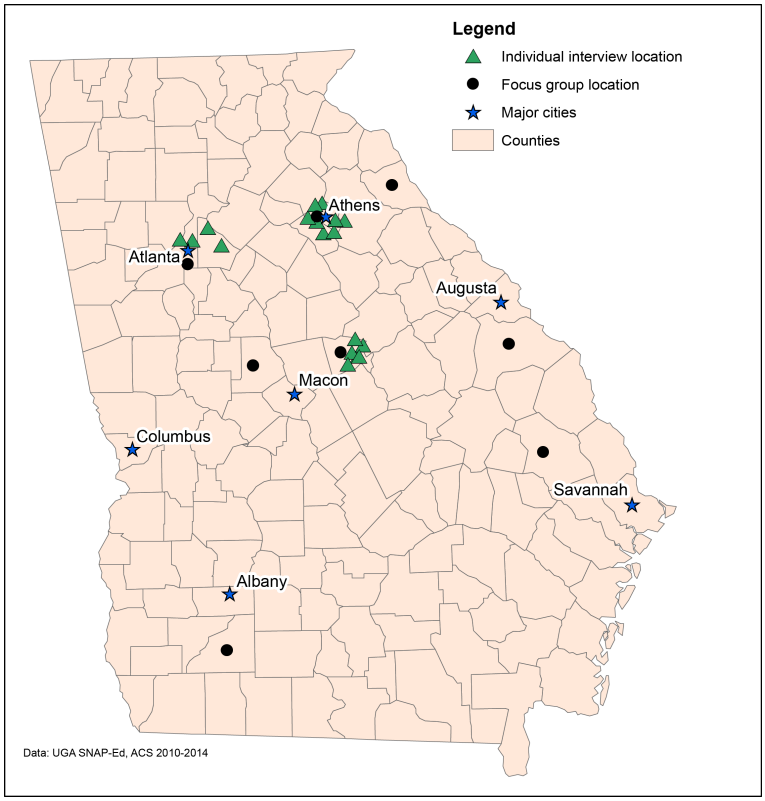

Figure 6.1. Map of Focus Group and Individual Interview Locations

Two qualitative data generation methods were utilized: a series of 2 focus groups and a series of 3 individual interviews. Focus groups #1 and #2 were separated by a 3 week trial period (while participants were using Food eTalk) and interview #1, #2, and #3 were separated by 3 weeks respectively (for a total of 6 weeks) while the participants used Food eTalk. A graphic representation of the study design can be found in **Figure 6.2**.

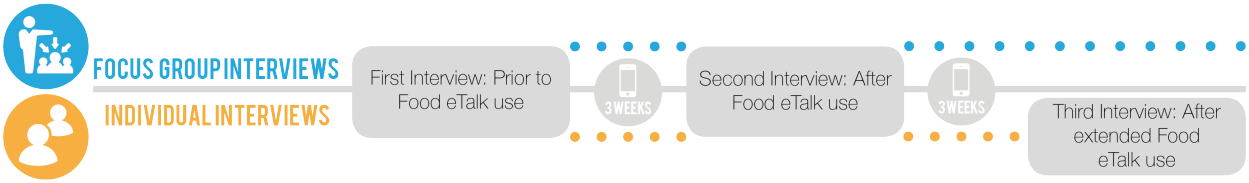

Figure 6.2. Study Design

Focus groups (n=16) were conducted with SNAP-Ed eligible Georgians (n=45) who participated in 2 groups each. Focus groups were conducted across the state of Georgia to include a diverse understanding of the experience of both rural and urban based individuals. At the initial focus group, informed consent was obtained, and self-administered questionnaires assessing sociodemographic, self-efficacy of using the Internet for health information, and Internet habits were completed. At this initial focus group participants were interviewed to discuss expectations of Food eTalk as well as their typical Internet habits. At the end of each of these initial (first in a series of two) focus groups, each participant was provided a loaned smartphone including a pre-paid data plan, provided basic Food eTalk accessing directions, and were instructed to engage in Food eTalk lessons over the following ~3 weeks. After this time, the participants returned for a second focus group to discuss their experience with Food eTalk, and to return the loaned smartphone. Participants each received a $20.00 gift card for each of their focus group interviews (total of $40.00 per participant).

After focus group interviews were completed, individuals (n=19) were recruited to engage in a series of 3 semi-structured individual interviews. The first interview protocol mimicked the first focus group as described above. After this initial interview, participants were encouraged to use Food eTalk for ~ 3 weeks. Each participant then attended another ~ 1 hour semi-structured individual interview with the researcher at the end of this 3-week period. In this second interview, participants were asked to discuss their experiences using Food eTalk. The third semi-structured interview in the series occurred 3 weeks after the second interview (6 weeks after the initial interview) to discuss participants' extended experience using Food eTalk. Interviewees received a $20.00 gift card for each of their individual interviews (total $60.00 per participant).

Data Generation Methods

Each participant completed two self-administered questionnaires at his/her first interview including a basic sociodemographic and Internet use habits survey Additional quantitative data included user-tracking information as captured by the LMS. The LMS provided individual tracking information such as how long a particular user was logged into a particular lesson and how many lessons each user initiated and completed. Interviews were facilitated with a semi-structured moderator guide designed to enable discussion about the participants' expectations of and experience using Food eTalk. During the interviews probing questions were used to clarify statements made by participants [100] and the researcher facilitated, digitally record, and transcribed each session verbatim. A major strength of case study research is the opportunity to use many sources of data as a means for triangulation [56]. Data includes verbatim transcriptions, descriptive survey data, LMS tracking data, researcher field notes, and research memos. All methods and procedures were approved by The University of Georgia Institutional Review Board.

Data Analysis

Codes, categories, and themes were constructed based on analysis of summary-notes taken by the researcher immediately after each interview, a research journal and memos kept by the researcher, and verbatim transcription from the digital recordings. The interview transcriptions were coded using the constant comparison method with categorical thinking [74] which served to identify common expectations and experiences across the interviews. Constant comparison approach to analysis includes the iterative process of transcribing the interviews,

coding the data, categorizing the codes, and reorganization of the categories into thematic representation through a series of assertions and interpretations [69,74]. The data were coded in various quotation increments depending on context of the quotation, as line-by-line coding did not support the epistemological view of the researcher [101]. The first pass of coding involved inductive free coding, which was narrowed by collapsing and integrating codes for redundancy during the second pass which involved describing and defining each code. Several codes, such as "barrier" evolved into a hierarchical code system as there were several prominent types of barriers including preference for 'unhealthy' food, limited budget, and feeding picky children. Qualitative data analysis was facilitated by Atlas.ti (Mac version 1.0) to organize, sort, code, and store data, and to facilitate a transparent analytical process [77].

Quantitative self-administered survey data are used to describe the participants. Descriptive statistics were calculated to describe participants' demographics, baseline Internet habits, and self-efficacy using the Internet. Each of the 6 Food eTalk lessons takes approximately 15 minutes to complete, and each includes 2 cooking videos varying from 8-10 minutes for the "Meals in Minutes" version and 2-3 minutes for the "Hands On" version. Therefore, it takes approximately 25 minutes to complete any given lesson including both of its accompanying cooking videos. If an individual completed all 6 lessons at 25 minutes per lesson – this would approximate 2.5 hours.

Results

Participant Characteristics

A total of 64 participants were included in this study (**Table 6.1**). Participants were predominately female (96.8%), non-Hispanic African American (54.6%), living with children ≤ 18 years old (76.5%), and currently receiving SNAP benefits (62.5%).

Table 6.1 Characteristics of Study Participants

Characteristic	**Mean ± SD or n (%) (N = 64)**
Age (y)	38.5 ± 13.5
Female	62 (96.8%)
Live with children ≤ 18 years old	49 (76.5%)
Latina/Hispanic	7 (10.9%)
Race	
Non-Hispanic African American	35 (54.6%)
Non-Hispanic White	21 (32.8%)
Other	1 (1.5%)
Currently receiving SNAP benefits	40 (62.5%)
Education ≤12th Grade	31 (48.4%)
Uses Internet ≥ 1 time/day	54 (84.3%)
Uses Smartphone or tablet (mobile device) as primary device to access the Internet	55 (85.9%)
Has more than one Internet accessing device (smartphone, tablet, laptop, desktop computer)	49 (76.5%)

Accessibility

Participants were asked, both in a survey and in interviews, to describe their current Internet habits. Survey data revealed the majority of participants had daily access to the Internet (84.3%), primarily use their smartphone to access the Internet (85.9%), and own more than one Internet accessing device (85.9%). During the interviews, participants discussed their use of the

Internet as ‘constant’, ‘daily’, ‘obsessive’, and primarily use a smartphone with WiFi or data plan to access the Internet. They discussed use of the Internet to get information, communicate with friends, use social media, and for entertainment (e.g., videos, movies, music, games). Other than the entertainment purposes (watching movies), participants suggested length of time on their device during any given usage period was ‘short’ and ‘real quick’.

I just, want the information in the shortest amount of time, that’s best. That’s the bottom line. (Focus group #1 SE GA)

I don’t think moms have much time, so I want the shortest version – you know, as a rule, make it short. (Focus group #2 SE GA)

But the quicker, the better. A lot of times on Facebook, they have these like really quick videos where it just shows a time lapse, of course, but it’s like, doo-doo-doo-doo-doo. Everything's really fast, and that’s really nice. It just shows the amount of what ingredient you need and then it’s just on to the next. I like those. Those are really good. (Participant #5, Interview #1)

I think the general attention span like for anybody, but mostly for myself, I think is like a minute. (Participant #8, Interview #1)

People don't sit on their smart phone for an hour doing something. They do it for three minutes here -- and two minutes there. (Focus group #2, NE GA)

And really, because we're in such a technological society, they already want you to give them the answer. That's the problem. People don't want to research. They want you to give them the answer. So eLearning is about, okay, we're going to give you the answer already instead of you trying to figure it out, so if you have the tool and you can guide the people, that's what -- to me, that's what should be done. Otherwise, people aren't going to do all that research. (Focus group # 1, NW GA)

These quotations exemplify how participants view their typical smartphone use and how a nutrition education eLearning program might be best accepted and accessed on a smartphone device.

Participant Usage Patterns

The LMS tracking system provided individual data as to the time spent in each lesson, first and last access dates, and number of sessions (logins) a participant had in each of the 6 lessons. Eleven participants accrued zero logged-in minutes, though one of these was an individual interviewee who withdrew from the study after interview #1 citing he didn't have enough time to attend the subsequent 2 interviews. All participants were encouraged to use Food eTalk to complete all 6 lessons but these 11 individuals failed to do so during the period (3 or 6 weeks) they had access. **Table 6.2** reflects usage data from participants excluding those who accrued zero logged in for their entire period with Food eTalk. Additionally when 'time in course' for any given login session exceeded a reasonable amount of time (i.e., over 1 hour) log-in data for that particular session was discarded, as it's likely a participant logged in and forgot to

log out. Actual use of Food eTalk included median 2.20 hours, with lower quartile 1.11 hours and upper quartile as 3.02 hours.

Table 6.2. Food eTalk Usage Patterns among Participants with a Reasonable Total and Individual Session Login Time Based on Learning Management System (LMS) User Tracking Data

Usage pattern	**Mean ± SD or n (%) (N = 53)**
Expected time to complete 6 Food eTalk Lessons	2.50 hours
Actual usage time	
Mean usage time	2.34 ± 1.55 hours
Median usage time (Q1, Q3)	2.20 (1.11, 3.02) hours
Used Food eTalk for > 2.5 hours	20 (31.4%)
Used Food eTalk for < 10 minutes	11 (17.1%)

Of note, a limitation in LMS data tracking included extensive challenges integrating the LMS with the Food Talk website and Food eTalk lessons. The implications of this are each participant had to manually start a new lesson, rather than being prompted to continue on to the next lesson after completion of the previous. Lesson 'completion' was not accurately recorded, as the 'trigger' to alert researchers as to the completion of a lesson was not functioning properly at the time of this research. Finally, if a participant lost Internet connection while logged into a lesson, the LMS often failed to record minutes spent within that lesson as the participant was 'logged out' when s/he lost Internet connection. **Figure 6.3** presents the distribution of total time spent logged in to Food eTalk and reflects the challenges with LMS tracking system. This figure includes all LMS data, including participants who perhaps forgot to log out of any given session (e.g. were logged in for up to 100 hours in a session). As shown in this figure, the range of tracked 'logged in hours' far exceeds the 2.5 hour expectation of how long it would take to complete all 6 Food eTalk lessons.

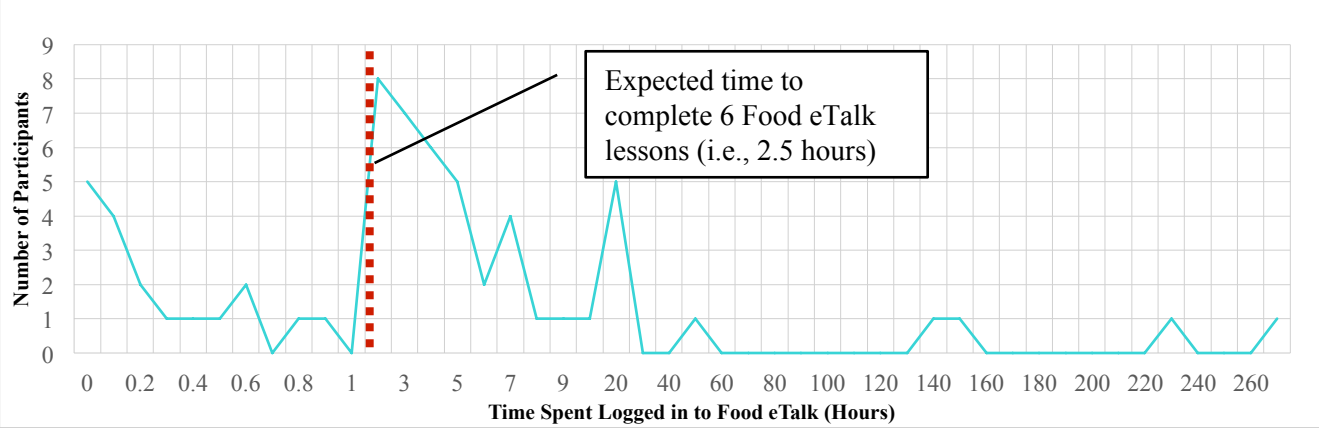

Figure 6.3. Learning Management System (LMS) Tracking Data Results for All Participants

During the interviews, participants discussed how they fit time for Food eTalk into their day, and where they typically accessed it. The majority of participants stated they used the program at home, or while they were "waiting" for something. One participant shared she'd like the lessons shorter:

One suggestion I would have is – is there any way you can make them shorter? I mean, yeah, it's a little bit overwhelming to have 22 pages to flip through on something that – I mean, I'm just saying from my perspective, I get home from work and I have two kids with the flu this week and probably my other one is getting the flu. All of this is just standard life stuff, right, when you have – and to open it up and realize I've got 30 minutes to sit and take the class on something that maybe I'm interested or maybe I'm not that interested in. If you could cut them up into more bite-sized sections, 10 minutes. I think that it'd just be easier to do them - Right, because I mean, I – quite frankly, if I've got 30 minutes to sit down and do something, am I going to choose Food eTalk? And I'm just speaking as any busy mom. If I have 10 minutes, though,

that could be like a little break or, oh, let me see what this one is about. (Participant #6, Interview #2).

This participant had voiced concerns that the lessons were too long, as each lesson including cooking videos is approximately 25 minutes. This participant also confessed she had to 'quick do' all of the rest of the lessons in the parking lot before we met for this interview, as she hadn't found time to do them during her week. Regarding location and how participants fit Food eTalk into their days – additional participants shared they typically completed lessons at home, when they had 'down time', or when they were waiting for something (e.g.; a ride or an appointment).

Findings from Interviews

Findings from focus groups and individual interviews are organized by themes including deductive themes guided by the original research questions and inductive emergent themes constructed from the data. Key themes include motivation, format, content.

Motivation to Use Food eTalk

Motivation to engage with and use Food eTalk was discussed as a formidable barrier to the program's success. Since eLearning programs tailored for SNAP-Ed eligible adults are a newly emerging method to provide nutrition education, and SNAP-Ed is a voluntary nutrition education program, it is important for researchers and SNAP-Ed implementing agencies to

understand how best to encourage participants to use and engage in Food eTalk. One participant specifically addressed motivation and how to make nutrition education programs relevant and accessible to the priority audience.

It's a lot, but you can always connect people. People are looking for something to be connected to, and you just have to find what connects them, what's most important to them, and I think that's how you draw people to the resources, but if they don't feel like it's important, guess what? It doesn't mean anything. Because there's millions of dollars that are out to help people, but guess what? They're not being used. Because they're not connecting it really with the people, and then they went -- Oh, this program failed. It failed because you didn't connect with people, and why is that? You're not reaching the people, because like they're not looking to eat no fruits and vegetables if -- you know what I'm saying? (FG #1 Central GA, Participant #1)

Here she suggested motivation to engage in Food eTalk would increase by including content perceived as important and by fostering connection to programs as to their relevance to the priority audience. Participants also discussed ways to extrinsically motivate people to engage in Food eTalk lessons. Financial incentives were unquestionably the most commonly mentioned way to incentivize as suggested here:

PARTICIPANT: Coupons. Totally. And that would be a huge incentive because it's saying I'm getting something after I'm watching all of this but not only that, I'm getting something towards what you're showing me, you know, so yeah, either to a grocery store or a manufacturer coupon that you can use universal. I mean the normal coupon, the most I've ever seen a coupon

for food is -- and that's General Mills and they usually do it -- like if you buy three boxes of cereal you get $1.50 off type of thing. That's the most that I've ever seen.

INTERVIEWER: Really? So you think $1.50 would motivate people to go through all these lessons?

PARTICIPANT: Oh yeah. That's a lot. That's a lot off of a meal. Especially if you're doing it specifically for a meal. So let's just say the breakfast burrito one. It had I think five ingredients in it. So out of those five ingredients you gave an incentive for three of them, okay. So those three incentives, let's just say it was cheese, the eggs, and the tortilla shells. So let's just say you gave 25 cents on the tortilla shells, you know 50 cents on the eggs, and then the cheese, most cheese, shredded cheese especially, is going to run you anywhere between $2 to $3 a bag. So you get 50 cents off of that. I've saved $1 or $1.25, $1.50 or whatever, just by getting this recipe. So I want to go to the store and get it. (Participant #17, Interview #3)

This participant shared what a motivating 'dollar value' would look like to incentivize use of a nutrition education eLearning program. Participants were animated when discussing all of the challenges they face to eat the way they 'should' be eating. Overall, barriers to eating healthfully were the most commonly discussed topics not included as an original question in the moderator guide. The inductive nature of qualitative analysis allowed us to recognize how barriers impact both motivation to engage in behavior change, and motivation to use Food eTalk. In order to connect our learners to the material in a way that seems feasible, relevant, and useful – it is important for nutrition education eLearning program designers to carefully consider motivation and barriers.

Format

Desired Format

Prior to using Food eTalk, some participants had relatively pessimistic expectations of the format. Participants who had previous experience with eLearning for general education degrees (GED), job training, and The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) had associations with eLearning as 'long and boring'. One participant explained her WIC eLearning experience:

And then at the WIC office, they definitely give a lot of like paper information. They had us use a couple like online apps. You can take like the nutrition courses through WIC online, but they were horrendous. They were really poorly put together and really difficult to use and slow, and I did it because I'd rather do that then go sit in a meeting. But it was really – yeah, it was very painful. It looks like the – I don't know if you had computer games like in elementary school, where they were just really poor – poorly put together. The animations were really bad and they – long and slow, and like the – And okay – so I feel like the training probably could've lasted like 10 minutes for each segment. There were five segments and they could've lasted about 10 minutes, but they dragged them out for 30 minutes, largely because it was just like voiceovers or like characters making like goofy noises, or like the transition images. And it was just very – I don't know, it just looked very unsophisticated. (Participant #9, Interview #1)

Participants who used WIC were overall happy with WIC services but were generally dissatisfied with the eLearning opportunities.

Format Highlights

The most popular Food eTalk features were interactive games and videos. Interactive activities included in Food eTalk are designed to assess what participants learned in the previous didactic section of the lesson, and include multiple choice, matching, as well as a final 'jeopardy' style game where points are awarded for correct answers. Participants especially noted that they liked the 'competition' parts of this game.

It keeps my attention more. I like the more interaction, because when you're just looking at slides over and over again, you just get tired of looking at them and you stop paying attention. And so the games definitely kept my attention more (Participant #7, Interview #2)

I liked the Jeopardy and interactive and the matching parts. It makes us pay attention so yeah I like answering questions, so I preferred the matching thing better and you learn better when you're having fun, make you want to do it, instead of just sitting there like…. (Focus Group #2, NE GA)

In addition to the eLearning games, participants were generally positive about the video components in Food eTalk which included cooking videos and several JIT learning videos. As explained in the Methods section, participants had the option to choose between the 'longer' and 'shorter' version of the cooking videos. They liked this option, suggesting people who don't know how to cook may need the full-length video, but for most participants who reported high self-efficacy cooking and limited time to engage in Food eTalk – the shorter version was preferred. The intention of the JIT learning videos was to enhance opportunities for point-of-

decision-making contextual learning such as purchasing bread and milk in the supermarket. These videos (2-4 minutes) were not embedded within any given Food eTalk lesson, rather were optional for participants, in addition to the 6 Food eTalk lessons. After watching the JIT video on how to read the food label to choose healthy bread (based on calories, sodium, and fiber) one participant shared:

It was good. It was really short. All of the tips, those videos were short because I was expecting them to be long or whatever but they like went really quickly. It was telling you how to select the bread. I never knew salt was in bread. That was helpful too. I liked that they showed the label and then they had it circles so you knew exactly what you were looking for because even people would mention reading the labels but then you look at the labels, because I remember years ago, I don't know if it was an episode of Oprah or what because I don't watch any of that anymore. But I don't know if it was Dr. Oz. No, it wasn't Dr. Oz I don't think he had a show then. But when people were first talking about reading labels and all that, I said I'm going to go to the grocery store and try to look small and be health conscious and I'm looking at the label and it's like what am I supposed to be looking at? What am I looking for? And is this good, is this bad. I didn't know I was just staring at it and looking at what was in there. And I'm looking at the calories but it's like, okay. Two sixty is that good or bad. I had no idea. So the fact that they showed with the different things what to look for and they circled it so even when you go look at the label and you can immediately -- because they're all in the same place. So you can immediately go to the calories where they fiber's closest to the bottom so that was helpful that they made it easier because some people would be like where would I see this or how would I

know? But yeah, the salt thing just blew me away. I never knew that so that was cool. (Participant #18, Interview #3)

One shortcoming of the cooking video format was the frame size to which videos were restricted. Participants suggested they would like the video to 'fill the screen' of their device (as was the case with the JIT videos), but the cooking video frame size was limited because of the specifications of the eLearning lesson template in which they were embedded. Since the JIT videos were not built within any given eLearning lesson, these videos were responsive to screen size, and participants greatly preferred this format. Prior to use of Food eTalk, participants reported watching videos and playing games as two of their most frequent routine habits while online, and this preference was reflected with their positive feedback regarding Food eTalk games and videos. Participants were favorable to the idea of smartphone-based eLearning because of its mobile, asynchronous, 'anytime, anyplace' nature.

It's in my own schedule, at my own pace. I love that. (Participant #12, Interview #1).

Also I can clean my kitchen while I'm doing them. Prop your phone up and playing while you're doing stuff. You can have it playing and the kids can be there. You can listen and stop to do the activity when you have to – it's handy to do it when I can. (Participant #2, Interview #3)

Participants noted as busy moms they were constantly multi-tasking and being interrupted through their day, and the 'resume' feature of Food eTalk allowed them to easily stop and start a lesson multiple times.

Content

Participants discussed what content they preferred in an eLearning program – both before and after engaging in Food eTalk. Prior to Food eTalk use, participants shared their expectations of such a program and after using Food eTalk, participants shared what they'd like to see in future eLearning programs, what they liked about Food eTalk content, and what information wasn't considered helpful or relevant.

Desired content

Participants discussed content in terms of what they hoped for, what they anticipated, and their opinions after engaging in Food eTalk as to its actual content. Prior to engagement in Food eTalk, participants suggested they hoped to learn about how to feed 'picky' children, new recipes, nutrition related to diabetes, organic food, and how to cook Southern dishes healthfully. Regarding challenges diabetes brings to planning healthy meals one participant shared:

I think people would need to know the benefits of fresh food and vegetables, I really do. Diabetes is so, so, so huge now, and it's causing dialysis and, you know, other issues. I think if people really knew better ways to cook food that they eat all the time, or if they knew better ways to make food taste good and still – let me see how I say this – I think people believe that because of green vegetables – I'm going to use that for example – the way they taste raw, that's the only way to eat them. I think if they knew a better way to cook them and prepare them, and the health benefits behind them, they would eat more. (Participant #15, Interview #1)

Both before and after engaging in Food eTalk, participants suggested recipes and cooking videos were their most desired content item, though the recipes featured in Food eTalk cooking videos did not meet their expectations. As discussed under 'format,' participants were positive about the format of the cooking videos, however; participants were not enthusiastic about the actual recipes (content) featured in Food eTalk, and only 2 participants suggested they might actually make one of the recipes they saw in Food eTalk. Regarding dislike for the recipes participants shared:

Okay, so for me, the recipes are horrendous. I would not – like my kids wouldn't even go for it at all, and I can't understand using like a bag of rice versus preparing rice. I don't understand the recipes personally. I don't know if it's a cultural difference. But no way am I going to – like ramen noodle recipe is straight outta jailhouse. That's how I felt about the recipes. The presentation of the recipes and the person who cooked and prepared it and all of that, that's fine. Yeah, I think she's clear and concise. She's friendly, engaging. I just didn't like the recipes. (Participant #6, Interview #2)

Okay. The first one was really gross and is not something that I would ever eat, ever. I think it was just like, ramen noodles and like, tomato. And really none of them are anything that I would eat. (Participant #3, Interview #3)

It's all cheap stuff kind of thrown together in a pot. (Participant #9, Interview #3)

While participants recognized the intention of the recipes was to feature quick budget-friendly meals – they suggested the high use of canned products, use of ramen noodles (in one recipe), and lack of fresh produce in the recipes was not what they wanted to incorporate in their family meals. Participants appreciated quick, budget friendly ideas, but wanted recipes including 'makeover' of traditional Southern dishes, diabetes-friendly meals, and an emphasis on meals 'my children would eat'. One example might be a low-calorie, high-fiber macaroni and cheese recipe using whole grain pasta, low-fat cheese/milk, with limited added fat.

Content was a review

After spending 3-6 weeks with Food eTalk, many participants suggested the content was primarily a review of what they already knew. They suggested Food eTalk was very basic and perhaps more suited to young mothers. The participants who suggested Food eTalk was primarily review were all > 28 years old or among the users who were logged into Food eTalk for >2.5 hours. Participants shared:

Basically, you know, buying fresh – fresh fruit and stuff like that is better than canned or processed food, I already knew that. Yeah and like the temperature of meat, I already know what all about that. (Participant #3, Interview #3)

Most of it was just review. Mhm. Pretty much when I'm watching it, all of it be like, okay, they said that in the VA, okay, we done did this, you know? And then like I said, I've been a cook

for God knows how long, so most of it – it's just telling me what I already know. (Participant #15, Interview #2)

I mean, it was basic information, nothing I had necessarily never heard before. (Participant #19, Interview #2)

Though Food eTalk lessons had a considerable focus on ideas for budgeting food dollars and saving money at the supermarket, these topics were generally not well received by participants as they were presented in Food eTalk. They suggested the menu planning and grocery shopping list is something they already to do save money, and Food eTalk was a review of 'common sense' skills to stretch food dollars. Participants explained elaborate systems by which they currently grocery shop, save money, use their SNAP benefits, find the best 'deals', and utilize coupons. They discussed how they find sales and discounts and how they chose supermarkets based on the specials specific to a particular store on a particular weekday and how they've learned techniques from their family and friends as how best to save/stretch food dollars.

Content highlights

The content item participants enjoyed and found most informative was on reducing dietary sodium. Food eTalk is based on DASH diet principles, so several lessons has a low-sodium focus. Participants shared:

I liked the lesson about the hypertension and blood pressure, too. That was really cool and informative. I didn't realize about the salt intake, so it was very educational for me, because I don't think about stuff like that because I'm in good health. But like my mom, she – she has high blood pressure, and I never knew that a teaspoon of salt was all the sodium that you needed for one day. Or the little packages of salt, that's like your daily value. I didn't know that. And so I've been able to learn from that and keep that out of my kids' diet, because we do use a lot of salt. We use it on everything. I never really thought about it, just because I'm in good health, or semi-good health. Well, definitely the sodium thing and reading the labels, now that I know how to do that, and just paying attention to the sodium content. I'm definitely going to incorporate that into our diet because I really didn't realize how much sodium is even in bread or biscuits or fried chicken. Like I almost fell out whenever I realized it was like 2,000-something grams of sodium in two pieces of fried chicken, because we do fried chicken sometimes, and that's a lot. And my kids, they will smash out on fried chicken. They like that. But there's got to be a better way. Maybe baked or something might be a little better. But I definitely took that in. That hit home with me because my mom just got diagnosed with the high blood pressure and she has to take pills every day, and my husband, too. He just got put on the same kind of medicine that she's on for high blood pressure, and he's pretty healthy. (Participant #5, Interview #2)

Yes, I didn't realize there was that much sodium in ramen noodles, and just sodium in general was informative, because I – I don't think about the salt we eat, you know. Like we don't use margarine - we use like butter, like salted butter, and things like that. You don't realize how much salt is in stuff. Like canned vegetables, there's lots of salt as a preservative. So I mean, it's informative that way, because it's just not stuff I think about. (Participant #7, Interview #2)

Motivation to Overcome Barriers to Healthful Eating

Though the moderator guides did not include specific questions about barriers to healthful eating, participants were eager to discuss the barriers that prohibited healthful eating for themselves and their families. These barriers included a myriad of concerns such as: limitations on time to grocery shop and cook, limited food budget, 'picky' children, lack of incentive to engage in healthy nutrition behavior, and preference for 'unhealthy' Southern food. Participants generally knew what 'healthy eating' entails and easily stated what they 'should' do: increase fruits and vegetables, decrease fried food and soda/sweet-tea, and decrease portion sizes. Participants were aware cooking at home is typically healthier than eating at fast food restaurants, especially with regard to healthy child eating habits, and knew benefits of eating home-cooked meals, both to save cost and for better nutrition. However, conversations about cooking at home focused on the barriers that make it difficult to do so, such as the temptation of better flavor/taste of healthy foods, dealing with 'picky' kids who prefer and demand fast food/processed food, time constraints to cook and grocery shop, and centered on the lack of motivation to make healthy changes because of these barriers. There were many discussions on feeding children healthy meals on a budget, but again, barriers persisted as to how best to execute this practice on a daily basis. Regarding feeding 'picky' children, a mother of an infant, 6 year old, and 11 year old said:

Well, they don't like vegetables. Like I really messed up when they were younger and fed them a lot of fast food. But recently, while I was pregnant with my youngest daughter, I learned how nasty, bad that stuff really is. So it's like, God, I'm trying to get them off of it. And it's like

an addiction, really, for them. I mean, seriously, it's been really hard trying to get them to eat homemade meals because they just want to eat out, processed everything, and I'm trying to get that out of our picture because really, they're gaining a lot of weight with all the fast food and stuff, and that's not healthy for them, so. That's all they – yeah, that's all they want. They just want those hamburgers, hamburgers, hamburgers. I'm like, God, I'm sorry, like I've created these monsters that just feed on junk, and I'm trying to get them out of that habit, and it – there's a couple of like mom websites that you can go to find good recipes like cauliflower mashed potatoes, and they just don't know. They'll eat mashed potatoes because I told them it was like a French fry, and they're weird. But that's really what I use the Internet for, is to find the best deals of where to go shopping and save money because we're on a very limited budget, and I want them to eat healthy as we can, but sometimes it's just really hard. (Participant #5, Interview #1)

This quotation exemplifies one of the most commonly discussed barriers participants discussed regarding challenges to feeding their children. A common thread between discussed barriers was the knowledge of what the family 'should' be eating vs. the reality of practicing these healthy nutrition habits. During focus group interviews, participants responded well to peer-to-peer advice regarding solutions to barriers. Participants discussed how find affordable fresh produce:

PARTICIPANT 1: Now the WIC office, they have farmer's markets, but it's like on the 15th, I think.

PARTICIPANT 4: We got one at the senior center, or that's something different?

PARTICIPANT 1: No, the WIC office, the nutrition office, they do it like once a month. Yeah, they have fresh --

PARTICIPANT 3: I know they have one at the senior center a couple of times a year.

PARTICIPANT 1: Yeah. The WIC office, they do it just once a month though. Be oranges and there is fruits and stuff.

PARTICIPANT 3: Oh wow.

PARTICIPANT 1: Yeah.

PARTICIPANT 2: That's awesome.

PARTICIPANT 1: Yeah. They -- When you go in the back they print out the vouchers. You could ask somebody and they give you the paper. They only do it once a month though.

PARTICIPANT 3: Okay. Well, that's a good tip, yeah, I'm going do that.

(Focus Group #1, SE GA)

This discussion shows how peer-to-peer advice, in this example high cost of produce, may facilitate increased motivation to healthful eating by decreasing perceived barriers. Participants shared what motivates them to want to change their eating habits including prevention of chronic disease and obesity. One participant (age 24) shared her concern for her mother and children's health:

I don't want her to be on pills and stuff. I've seen a lot of bad things come from that, people getting dependent on pills and just, after a certain age, they can't live without this and this and this and this, and I understand she's going to be on some medicine, but I don't want to

see her be on tons of medicine is maybe we could change our diet and be healthy. But just – my son too, he's got cellulite in his belly and he's wearing a size 16 and he's only 11, and his pants are too long and I'm having to get them hemmed. And the next size up is in a man's size, and he's only in the fifth grade. (Participant #4, Interview #2)

Another participant (age 57) shared her motivation to lose weight:

I had gained almost 50 extra pounds, and what really got me was, like I said, I work with the kids, kids ministry, and every year, I take them on a – amusement park, Wild Adventures or somewhere. I couldn't walk that far without getting so tired and my mom was like, you might have to cancel that trip. And I said no, I can't do that to the kids. And I actually went. I brought a wheelchair and I had a friend. She pushed me around in the wheelchair. And that just – that got me down. I said, I got to do something. (Participant #13, Interview #1)

Intrinsic motivation such as prevention of chronic disease may be too abstract to motivate younger learners, as likely they are not personally impacted by chronic disease. However, the first quote in this section shows how motivation may arise vicariously through a family member's experience. Older adults, as exemplified in the second quote, are likely motivated by education focusing on treatment rather than prevention, given the high rate of overweight, obesity, and chronic disease among adult Americans.

Findings under the theme 'content' provide insight as to what participants liked and didn't like about Food eTalk's content as well as suggestions as to what content ought to be included in

nutrition education eLearning programs. The inductive theme of motivation and barriers to healthful eating suggests content could be effective when focused on tools and tips to mitigate common barriers to eating healthfully. It is important eLearning nutrition education program content is responsive to the needs of the learners, as this is likely what will motivate users to engage in the eLearning program.

Discussion

Findings from this case study provide direction and insight as to users' experience with Food eTalk and to best practices for the development of future eLearning nutrition education programs tailored to the unique needs of SNAP-Ed eligible adults. Motivation to engage in Food eTalk and subsequently make healthy behavior change was discussed as the primary formidable barrier to the program's success. Since Food eTalk is a voluntary SNAP-Ed nutrition education program, the most effective way to increase motivation to use the program is to ensure the content includes information deemed relevant and necessary by members of the priority audience and the format design facilitates quick access to learning the desired content. Though information perceived as 'needed' and 'relevant' by the audience, may not be aligned with traditional nutrition education messages as provided by federal guidance or dietitian's expertise, it is essential at least part of the content is desirable to the audience to serve as a stimulus to engage in the program and enhance motivation of these voluntary nutrition education programs. Discussions focusing on barriers to eating healthfully suggested the need for resources and problem-solving strategies for mitigating these perceived barriers. Addressing solutions to these barriers should inform the content, as this is what people suggested adding to Food eTalk, such

as specific tips and simple ideas as to how feed 'picky' children and implement a diabetes-friendly diet.

Sodium and hypertension were the most well received content items of Food eTalk. This may be because Food eTalk is based on the DASH diet, so low sodium diet principles are included in almost every lesson. It might also be the sections on sodium included very specific 'how to' information to decrease dietary sodium such as rinsing canned food items with water before cooking (didactic section), reading the food label to determine a low sodium food (video), and identification of commonly consumed high sodium foods (interactive game). Sodium's link to hypertension sparked participants' interest as it aligned with the concerns that many members of their family already have chronic diseases, and one of their challenges is cooking for all family members' 'restrictions' and how to manage the chronic disease people already have (vs prevention). One limitation on providing content related to disease specific prevention and management, such as diabetes, is the restriction in disease-specific medical nutrition therapy as stated by SNAP-Ed guidance[93].

Participants who said Food eTalk was primarily a review of what they already knew were > 28 years old or among users who were logged into Food eTalk for >2.5 hours. These individuals shared information was primarily review and 'too basic', which may be explained by their personal interest in nutrition and engagement in previous nutrition education because of this baseline interest. Additionally, participants who were > 28 years old specifically suggested the food dollar budgeting content included in Food eTalk was very basic and 'common sense'. No one suggested s/he learned something new with regarding to budgeting food dollars from Food eTalk. This may be in part because these participants already had their own system by which to save money at the grocery store. Focus groups discussions about food dollar budgeting often

generated the most robust and animated participant-to-participant conversations. Given this, and participants' frequent access of social media, it might be advantageous to link eLearning nutrition education programs with social media sites, such as FaceBook, as a means to facilitate communication among constituents and build an eLearning community. USDA SNAP-Ed guidance [93] encourages education on food resource management, but it might be more effective and relevant for peers who live within the same community and know the specifics as to food availability and sales in their communities share food resource management tips rather than general suggestions and education as provided by many federally funded nutrition education programs.

The original design elements of Food eTalk aimed to emulate the classroom-based nutrition education program, Food Talk, as closely as possible as to facilitate comparison of the two methods of nutrition education. However, as determined from this formative evaluation - unless the program is mandatory, a class-based eLearning program likely isn't going to meet the needs of the intended audience, especially given the traditional use of smartphones in participant's everyday lives. The majority of the priority audience primarily accesses the Internet via smartphone, which is logical given these devices are significantly less expensive than laptop or desktop computers, and it has been ascertained from both participant comments and low-completion rate of the lessons, as observed through the LMS data tracking, that the lessons are too long to fully engage users to completion. Additionally, because of the 'classroom' style lessons, we believe the format of Food eTalk fails to capitalize on the 'contextual learning' opportunities smartphone-based education can facilitate. Participants primarily used the Food eTalk lessons at home "in my living room", "while laying in bed" or while they were waiting for something (such as a child at school).

Prior to using Food eTalk, participants shared they use their smartphones for entertainment such as music, videos, games on a daily basis, so it was expected they would enjoy the interactive activities and videos in Food eTalk. Given the immense number of videos and games available, and the budget required to develop high-quality, entertaining, and captivating media – the motivation to use an eLearning nutrition education program will likely not be because of its entertaining qualities. Rather, the motivation to use a program such as Food eTalk needs to be inspired by its relevant and applicable content, as perceived by members of the priority audience.

Because of the 'lesson' format of Food eTalk, participants did not usually use the program at point of nutrition-related decision making such as at the supermarket or at a restaurant. In order to better capitalize on common practices of using smartphones, future eLearning programs need to include much quicker lessons (or sessions) with shorter bits of information. It may also be helpful for each learning topic to be its own 'lesson' instead of the current format of a comprehensive lesson with multiple chapters. This would facilitate quickly choosing a title and topic for quick just-in-time access. Though each Food eTalk lesson is arranged by chapter, as to enable the learner to click on whatever 'chapter' of a lesson s/he would be interested in participating, the extra step of choosing a lesson and subsequently choosing a chapter within that lesson may be too lengthy a process for typical smartphone-based eLearning use. Many of the participants interviewed suggested the lessons were too long, and they struggled to find time to complete all 6 lessons over the course of 3-6 weeks. Providing nutrition education that encourages small daily shifts [102] may be better received because participants indicated barriers to eating healthfully seem insurmountable and plausibly a more 'bite sized' format approach to nutrition education would better suit learning needs.

Participants who had experience with eLearning nutrition education through WIC were not impressed with WIC eLearning format; however, WIC nutrition education programs are mandatory for beneficiaries to receive their WIC food vouchers. This inherent incentive likely makes the need for an engaging format significantly less relevant for WIC nutrition education program developers. Unless SNAP-Ed became a mandatory prerequisite to receiving SNAP benefits, eLearning programs for SNAP-Ed eligible adults would benefit from incentive opportunities as discussed by participants. SNAP-Ed guidance [93] does not allow for coupons or food-based incentives in their programming, however pilot projects including 'produce bags' and farmers market incentives are investigating the feasibility of incorporating financial incentives to nutrition education [103].

Limitations and strengths

As is the nature of qualitative research, our sample size does not allow for generalizability and does not represent the entire Georgia SNAP-Ed eligible population. Participants accessed Food eTalk on a loaned smartphone for this project, as the intent of this evaluation is not to assess access, and participants may be more or less apt to use a program if it is on their own device. Many participants had their own smartphone and it is possible carrying 2 phones was cumbersome, and stymied Food eTalk participation. Participants did not likely have the device and Food eTalk access long enough (3-6 weeks) to determine changes in behavior, though outcome and impact evaluation is not the intention of this particular paper. Participants may have engaged in Food eTalk more than they would outside of this study, as they may have been motivated to complete lessons prior to each interview because of social desirability bias.

Strengths of this study include case study methodology, which allows for multiple data sources to provide a clear and rich description of the user experience. The mixed-methods approach including LMS data tracking provides a foundation for further evaluation of eLearning programs. This design facilitated participants to share expectations prior to exposure to Food eTalk, and reflect on how their expectations and experience compared.

Implications for Research and Practice

eLearning is a feasible means of providing nutrition education to SNAP-Ed eligible adults. Concerns of Internet access and digital literacy were extinguished based on findings from this project and support from the literature. In order to enhance motivation to use eLearning nutrition education programs both the format and content of an eLearning nutrition education program needs careful consideration. Findings regarding format of Food eTalk and typical smartphone-use habits suggest the need to design voluntary nutrition education eLearning programs in a way that facilitates quick, timely, easy-to-navigate answers to specific nutrition questions. Videos and interactive games need to be prominent features to encourage engagement. Content needs to be considered relevant by the priority audience, and needs to address typical barriers to behavior change related to nutrition habits. eLearning nutrition education programs be will be best received if content is tailored to the unique cultural needs of the priority audience, including familiar foods, recipes, and tangible methods to mitigate barriers to healthful eating.

CHAPTER 7

CONCLUSION

Summary of the Problem

The USDA SNAP-Ed program requires grantees use a fiscally responsible approach to develop and provide evidence-based nutrition education programs for SNAP-Ed eligible individuals. The expectation of the USDA SNAP-Ed is that implementing agencies in each state will provide nutrition education opportunities to all of the state's eligible constituents. As access to the Internet becomes increasingly available among SNAP-Ed eligible adults, and Internet-accessing device ownership rates increase among this audience [2], it is practical to systematically develop and evaluate nutrition education eLearning programs for this audience. The myriad of barriers to attending traditional face-to-face nutrition education classes such as: high cost of these programs, challenges with transportation and childcare, combined with an increasingly online and tech savvy priority audience, suggests eLearning as a reasonable solution to meet the nutrition education needs of this audience in a fiscally responsible and efficient approach [12,13].

Summary of Findings

Since eLearning nutrition education programs are relatively new among this priority audience and evidence-based nutrition education programs must include both needs assessment

and formative evaluation, it was important to first conduct a needs assessment as a systematic process to determine desires of the audience and to serve as a foundation for planning and evaluating this new nutrition education programming effort. The first study, presented in Chapter 4, found that nutrition educators who have extensive professional experience working with SNAP-Ed eligible Georgians, considered eLearning a feasible form of nutrition education. Other researchers who are exploring eLearning opportunities for their low-income audiences have published needs assessment findings primarily from the perspective of members of low-income audience [18,104]. While this perspective is essential to understanding the point-of-view and needs of members of the intended audience, the study presented in Chapter 4 of this dissertation includes the unique perspective of nutrition education experts with specific experience working with the priority audience. We chose to include these individuals in this needs assessment to contribute to the literature with the voices of key stakeholders in the success of an eLearning nutrition education program. These interviewees did not believe access to the Internet nor digital literacy to be viable barriers to eLearning and nutrition education; however they voiced substantial concerns as to the motivation members of the intended audience may have to utilize such a program and their motivation to translate nutrition education into measurable behavior change. The interviewees strongly suggested financial incentives, such as food coupons or additions to electronic balance transfer (EBT), as the best extrinsic motivation tool to encourage participation. They also discussed the need for nutrition education content to be perceived as relevant and the format to include practical tips, recipes, and step-by-step guidance to promote nutrition related behavior change.

These interviewees' concerns about motivation to engage in eLearning are echoed by concerns of low-motivation as voiced by participants in the formative evaluation (Chapter 6) of

this dissertation. Both the key informant interviewees and formative evaluation participants indicated extrinsic incentives, such as food coupons, be included to encourage use of Food eTalk. There are, however, many challenges to including food coupons in a SNAP-Ed program such as: specific restrictions by USDA funding agency which prohibit this type of budget item, concern about endorsing a specific brand or supermarket should an industry sponsored opportunity arise, and issues with access to particular supermarkets (in the case of a food retailer sponsorship) in varying parts of Georgia. Incentivizing purchase of healthier food choices as a systems approach through the SNAP program is being explored by health economists, but these studies are not specific to incentivizing nutrition education - rather, they incentive the actual purchase of healthful foods [105–107]. Additionally, several researchers are exploring opportunities to increase intake of fruits and vegetables through use of farmers market incentive programs, with preliminary findings suggesting participants report eating more fruits and vegetables and rate such free and reduced-cost produce programs as favorable [103,108–110]. A feasible approach to externally incentivizing an eLearning nutrition education program, such as Food eTalk, may be to combine this effort with supplemental produce from local Georgian farmers - as a twofold benefit: to provide incentive for engaging in Food eTalk, and encourage intake of more fresh fruits and vegetables. This concept would not only assist in mitigating the cost barrier to eating fruits and vegetables, but could empower recipients through education, perhaps specific to the produce they are receiving (ie: recipes and cooking videos which support use of the produce).

Development of an eLearning nutrition education program is a complex process, and throughout the development of Food eTalk, the UGA SNAP-Ed research group encountered challenges and delays. To share lessons learned and experiences in the development and evaluation of Food eTalk, we wrote a report included in Chapter 5 of this dissertation. This

report explained the iterative design process, the key personnel, and key resources needed to develop Food eTalk. The report included details on the Food eTalk development timeline and evaluation to describe these crucial components of building an evidence-based program, especially for nutrition education professionals with little experience in eLearning and instructional design. Another primary aim of this report was to inform and educate the funding agencies and policymakers who make fiscal decisions regarding allowable costs, budgets, and resources available as to what is needed to develop innovative programs which aim to serve and increasingly 'online' SNAP-Ed eligible audience.

The third study, presented in Chapter 6, describes findings from the comprehensive formative evaluation of Food eTalk. This study explored the users' expectations before and experience after engaging in Food eTalk. Participants engaged in a series of focus groups or individual interviews, between which they were asked to utilize Food eTalk on their own time, using a loaned smartphone with pre-paid data plan. Participant's logged-in time within each of the 6 Food eTalk lessons was tracked using an LMS, and participant's described what they hoped would be in Food eTalk (expectations), what they liked and didn't like about Food eTalk, what technical issues they encountered, as well as how they would improve Food eTalk (experiences), in terms of format and content. As with the study described in Chapter 4, motivation to engage in a voluntary nutrition education eLearning program was discussed as the most formidable barrier – as Internet access, digital literacy, and self-efficacy using the Internet were not considered relevant barriers. Participants in this study also suggested monetary incentive, such as food coupons for items featured in the cooking videos, would promote engagement in the program.

The most significant inductive theme, which emerged from the formative evaluation, was that of barriers to eating healthfully. Participants were loquacious and animated when discussing their perceived barriers and challenges to eating healthfully, and feeing their family healthfully. One of the constructs of Food eTalk's guiding health behavior change theory, The Health Belief Model, includes 'perceived barriers' as a means to address challenges participants perceive as to transferring knowledge into meaningful behavior change [72]. The concern of barriers as they may stymie a person's behavior change is addressed robustly in the literature, and certainly is not a new issue among nutrition educators and program developers [111–114]. However, findings from this dissertation research suggest additional barriers such as lack of Internet or limited digital literacy introduced by eLearning opportunities do not exacerbate this list of barriers, rather eLearning may offer new avenues by which to provide support and solutions to many barriers such as: contextual learning opportunities, asynchronous learning environments, frequently updated food resource management guidance, and educational opportunities which timely and responsive to real-time barriers. This finding will strategically guide future nutrition education eLearning programs to address perceived barriers to healthful eating and problem-solving strategies to mitigate these barriers.

Limitations and Strengths

As is the nature of qualitative research, our sample size does not allow for generalizability nor does it represent the entire Georgia SNAP-Ed eligible population. Discussed in the published "Development" paper (Chapter 5) we encountered challenges securing necessary resources and key experts needed, both of which greatly delayed our development timeline. During both of the development and formative evaluation phase, we faced challenges

with the LMS integration and data tracking capabilities. Because of these delays, we were not able to assess how users would experience Food eTalk by logging into the portal (www.foodtalk.org) and subsequently access Food eTalk through the LMS by means of this portal. Our work-around allowed users in the focus group and individual interview series to access Food eTalk directly from the LMS, which proved frustrating to the participants, as lessons were not seamlessly integrated with one another. For example, after a participant finished one lesson, s/he was not automatically able to continue on to the next lesson, rather s/he needed to exit the lesson and re-enter the LMS by manually selecting the next lesson.

Participants accessed Food eTalk on a loaned smartphone for this project, as the intent of this evaluation is not to assess access, and participants may be more or less apt to use a program if it is on their own device. We considered it more ethical to provide data plan and loaned devices to the participants, as not to burden them with using their own (often limited) data plans for the purpose of our formative evaluation. However, almost all participants had their own smartphone and it may be that carrying 2 phones was cumbersome, and stymied Food eTalk participation. Participants likely did not have the device and Food eTalk access long enough (~ 3-6 weeks) to determine changes in behavior, though outcome and impact evaluation is not the intention of this particular paper. Participants may have engaged in Food eTalk more than they would outside of this study, as they may have been motivated to complete lessons prior to each interview because of social desirability bias.

Strengths of this study include case study methodology, which allows for multiple data sources to provide a clear and rich description of the user experience. The mixed-methods approach including LMS data tracking provides a foundation for further evaluation of eLearning programs. The longitudinal nature of this study design allows for in-depth exploration of a

user's experience prior to and after using Food eTalk and contrasts how their expectations and experience were actualized. The combination of nutrition education experts (needs assessment) and SNAP-Ed eligible participants (formative evaluation) allowed varying perspectives on eLearning nutrition education programs to emerge. Of note were the many overlapping themes between these two unique groups. The final strength of this project was the unique team effort that supported robust recruitment, a rigorous and well-organized study design, and an innovative and engaging eLearning program as the case of interest.

Implications for Research and Practice

eLearning is a feasible means of providing nutrition education to SNAP-Ed eligible adults. Concerns of Internet access and digital literacy were extinguished based on findings from this project and support from the literature. In order to enhance motivation to use eLearning nutrition education programs both the format and content of an eLearning nutrition education program needs careful consideration. Findings regarding the format of Food eTalk and typical smartphone-use habits suggest the need to design voluntary nutrition education eLearning programs in a way that facilitates quick, timely, easy-to-navigate answers to specific nutrition questions. Videos and interactive games need to be prominent features to encourage engagement. Content needs to be considered relevant by the priority audience, and content needs to address and provide problem-solving strategies for typical barriers to behavior change related to nutrition habits. Federally funded nutrition education programs could consider permitting incentives, perhaps in the form of food coupons, as a means to increase engagement of SNAP-Ed eLearning programs. eLearning nutrition education programs will be most widely received if

content is tailored to the unique cultural needs of the priority audience, including familiar foods, recipes, and practical methods to mitigate barriers to healthful eating.

Findings from this dissertation project are already being used to inform the development of UGA SNAP-Ed's first original curriculum Food Talk: Better U. This curriculum will serve as a foundation for Food eTalk: Better U, and key findings regarding format and content have guided the entire design process of this new eLearning nutrition education program.

Future Research

Next steps of this research and possible future research studies include: careful analysis of the LMS user tracking data, analysis of eHeals self-efficacy of Internet-based health research data, integration and enhancement of pre- and post- behavior and knowledge change measures (such as timing of when participants are presented with these self-administered food recall and surveys), enhancing Food eTalk based on participant suggestions (such as adding additional videos), establishing an evaluation user experience with built-in extrinsic incentives (such as food coupons), developing a Spanish version of UGA SNAP-Ed eLearning programs, enhancing seamless functional integration between the LMS and portal/website, and continued collaboration with the priority audience to ensure these programs are developed to highlight the format and content considered accessible and relevant by the intended audience. Findings from this dissertation project have already been used to inform the evidence-based UGA SNAP-Ed nutrition education program, Food Talk: Better U. This classroom-based curriculum focuses on health weight management practices for SNAP-Ed eligible Georgian families - and it's content

will serve as the foundation for Food eTalk: Better U, and UGA SNAP-Ed Food Talk: Better U social marketing programming. Specific findings from this dissertation which have informed Food Talk: Better U include: emphasis on problem solving, inclusion of Southern recipes, and focus on child-friendly recipes.

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Appendix A.1 : Moderator Guide for Key Informant Needs Assessment Interviews

Introduce self, set expectations, ground rules, housekeeping, sign consent. Provide 'grand tour' of Interview guide and state interview will last ~60 minutes.

Theme 1 – Access

1. In your opinion, tell me about low-income Georgians' access to the Internet. You can tell me about how they use the Internet, where they use the Internet, if they really don't use the Internet at all, and your thoughts on what they typically use the Internet for if they do use it.
2. Have you ever taken a class on the Internet? If yes, describe your experience.
3. What do you think about low-income Georgians' experiences in taking classes on the Internet? Have you ever come across any participants in your program who have taken online classes?
4. How might low-income Georgians respond to taking a nutrition class on the Internet?
5. Access questions using the prototype as a talking point
    a. How might low-income Georgians most likely use this sort of website?
    b. What barriers can you foresee in low-income Georgians being able to use to this sort of website?

Theme 2 – Content

1. What sort of nutrition information do you think low-income Georgians would be interested in (find helpful) as a part of an online nutrition education program?
2. What do you think are advantages and disadvantages of an online nutrition education program for low-income Georgians?
3. Let's say a client is having trouble stretching food dollar or feeding family, feeding kids, etc. How would you feel about recommending they go online and take a short educational class (15 minutes)? What would be the advantages and disadvantages of recommending this?
4. Content questions using prototype as a talking point
    a. Talk me through what you'd most likely read/watch in this example.
        i. Why might you read/watch though this section?
    b. Talk me through what you'd most likely skip over in this example.
        i. Why might you skip over this section?

Theme 3 – Health and Digital Literacy

1. How do you think low-income Georgians learn about nutrition? (from who, what resources, etc)
2. What are your thoughts on how comfortable low-income Georgians are in using the Internet?
3. Given what you know about low-income Georgian's comfort level in using the Internet, what might be some important considerations for us to take into account as we're developing new nutrition education materials for this audience?
4. Literacy questions using the prototype as a talking point
    a. Looking at this example, what do you like and dislike about the format/layout of the website?
    b. What about this website do you think low-income Georgians would find easy or difficult to use?
    c. What are your feelings on the audio feature of this website?

Questions regarding Food eTalk Prototype

1) Can you describe your initial thoughts on this website based on aesthetics, design, format, and general appearance?
2) What are your opinions regarding the interactive learning activities in Food eTalk module 1 and 2?
3) If you were comparing module 1 and module 2; what are your opinions regarding the length, difficulty, and depth of one module compared with the other?
4) What are your opinions about the different aspects of education delivery such as: powerpoint speed, voice, cooking video, and images?

Appendix A.2 : Moderator Guides for Semi-Structured Focus Group Formative Evaluation Focus Group Series

Interview Guide
Focus groups Pre-Food eTalk

1. It seems like almost everything can be done online these days, how would you describe your use of the Internet?

Key probes: purpose, frequency, accessibility, device, comfort level

2. People seem to find nutrition and food information from many different places. Think about the last time you learned something new about food, cooking, or nutrition – tell me about that experience.

Key probes: friend, internet, TV, doctor, nutritionist, reading

3. When you think about an online nutrition education class what might you expect this online class to include?

Key probes: content, cooking, budgeting, shopping, videos, quizzes,

4. Now that you're thinking about food and nutrition education, what sort of nutrition related information would be helpful for you and your family?

Key probes: recipes, cooking tips, budgeting tips, snack ideas, chronic disease

Instructions on photovoice data collection
Script:
While you have the smartphone for the next 2-3 weeks, we would like you to use it to do the Food eTalk lessons, and also to use the smartphone camera to take pictures of what you learn in the lessons, as well as pictures of where you do your food shopping. For example, if you learned in a lesson how to read the sodium on a food label, when you go to the supermarket and start reading sodium on food labels, we would like you to take pictures of that food and it's food label. If you learned about the importance of fresh fruit and vegetables, we would like you to take photos of the selection of fresh fruits and vegetables at your local supermarket or grocery store. We would like you to use the smartphone camera to help us see what your food shopping experience looks like – from foods to labels to signs in your supermarket.

Interview Guide
Focus Groups post Food eTalk

1. Now that you've had a few weeks to use Food eTalk, tell me about what it is like using Food eTalk.

Key probes: logistics, ease/difficulty, content, videos, interactive games, device,

2. Can you walk me through an example of how you used something you learned in Food eTalk in your personal life?

Key probes: location, device, helpful, new information, and improvement

3. I am interested in how people choose which lessons to take and how they move from lesson to lesson. Can you walk me through your process starting when you first logged into and registered for Food eTalk?

Key probes: motivation, interest, reason for stopping, length of time

4. Remember we talked last time about what you thought Food eTalk might be like, how does your experience so far compare with what you expected?

Key probes: length, format, formality, content, navigation

5. If I had unlimited money, time, and resources to improve Food eTalk what are some changes I should make?

Key Probes: content, format, accessibility, navigation, videos,

6. Discussing PhotoVoice Data:
Now I'd like to discuss any of the photos that you took. Would someone like to share a photo and talk about their photo(s)?

Appendix A.3: Moderator Guides for Semi-Structured Individual Interview Series

Interview Guide
First Individual interview (before starting Food eTalk)
Interview #1 out of 3

1. It seems like almost everything can be done online these days, how would you describe your use of the Internet?

Key probes: purpose, frequency, accessibility, device, comfort level

2. People seem to find nutrition and food information from many different places. Think about the last time you learned something new about food, cooking, or nutrition – tell me about that experience.

Key probes: friend, internet, TV, doctor, nutritionist, reading

3. When you think about an online nutrition education class what might you expect this class to include?

Key probes: content, cooking, budgeting, shopping, videos, quizzes

4. Now that you're thinking about food and nutrition education, what sort of nutrition related information would be helpful for you and your family?

Key probes: recipes, cooking tips, budgeting tips, snack ideas, chronic disease

Instructions on photovoice data collection
Script:
While you have the smartphone for the next 2-3 weeks, we would like you to use it to do the Food eTalk lessons, and also to use the smartphone camera to take pictures of what you learn in the lessons, as well as pictures of where you do your food shopping. For example, if you learned in a lesson how to read the sodium on a food label, when you go to the supermarket and start reading sodium on food labels, we would like you to take pictures of that food and it's food label. If you learned about the importance of fresh fruit and vegetables, we would like you to take photos of the selection of fresh fruits and vegetables at your local supermarket or grocery store. We would like you to use the smartphone camera to help us see what your food shopping experience looks like – from foods to labels to signs in your supermarket.

Interview Guide
Second Individual Interview (~3 weeks after starting Food eTalk)
Interview #2 out of 3

1. Now that you've had a few weeks to use Food eTalk, tell me about what it is like using Food eTalk.

Key probes: logistics, ease/difficulty, content, videos, interactive games, device,

2. Can you walk me through an example of how you used something you learned in Food eTalk in your personal life?

Key probes: location, device, helpful, new information, and improvement

3. I am interested in how people choose which lessons to take and how they move from lesson to lesson. Can you walk me through your process starting when you first logged into and registered for Food eTalk?

Key probes: motivation, interest, reason for stopping, length of time

4. Remember we talked last time about what you thought Food eTalk might be like, how does your experience so far compare with what you expected?

Key probes: length, format, formality, content, navigation

5. If I had unlimited money, time, and resources improve Food eTalk what are some changes I should make?

Key Probes: content, format, accessibility, navigation, videos,

6. If you took any photos with the smartphone, would you mind walking me though some of them and sharing them with me?

Key Probes: reasoning for that image, difficulty/challenges, new observations?

Interview Guide
Third Individual interview (~6 weeks after starting Food eTalk)
Interview #3 out of 3

1. Now that you've had several weeks with Food eTalk, walk me though an example of something you didn't like about it.

2. Now how about share something that you liked about Food eTalk.

Key probes: remembered –(content, voice, games, videos)
revisited – (content, videos)
used - (content, skills, recipes)

3. Can you describe an example of how you used something you learned in Food eTalk in your personal life?

Key probes: location, device, helpful, new information, and improvement

4. I know that Food eTalk doesn't answer every question or address every concern people have about food or nutrition. I wonder if you can share with me any nutrition related questions that came up for you as you were going through the lessons?

Key Probes: content, format, accessibility, navigation, videos

5. Lots of people like to share food and nutrition tips with their friends and family. Let's say that you have a friend who is interested in learning about food/nutrition. How would you describe Food eTalk to that friend?

Key prompt: easy, helpful, device, navigation

6. If you took any photos with the smartphone, would you mind walking me though some of them and sharing them with me?

Key Probes: reasoning for that image, difficulty/challenges, new observations?

Appendix B.1: Consent Form for Semi-Structured Focus Group Formative Evaluation Focus Group Series

UNIVERSITY OF GEORGIA
CONSENT FORM
User experience of an online nutrition education program for SNAP-eligible Georgians

Researcher's Statement
We are asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Jung Sun Lee, Ph.D., RD
Associate Professor
Department of Foods and Nutrition
College of Family and Consumer Sciences
University of Georgia
leejs@uga.edu
706-542-6783

Purpose of the Study
The purpose of this study is to learn about how Georgians who are eligible for the SNAP Ed (food stamp education) program would use an online nutrition education program. We are creating an online nutrition education resource for Georgians who are eligible for SNAP Ed benefits. You are being asked to participate because you are a Georgian who is eligible for SNAP Ed benefits.

Study Procedures
If you agree to participate, you will be asked to complete a short written survey about your computer and Internet habits. This survey will also ask a few questions about you (example: your age, household income, how many people live in your household). You will also be asked to participate in a group of 5 – 8 other people answering questions about your opinions of Internet-based nutrition education. In this group you will also be asked about your confidence and comfort using the Internet. After this group interview, you will be given a smartphone and access to the online nutrition education program. During the time you have the smartphone you will be asked to try the online nutrition education lessons and use the smartphone camera to take pictures of food in your local supermarket or grocery store. After ~2-3 weeks you will be scheduled to come back for a second group interview. After this group interview you will return

the smartphone. . If you lose or damage the smartphone, you will not be he held liable. Please let us know if you have any problems using it to access the online nutrition education program during the study. All together, the first survey and the group session will take about 1 ½ hours and the second group session will take about 1 ½ hours. The whole project will take you approximately 1 month to complete from start to finish.

Risks and discomforts
The risks and discomforts of participating in this study are minimal.
Psychological Risks
While in this study, you might experience some mild psychological discomfort. For example, answering questions about your health, beliefs, and behaviors and other personal questions might make you feel uncomfortable in the group setting. Everyone in the group will be asked to sign a confidentiality form before participating.
Risk of Loss of Privacy
Even though the investigator will emphasize to all participants that comments made during the focus group session should be kept confidential, it is possible that participants may repeat comments outside of the group at some time in the future. We would like only pictures of food, food packages, food sales signs, and supermarket images, not of yourself or any other person. We will make every effort to protect the privacy of the information you provide during this study

Benefits
There are no personal direct benefits to your participant in this study. The benefits to society include: development of a user-friendly online nutrition education program for Georgians' who are eligible for SNAP benefits. The researchers will also learn how participants feel about the new teaching method, which was designed especially for Georgians who are eligible for SNAP benefits.

Incentives for participation
You will receive a $20.00 gift card for your participation in each of the 2 focus groups.

Audio/Video Recording
The two group interview sessions will be audio recorded. This is necessary so the researcher can review the group sessions in detail, so that no information is missed. The audio recordings will be written out, and all identifying words (ie: someone's name) will be left out of the written version of the group session. The recordings and transcriptions will be destroyed upon the completion of the data analysis and the project.

Privacy/Confidentiality
The written survey we collect from you will have identifying information such as your age, date of birth, address, and email address. The audio recorded group sessions will be anonymous, meaning, no one will know who is the voice talking at any given time (other than the researcher's voice). You will be assigned a non-identifying number, and all of your data and recordings will be stored under this number. Identifiable data will be used by the researchers and stored in locked filing cabinets in a locked office on the UGA campus. All information entered into a computer database will be stored under a password-protected, encrypted file. The project's research records may be reviewed by United States Department of Agriculture (USDA)

and by Departments at the University of Georgia responsible for regulatory and research oversight.

Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary
Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you refuse or decide to withdraw later, there will be no penalty and you will not lose any benefits or rights to which you are entitled.
If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions
The main researcher conducting this study is Sarah Stotz a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Jung Sun Lee at leejs@uga.edu or 706-583-0116. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.
Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Appendix B.2: Consent Form for Semi-Structured Individual Interview Series

UNIVERSITY OF GEORGIA
CONSENT FORM
User experience of an online nutrition education program for SNAP-eligible Georgians

Researcher's Statement
We are asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Jung Sun Lee, Ph.D., RD
Associate Professor
Department of Foods and Nutrition
College of Family and Consumer Sciences
University of Georgia
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706-542-6783

Purpose of the Study
The purpose of this study is to learn about how Georgians who are eligible for the SNAP Ed (food stamp education) program would use an online nutrition education program. We are creating an online nutrition education resource for Georgians who are eligible for SNAP Ed benefits. You are being asked to participate because you are a Georgian who is eligible for SNAP Ed benefits.

Study Procedures
If you agree to participate, you will be asked to complete a short written survey about your computer and Internet habits. This survey will also ask a few questions about you (example: your age, household income, how many people live in your household). You will also be asked to participate in series of 3 interviews with a graduate student from the University of Georgia. Each interview will last about 60 minutes. During the first interview, you will receive a smartphone and learn how to use the online nutrition education program. . During the time you have the smartphone you will be asked to try the online nutrition education lessons and use the smartphone camera to take pictures of food in your local supermarket or grocery store.After three weeks, you will return for the second interview. After another 3 weeks you will return for the third and final interview and you will return the smartphone. If you lose or damage the smartphone, you will not be he held liable. Please let us know if you have any problems using it to access the online nutrition education program during the study. In these interviews you will also be asked about your experience with the online nutrition education program. From start to finish this study will take about 2 months.

Risks and discomforts
The risks and discomforts of participating in this study are minimal.
Psychological Risks
While in this study, you might experience some mild psychological discomfort. For example, answering questions about your health, beliefs, and behaviors and other personal questions might make you feel uncomfortable.
Risk of Loss of Privacy
Even though the investigator will take extensive precautions with your personal private information, there is always a chance of loss of privacy. We would like only pictures of food, food packages, food sales signs, and supermarket images, not of yourself or any other person. We will make every effort to protect the privacy of the information you provide during this study

Benefits
There are no personal direct benefits to your participant in this study. The benefits to society include: development of a user-friendly online nutrition education program for Georgians' who are eligible for SNAP benefits. The researchers will also learn how participants feel about the new teaching method, which was designed especially for Georgians who are eligible for SNAP benefits.

Incentives for participation
You will receive a $20.00 gift card for your participation for each of the 3 individual interviews.

Audio/Video Recording
The three interviews will be audio recorded. This is necessary so the researcher can review the interview sessions in detail, so that no information is missed. The audio recordings will be written out, and all identifying words (ie: someone's name) will be left out of the written version. The recordings and transcriptions will be destroyed upon the completion of the data analysis and the project.

Privacy/Confidentiality
The written survey we collect from you will have identifying information such as your age, date of birth, address, and email address. The audio recorded group sessions will be anonymous, meaning, no one will know who is the voice talking at any given time (other than the researcher's voice). You will be assigned a non-identifying number, and all of your data and recordings will be stored under this number. Identifiable data will be used by the researchers and stored in locked filing cabinets in a locked office on the UGA campus. All information entered into a computer database will be stored under a password-protected, encrypted file. The project's research records may be reviewed by United States Department of Agriculture (USDA) and by Departments at the University of Georgia responsible for regulatory and research oversight.

Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you refuse or decide to withdraw later, there will be no penalty and you will not lose any benefits or rights to which you are entitled.
If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions
The main researcher conducting this study is Sarah Stotz a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Jung Sun Lee at leejs@uga.edu or 706-583-0116. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Appendix C.1: Formative Evaluation Food eTalk - Self-Administered Questionnaires
Demographic and Internet Use Habits Survey

UGA SNAP-Ed Food eTalk Demographic and Internet Use Habits Survey

Date	
Location of Focus Group or Interview	
Participant Name	
Participant Address	Street Address: _____ _____ City_____ Zip Code_____
Participant Email	
Participant Phone Number	
Participant Signed Consent	_____ Yes _____ No
Participant ID Number	

Participant Survey **Participant ID _____**

Please fill out the following survey to the best of your ability. If you need help, please ask the researcher. If you prefer someone reads the survey to you and fills it out for you, please let the researcher know. Thank you!

1. How often do you use the Internet? **(Choose only one)**
   a. Never
   b. Once a month or less
   c. About once a week
   d. Every day
   e. Several times every day

2. Where do you most often access the Internet? **(Choose only one)**
   a. Never use it
   b. Home
   c. Library
   d. Work or work training site/Jobs Program
   e. School
   f. Family or friends house
   g. Smartphone – I can access anywhere
   h. Other: specify_____

3. What device do you use to access the Internet? (You can choose more than one)
   a. Laptop
   b. Tablet
   c. Smartphone
   d. Desktop computer
   e. E-reader (Kindle, Nook, etc)

4. If you answered more than one to question #3, which one do you use the most often? **(Choose only one)**
   a. Laptop
   b. Tablet
   c. Smartphone
   d. Desktop computer
   e. E-reader (Kindle, Nook, etc)

5. What do you use the Internet for? **(You can choose more than one)**
   a. Never use it
   b. Listen to or download music or videos
   c. News or current events
   d. Games
   e. Shopping

f. Search for information
g. Recipes
h. Food coupons
i. Communicating w/family or friends
j. On-line class or training
k. Complete forms to register for classes, apply for jobs, etc
l. Other: specify:_____

6. What kind of connection to the Internet do you use most often?
(Choose only one)
a. Never use the internet
b. Don't know
c. The computer I use is not connected to the internet
d. Dial Up
e. DSL
f. Wi-fi someplace outside of my home (ie: coffee shop)
g. Cable / Broadband
h. Smart phone cellular signal
i. Smartphone wi-fi
j. Other, specify: _____

7. How likely are you to use the Internet to take a free 15-minute educational session or class on a topic that interests you?
a. Not at all
b. Probably not at all
c. Possibly
d. Probably
e. Definitely

8. In your home, who does **most** of the shopping and cooking? (**Choose only one)**
a. I do
b. My significant other
c. My children
d. Other adult in household, specify: _____
e. Cooking and shopping tasks are equally shared between everyone

9. Your Age: _____ years
10. Your Sex:
a. Male
b. Female

11. Including you, how many people live in your household?

a. Only me
b. 2
c. 3
d. 4

e. 5
f. 6
g. 7
h. More than 8

12. Do you have children less than 18 years living with you?
    a. Yes. Indicate in the table how many from each group live with you

	Number
Infant	
Toddler (12-36 months)	
Preschool	
Elementary school	
Junior high school	
High school	

    b. No, there are no children living with me

13. What is your marital status?
    a. Single, never married
    b. Married
    c. Divorced or separated
    d. Domestic partnership
    e. Other (Please Specify: _____)

14. Which of the following best represents your racial or ethnic heritage? Choose all that apply.
    a. Do you consider yourself Hispanic/Latino?
        1) Yes
        2) No
    b. Which race category do you identify with?
        1) Native American or Alaskan Native
        2) East Asian or Asian American
        3) South Asian or Indian American
        4) Middle Eastern or Arab American
        5) Native Hawaiian or other Pacific Islander
        6) Black or African American
        7) White
        8) Other

15. Are you receiving food stamps?
    a. Yes
    b. No
    c. Not sure

16. What is the highest education level you have reached? **(Choose only one)**
    a. 6 or less

b. 7
c. 8
d. 9
e. 10
f. 11
g. 12 or GED
h. Some college
i. Graduated 2 year college
j. Graduated college
k. Post graduate

17. Employment Status**. (Choose only one)**

a. Employed for wages
b. Self-employed
c. Out of work and looking for work
d. Out of work but not currently looking for work
e. A homemaker
f. A student
g. Military
h. Retired
i. Unable to work

18. What is your total household income?

a. Under $10,000 / year
b. $10, 001 – $15, 999 / year
c. $16,000 - $19,999 / year
d. $20,000 - $24,999 / year
e. $25,000 – $29,000 / year
f. Over $30,000 / year

19. How would you describe your neighborhood

a. Farm
b. Small town (<10,000)
c. Town of 10,000-50,000
d. Large Town (50,000+)
e. I don't have a home/neighborhood

Appendix C.2: Formative Evaluation Food eTalk - Self-Administered Questionnaires eHealth Literacy Scale

eHealth Literacy Scale

I would like to ask you for your opinion and about your experience using the Internet for health information. For each statement, tell me which response best reflects your opinion and experience *right now*.

1. How **useful** do you feel the Internet is in helping you in making decisions about your health?

❑1	❑2	❑3	❑4	❑5
Not useful at all	Not useful	Unsure	Useful	Very Useful

2. How **important** is it for you to be able to access health resources on the Internet?

❑1	❑2	❑3	❑4	❑5
Not important at all	Not important	Unsure	Important	Very important

3. I know **what** health resources are available on the Internet

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

4. I know **where** to find helpful health resources on the Internet

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

5. I know **how** to find helpful health resources on the Internet

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree

5) ❑ Strongly Agree

6. I know **how to use** the Internet to answer my questions about health

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

7. I know how to use **the health information** I find on the Internet to help me

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

8. I have the skills I need to **evaluate** the health resources I find on the Internet

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

9. I can tell **high quality** health resources from **low quality** health resources on the Internet

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

10. I feel **confident** in using information from the Internet to make health decisions

1) ❑ Strongly Disagree
2) ❑ Disagree
3) ❑ Undecided
4) ❑ Agree
5) ❑ Strongly Agree

Appendix D: Graphic Representation of Full Dissertation Study Design