

ONLINE NUTRITION EDUCATION: PERCEIVED UNDERSTANDING, ACCEPTANCE,
AND USABILITY OF FOOD AND NUTRITION BYTES CURRICULUM FOR THE
EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

by

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Abstract

Nutrition education programs strive to help low-income people make optimal food choices while living on a limited budget. This study addressed perceived understanding, acceptance, and usability of *Food and Nutrition Bytes*, a set of 12 eight- to eleven-minute online Expanded Food and Nutrition Education Program (EFNEP) lessons. Clients in EFNEP during 2005-2006 were surveyed on internet usage and interest in online nutrition lessons. Lessons were developed and assessed for reading levels using two formulas. Clients and professionals in six Kansas counties completed a Likert scale survey and gave comments after they viewed one online lesson. Fifty-five percent of 75 EFNEP clients who had internet access indicated they were interested in taking nutrition lessons online. The new lessons averaged a 6.64 grade reading level. Two lessons had content that was rated too general to be useful. For the remaining lessons, both groups ranked their perceived understanding, helpfulness of graphics and audio, and usefulness of information at the first or second most-desirable rating. They rated length and amount of information as “Just Right.” The only difference found between the groups was when clients rated one lesson as having a little too much information and professionals rated it as having not quite enough (Mann-Whitney U = 35.0, p = 0.039). Within-sample associations were measured for two lessons. Clients older than 30 years of age found the *Grains* lesson’s pictures and graphics to be more helpful than did younger clients (Kendall tau-b = 0.593, p = 0.002). White clients evaluated the *Cooking* lesson as being easier to understand than did non-white clients (Kendall tau-b = -0.477, p = 0.020). The most frequent comments pertained to the importance of portion sizes and appropriate pictures and graphics. Overall, *Food and Nutrition Bytes* lessons were easy to read, and perceived by both clients and professionals to be easy to understand, helpful and useful, and also optimal in length and amount of information. Despite low numbers of EFNEP clients who had internet access, over half were interested in taking lessons online. Limitations of this study include small samples, convenience samples, subjects’ time constraints, and interviewer bias.

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CHAPTER 1 - Introduction

Households with children are at an increased risk for food insecurity and hunger. Food insecurity occurs when households are uncertain about having enough food. Hunger occurs when one or more members of a household have gone without food and have experienced hunger because of lack of resources (Kansas Food Security Task Force, 2006). In Kansas, nearly 40 percent of single-mother households report that they have experienced food insecurity. Most food-insecure households are working families, with 60 percent having at least one household member working full-time. Children who grow up in food insecure households perform less well in school and are more likely to suffer from behavior problems. In addition, food-insecure families may make affordable but not healthy food choices which lead to overweight and obesity (Kansas Food Security Task Force, 2006).

Through nutrition education programs such as the Expanded Food and Nutrition Education Program (EFNEP), people in food insecure households can learn how to make optimal food choices for family health and well-being while living on a limited budget. EFNEP currently provides nutrition education through one-on-one or group lessons with a paraprofessional educator. Staff safety concerns, funding issues, and Welfare Reform have negatively impacted EFNEP delivery methods in Kansas and the ability to reach clients. In urban areas, particularly in Sedgwick County, home visits are no longer provided due to the threat of gang violence (J. McMahon, Sedgwick County EFNEP Agent, personal conversation, April 9, 2007). The majority of home visits provided in Shawnee and Wyandotte Counties are made to Spanish-speaking clients because many of these clients work evening and night shifts and are home during the day. Bourbon and Crawford counties have higher rural populations, but providing home visits to rural clients is expensive, and many will not access group lessons because of transportation problems.

An online nutrition education program would offer another option for reaching EFNEP clients, not only in counties currently served by EFNEP, but also to the many counties that are not served by EFNEP. At the time this paper was written, three states: Nebraska (University of Nebraska-Lincoln, no date [n.d.]), Oregon (Oregon State University Extension Service, 2006), and Virginia (Virginia Cooperative Extension Service, n.d.) offered online nutrition lessons for

EFNEP clients. None has been extensively evaluated to determine the effectiveness of this type of program delivery.

CHAPTER 2 - Purpose

This study addressed client and professional perceived understanding, acceptance, and usability of *Food and Nutrition Bytes*, a set of online EFNEP nutrition lessons. The research question behind this study was “Do low-income clients, and the professionals who work with these families, accept online EFNEP nutrition lessons in which low-income clients learn on their own?” This study evaluated 12 newly-developed online nutrition lessons using qualitative survey tools. The results will guide modifications to the online lessons so they meet the needs of low-income clients who wish to complete EFNEP online. This online program has the same goals as those of traditional EFNEP delivery methods, namely, that clients will learn how to choose and prepare healthy and safe foods while living on a limited budget.

CHAPTER 3 - Objectives

Objectives for this study were to assess:

1. Local internet use of enrolled EFNEP clients and interest in taking online lessons.
2. Reading levels of the newly-developed online nutrition lessons.
3. Perceived level of understanding of low-income clients and professionals after viewing the EFNEP online lessons.
4. Acceptance by low-income clients and professionals of the online lessons based on evaluation of pictures and graphics, audio, length, and amount of information provided.
5. Perceived usefulness of the information provided in the online lessons.

CHAPTER 4 - EFNEP History and Overview

Since 1969, EFNEP has assisted low-income families and youth with acquiring skills and abilities needed to improve their diet and stretch their food dollars. EFNEP is administered through the Cooperative State Research Education and Extension Service (CSREES) of the

United States Department of Agriculture (USDA). It operates in nearly 800 counties in all 50 states and the six United States (U.S.) territories (Montgomery & Willis, 2005).

EFNEP has a history that is rich in positive nutritional, social, and economic impacts. Its unique program model effectively reaches low-income clients and teaches them how to make positive behavior changes that lead to better health and wellness (Willis & Montgomery, 2006).

Through an experiential learning process, EFNEP clients learn how to:

- Improve their diets and nutritional health for the whole family.
- Select and purchase food that meets their nutritional needs.
- Improve their skills in food preparation, storage, and safety.
- Improve their skills in managing food resources.

The benefits of EFNEP are far-reaching, since EFNEP graduates serve as role models for other family members, resulting in overall improved family health and well-being (USDA-CSREES, 1983).

EFNEP evolved during the turbulent 1960s when the Cooperative Extension Service was searching for new ways to reach and teach low-income families. One project, *The Pilot Program Involving Young Homemakers in Low-Income Rural Areas of Alabama*, was launched in five counties in Alabama on July 1, 1964 (Alabama Cooperative Extension System, n.d.). It was a cooperative project between Alabama Cooperative Extension Service, Auburn University and the Federal Extension Service of USDA with three main goals:

- To develop and test methods of reaching and teaching low-income homemakers.
- To develop and test nutrition education materials.
- To determine if paraprofessionals could be trained as educators for low-income homemakers and be successful at teaching homemakers to make positive behavior changes.

This project proved to be highly successful, and it paved the way for the federal EFNEP program. The federal EFNEP program was launched in 1969 after legislation enacted in 1968 granted the USDA \$10 million in funding (USDA-CSREES, 1983). Three program directives were developed which continue to guide EFNEP today:

- Existing nutrition education programs can be modified to effectively reach low-income audiences.
- Professional home economists can teach and supervise paraprofessionals who provide the actual education to low-income clients.

- A nutrition education program, modified to meet the needs of low-income clients in terms of interests, competencies, and economic and educational levels, and delivered by paraprofessionals indigenous to the target population, can result in positive changes in clients' eating habits (Alabama Cooperative Extension System, n.d.).

At the same time, a television documentary, *Hunger in America*, aired in 1968 and brought increased awareness of food insecurity and hunger problems in the U.S. (Kennedy, 2002; Gunderson, n.d.). News that widespread hunger existed in a country with a plentiful food supply created such a controversy that the first White House Conference on Food, Nutrition and Health was convened in 1969. This conference produced many reports and recommendations. As a result, far reaching changes were made to enhance or develop federal food and income programs to combat hunger and malnutrition (White House Conference on Food, Nutrition and Health, 1969).

Part Three of the White House Conference report focused on community nutrition teaching and highlighted the need for public education on food and nutrition, especially among high-risk audiences. The report also noted that the Cooperative Extension Service was mostly responsible for nutrition education in both rural and urban areas, and that Extension programs using the paraprofessional teaching model were highly effective. Increased funding for these programs was encouraged to permit the hiring and training of more nutrition paraprofessionals. By 1970, EFNEP was funded with \$30 million (White House Conference on Food, Nutrition and Health, 1969). Today, the annual appropriation is over \$62 million (USDA-CSREES, 2007b).

Who are EFNEP Clients?

EFNEP primarily targets two audiences: low-income adults and youth. Eligible adults include individuals living in rural or urban areas who are responsible for planning and preparing family meals, especially in households with young children. Adult clients are mothers, fathers, single parents, foster parents, teen parents, grandparents caring for grandchildren, child care providers, and pregnant women. Youth include children living in rural or urban areas. Youth receiving EFNEP nutrition education are also included in Extension's 4-H program.

All eligible people are to have equal access to the program and facilities regardless of race, color, national origin, sex, age or disability (USDA-CSREES, 1983). In 2005, the federal EFNEP Impact Report noted that the program reached a total of 411,849 youth and 150,995

adults in the U.S. and U.S. territories that year. In terms of racial and ethnic breakdown, 36 percent were Hispanic, 31 percent were white, 27 percent were black, 4 percent were Asian or Pacific Islander, and 2 percent were American Indian or Alaskan (Montgomery & Willis, 2005).

Adult clients are recruited through a variety of methods. Paraprofessionals may recruit them at social service and emergency resource agencies with While-You-Wait displays. The paraprofessional sets up a display and then markets the program by visiting with clients who are waiting for services at the particular agency. In addition, county EFNEP programs often enter into agreements with partnering agencies to teach adult nutrition lessons on site at those particular agencies. Partnering agencies typically include health departments, medical clinics, prisons, substance abuse rehabilitation programs, and other social service organizations. EFNEP also markets services to community agencies and government programs and then receives client referrals from case managers and other staff.

To recruit youth, EFNEP markets services to preschools, child care organizations, schools, and after-school programs, and programs are scheduled as requested.

EFNEP Delivery

Research-based subject matter in the area of food and nutrition is the principal education content for both adult and youth audiences. Instruction is tailored according to the clients' nutritional needs and cultural heritages. Content areas include basic nutrition, menu planning, food selection and preparation, food budgeting, food safety, maternal and infant nutrition, child feeding guidelines, and physical activity (USDA-CSREES, 1983).

Clients enroll in EFNEP and typically complete 10 to 12 lessons over several months (USDA-CSREES, 2006). As in 1969, paraprofessionals and volunteers, many of whom are indigenous to the population that they serve, teach the lessons. EFNEP lessons are delivered through home visits, small group lessons, mailings, and telephone teachings or other mass media efforts (USDA-CSREES, 1983; Montgomery & Willis, 2005). Lessons include hands-on learn-by-doing activities so that clients develop practical skills necessary to make positive behavior changes (USDA-CSREES, 2006).

CHAPTER 5 - EFNEP Impacts

The Centers for Disease Control and Prevention recently reported that poor nutrition and lack of physical activity are approaching tobacco use as the leading causes of death in the U.S. (U.S. General Accounting Office [GAO], 2004). These unhealthy habits have led to dramatic increases over the past two decades in the proportion of children, adolescents, and adults who are overweight or obese. To address this “epidemic,” the USDA’s Strategic Plan established a new Partnership Obesity Prevention Initiative to support and coordinate research, education, and extension programs across the nation to focus on obesity prevention and treatment. Enhancement of EFNEP is recommended because it focuses on low-income families and children, people who are disproportionately affected by overweight and obesity (USDA-CSREES, 2004).

To help improve nutrition and decrease related diseases, the USDA currently provides nutrition education through five of its nutrition programs: the Food Stamp Program; the Special Supplemental Nutrition Program for Women, Infants and Children; the National School Lunch Program; the Child and Adult Care Food Program; and EFNEP. In 2004, the GAO completed a review of USDA’s nutrition education programs to determine if they were successful (U.S. GAO, 2004). The report noted that three key actions are needed for nutrition education to be successful:

- When programs are designed, the programs must have clear goals with specific target populations identified, and the programs must have strategic plans that outline how they will achieve goals.
- The nutritional and learning needs of the targeted populations must be assessed, and services must be tailored to meet those needs.
- The programs must be monitored and evaluated, and outcomes must be assessed to see if desired impacts are reached.

EFNEP was noted by the report to be the only USDA program that has accomplished all three actions (U.S. GAO, 2004).

To monitor and evaluate programs at the county and state levels, the federal EFNEP program added the Evaluation and Reporting System, or ERS, in 1993 to collect information about positive impacts of the program (USDA-Research, Education & Economics Information System [REEIS], n.d.). The data system was updated in 2005 and now is called the Nutrition Education Evaluation and Reporting System, or NEERS5 (USDA-CSREES, 2007a). It has an

enhanced foods database for analyzing food intakes and it can also generate demographic reports, diet summary reports, and behavior changes summaries.

To measure diet and behavior changes, data are collected when clients enroll in the program. These data include demographic information, 24-hour food recalls, and behavioral practices related to nutrition, food resource management, and food safety. The information is collected again when clients graduate and the data sets are compared to determine changes that clients have made as a result of completing EFNEP (USDA-REEIS, n.d.).

Specific nutrition practices measured include:

- Planning meals.
- Thinking about healthy foods choices.
- Preparing foods without adding salt.
- Using the Nutrition Facts on the food label to make food choices.

Food resource management practices measured include:

- Planning meals.
- Comparing prices before buying food.
- Not running out of food before the end of the month.
- Shopping with a grocery list.

Food safety practices measured include:

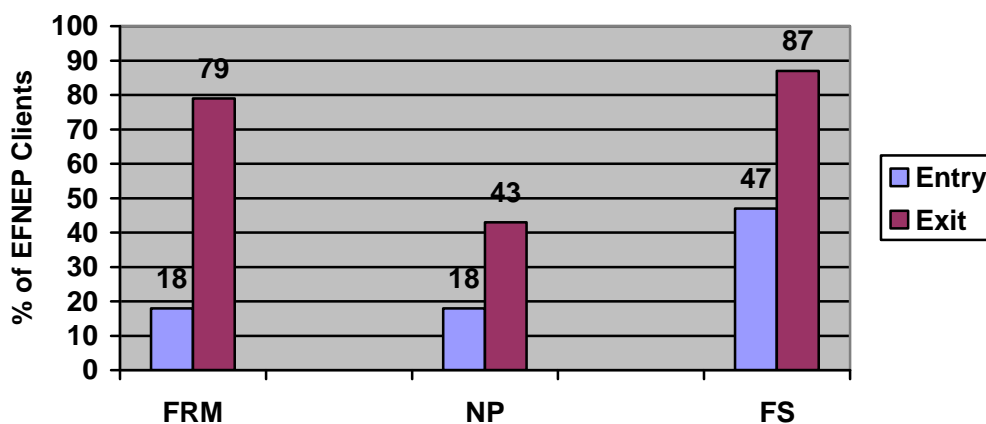
- Refrigerating or freezing food within two hours of preparing or cooking.
- Thawing frozen foods in the refrigerator, not at room temperature.

In Kansas, EFNEP operates in six counties: Bourbon, Crawford, Riley, Sedgwick, Shawnee, and Wyandotte. In 2006, 1,153 Kansas families with 1,637 children enrolled in EFNEP. These totals included 601 pregnant clients enrolled in prenatal nutrition lessons, and 333 families who graduated from the basic EFNEP program. In addition, 5,249 youth contacts were made through the EFNEP youth program (Procter, 2006).

Positive outcomes were associated with graduating from Kansas EFNEP, including:

- 96% improved in one or more nutrition practices. 85% improved in two or more practices.
- 40% ate meals together as a family more often.
- 91% improved in one or more food resource management practices.
- 84% seldom or never ran short of food before the end of the month.
- 77% used food labels more often to make food choices.
- 77% improved in at least one food safety practice.
- 71% thawed food safely more often.

ERS IV (now NEERS5) also measured desirable practices at program entry and at exit to indicate which clients have improved to satisfactory practices by graduation. Comparisons of entry and exit data of the 333 Kansas graduates in 2006 using ERS IV revealed that 79 percent of clients at program exit demonstrated acceptable food resource management practices compared to only 18 percent at program entry (see Figure 1). In addition, 43 percent demonstrated acceptable nutrition practices at program exit compared to only 18 percent at entry. With food safety practices, 87 percent at exit were demonstrating acceptable practices, compared to 47 percent demonstrating acceptable practices at entry (Procter, 2006).



FRM=Food Resource Management Practices
 NP=Nutrition Practices
 FS=Food Safety Practices

Figure 1. Kansas homemakers with desirable practices before and after EFNEP graduation

Numerous research studies in other states also have documented positive impacts of EFNEP in terms of economic benefits, improved health behaviors, and disease prevention. For example, a Virginia cost-benefit analysis found that for every \$1 invested in EFNEP, \$10.64 are saved in future health care costs (Lambur, Rajgopal, Lewis, Cox, & Ellerbrock, 1999). In addition, a Tennessee study found that for every \$1 invested in the program, low-income families save an average of \$2.48 on food costs (Burney & Haughton, 2002).

A study of 59 graduates in two New York counties examined the persistence of changes in food-related behaviors for one year after graduation. Clients significantly improved on 10 of 12 behavior practices measured between EFNEP entry and exit. One year later, no significant

changes were found, showing that they had maintained the positive behaviors. The majority of clients also reported that they were eating more fruits, vegetables, grains, and beans (Arnold & Sobal, 2000).

CHAPTER 6 - EFNEP Challenges and Barriers to Participation

When EFNEP was initiated in 1969, instruction was primarily one-on-one in the participant's home. The use of group teaching methods began increasing in the early 1980s, particularly in urban areas. At this time, there was increased concern for staff safety in individual homes, and group teaching was also encouraged to stretch program dollars because EFNEP was facing funding constraints. A small-group format increases efficiency (Dollahite & Scott-Pierce, 2003).

Several researchers found that client outcomes are similar regardless of delivery method. One study compared dietary changes of clients receiving individual versus group instruction and found no significant differences between groups in servings of grains, vegetables, dairy foods, and protein foods eaten. Increases in fiber, iron, calcium, vitamin A, vitamin C, and vitamin B6 also showed no significant differences between methods of instruction (Luccia, Kunkel, & Cason, 2003). Another study tested the effectiveness of self-administered video lessons as an instructional method for EFNEP homemakers. Participant improvements were observed in both the traditional group and the video group. No differences were found between the two groups in dietary or behavior changes. The cost of administering video lessons was 36 percent of the traditional lessons in terms of labor and travel expenses (Cox, White, & Gaylord, 2003).

Another study, however, found differences in outcomes of individual versus group instruction in EFNEP. Individual and group client outcomes from a three year period from 1999 to 2001 in New York were compared and, while both showed improvements in behavior practices, the group outcomes were not as high as the outcomes of clients receiving individual instruction (Dollahite & Scott-Pierce, 2003).

The success of EFNEP has been attributed, in part, to the use of paraprofessionals indigenous to the population that they serve. Another key factor is the tailoring of educational efforts to the needs, interests, financial resources, age, cultural backgrounds, and learning abilities of the clients. These factors are diminished when the instruction method is moved from

individual instruction to group settings. The paraprofessional must attempt to meet the needs of a number of clients at one setting instead of just one client's needs (Luccia et al., 2003). The paraprofessional must be trained in group facilitation skills, and contend with language and literacy barriers. In addition, participants who miss classes need follow-up, and evaluation data are difficult to obtain, since some clients need more individualized help with completing data collection forms (Dollahite & Scott-Pierce, 2003).

In 1996, welfare reform brought a major shift to the lives of low-income people. Clients receiving public assistance are now required to find work after two years of receiving that assistance, with few exceptions. If they are not working, they are required to be in work training or providing community service (U.S. Department of Health and Human Services, 1996). This reform impacted how EFNEP could reach and enroll clients. Many group lessons now take place where eligible clients are receiving other services, such as at medical clinics, welfare-to-work programs, substance abuse programs, and prisons.

To determine specific educational barriers that prevented clients from accessing Extension programs, 20 enrolled EFNEP clients were surveyed in North Carolina (Richardson, Williams, & Mustian, 2003). The main (85 percent) reason why clients did not access Extension programs was that they did not have transportation. Other reasons included that they could not leave home because of family responsibilities (80 percent) and that they had trouble reading the information (80 percent). Some also reported that they did not feel comfortable in a group (40 percent). The authors noted that clients need programs that they can access in their home or in the nearby community. They also recommended delivery methods that are not face-to-face, such as mass media or self-directed educational materials including audio, video, learning modules, or printed materials.

CHAPTER 7 - The Internet: An under-developed tool for reaching and teaching EFNEP clients?

The Pew Internet and American Life Project continually researches the impact of the internet on family life, and how people interact with the internet, by tracking internet use through telephone surveys. In 2006, the project reported that eight in ten internet users have researched

health information online (Fox, 2006). Interest in the topics of diet and fitness have increased from 2002 to 2006 with the percentage of people looking for diet and nutrition topics moving from 44 to 49 percent, and those looking for exercise or fitness information increasing from 36 to 44 percent. In terms of subgroups of people, 45 percent of people ages 18 to 29 looked for information on diet and nutrition, and 40 percent of people with a high school education or less looked for the same topic. Fifty-five percent of people ages 18 to 29 researched exercise or fitness topics, and 35 percent of people with a high school education or less looked for this topic (Fox, 2006).

The Pew Health Information Online report found that as people gain experience with using the internet, they use it for more activities. As they use it more often, they have higher expectations for finding certain topics. One popular activity, as noted, is to research health information. Health-related websites are also providing more information. In tandem, government agencies have called for increased obesity awareness and public education about nutrition. All of these reasons may be prompting more internet traffic (Fox, 2005). These data indicate a need for research-based nutrition education in an online format.

The Pew report also noted increased use of high-speed internet (Horrigan, 2006). From March 2005 to March 2006, the number of people with high-speed internet connection at home increased by 40 percent. Growth (121 percent) was particularly fast for African Americans and those (70 percent) with less than a high school education.

A report released by the U.S. Department of Commerce (2004) also described the transition from dial-up to high-speed internet access. The number of households switching to broadband access (which includes digital subscriber lines or DSL, cable modems, and satellite and fixed wireless systems) more than doubled from September 2001 to October 2003. The main reason for switching is the increased speed in accessing and relaying information. Internet users with high-speed internet compared to dial-up use the internet more frequently and engage in more internet activities, such as information gathering (U.S. Department of Commerce, 2004).

The Commerce report also noted that while not everyone has internet access at home, many may use it at another location such as school, work, or a public library. Of the users surveyed in 2003, 32 percent who did not have access at home searched for information on health services or practices, compared to 40 percent who had home dial-up service and 48 percent who had broadband service at home (U. S. Department of Commerce, 2004).

Thirty-seven percent of Kansans live in rural areas (USDA-Economic Research Service, 2007). Fifty to 60 percent of Kansans had internet access in 2003 (U. S. Department of Commerce, 2004). While broadband internet access in rural areas nationwide is only 25 percent, wireless technologies offer promising technologies for internet use in rural households (U. S. Dept. Commerce, 2004).

CHAPTER 8 - Challenges in Using the Internet for Nutrition Education for Audiences with Limited Resources

Internet usage is high among people of certain ages, races, and incomes. For the February to March 2007 survey period, the Pew demographics report noted that eighty-seven percent of people ages 18 to 29, and 83 percent of people ages 30 to 49, use the internet (Pew Internet and American Life Project, 2007). Seventy-three percent of non-Hispanic whites, 62 percent of non-Hispanic blacks, and 78 percent of English-speaking Hispanics use the internet. Fifty-five percent of households making less than \$30,000 per year use the internet.

Despite the popularity of the internet for some, a digital divide still exists in the U.S. Less than a high school education and low English proficiency are significant factors in explaining low use of the internet. Only 32 percent of whites, 25 percent of blacks, and 31 percent of Hispanics with no high school degree use the internet (Fox and Livingston, 2007). Among Spanish-speaking Hispanics, only 31 percent use the internet.

Reasons for not using the internet include perceptions that the internet is dangerous and that nonusers are not missing anything. Other reasons cited include that the internet is too expensive, and it is confusing and hard to negotiate (Lenhart, Rainie, Fox, Horrigan, & Spooner, 2000).

Learning online involves different sensory inputs, mainly reading and typing, than classroom or group learning, which involves speaking and listening (Finnegan, 2006). Success in an online education program is therefore dependent on reading skills. Finnegan noted that online lessons need to be clear, easy to read, focused on learning objectives, and free from extraneous information. He also stated that writing for the internet greatly differs from writing for print media. Small type and long sentences that fill the width of the monitor should be avoided. The

material should also be presented in simple and manageable amounts, since the proliferation of information available on the internet can be overwhelming (Finnegan, 2006).

Literacy levels of most online information are relatively high compared to the reading levels of the U.S. population. Nearly 50 percent of the U.S. population reads at or below the eighth grade level, but most internet information is written at the 10th grade level or higher (Zarcadoolas, Blanco, Boyer, & Pleasant, 2002). Sutherland, Wildemuth, Campbell, and Haines (2005) reviewed 150 nutrition based websites for readability and found that general web searches for nutrition information yielded web pages that read at an average of a 10th grade level (using the Flesch-Kincaid formula). Focused searches for nutrition information using the Healthfinder search engine yielded web pages that read at an average of a 12th grade level, which only 37 percent of U.S. adults would be able to read. More than three-quarters of the focused search sites reviewed would be classified as “fairly difficult” or “difficult” to read (Sutherland et al., 2005).

Zarcadoolas et al. (2002) explored the internet skills of 24 low-literate adults. The most frequent assistance needed by participants during the study was for correct spelling and reminders to scroll down to see all of the web pages. Participants also had trouble with many graphics, especially if they were links to other sites. The authors recommended that web pages not be overloaded with graphics or text and that graphics be clearly labeled. In addition, the web pages should stay mostly within the browser window. Despite the barriers cited, 23 of their 24 participants reported that they would use the internet more in the next few years, especially for finding information (Zarcadoolas et al., 2002).

In another observational analysis of internet usage by low-literacy adults seeking health information, eight participants with 3rd to 8th grade reading levels conducted self-directed internet searches on health topics in response to questions asked by the researchers (Birru et al., 2004). All subjects had trouble answering questions from sites with an average of an 11th grade reading level. Five of the eight could answer questions from a site that read at an 8th grade reading level suggesting that low-literacy learners could identify and use easier-to-read information on the internet (Birru et al., 2004).

The HomeNetToo project (sponsored by the National Science Foundation) provided computers and internet service to 90 low-income families in the Midwest (Jackson et al., 2002). Sixty-seven percent were African-American and the rest were European American. Participants were surveyed about their internet use after six months. They spent an average of 41.5

minutes/day on the internet in a single session, visiting about nine websites. Participants perceived the internet to be a helpful source of parenting information and as a personalized source of practical information to meet their other information needs. However, participants were concerned about revealing personal information and about the validity of information. In addition, they were concerned about the intrusion of advertisements and commercialization of information that was available only for a fee (Jackson et al., 2002).

CHAPTER 9 - Successful Use of the Internet and Other Computer-Assisted Media for Nutrition Education for Low-Income Adults

A successful adult education program must be designed to meet the needs of its audience. Adult learners have learned to manage other aspects of their lives so they are also capable of directing their own learning (Merriam, 2001). They have life experiences that aid in their learning, and their learning needs are closely related to their changing social roles. They want to learn so that they can solve problems, and want knowledge that can be immediately applied. They are motivated to learn by internal rather than external factors, and prefer a learning setting where they are accepted, respected, and supported by instructors in a mutual relationship (Merriam, 2001).

Norris (2003) also stressed the importance of including different learning modalities in adult education programs. Approximately 60 percent of adult learners learn by seeing, and are attracted to pictures and graphics. Twenty-five percent of adults need to learn kinesthetically or “learn by doing” with their hands. They find it difficult to sit still and listen. The remaining 15 percent, however, do prefer to listen and they like lectures and discussions. A successful education program should include all three learning modalities (Norris, 2003).

Gregov and Marrero (2007) noted that people of all ages are internet learners, and that three-quarters of undergraduates today are non-traditional students. Doing is more important than knowing, and multitasking is a way of life. Online learners also have zero tolerance for delays, prefer the flexibility for self-paced learning that web-based education offers, and want to be entertained with animation, voice and video clips, captions and text, and games rather than a lecture style format (Gregov & Marrero, 2007).

Online education programs offer unique learning opportunities for low-income adults. While this population has typically not done well in traditional school settings, they are highly-motivated if they value what they are learning (Click & Alberts, 2005). They tend to be auditory learners and prefer little reading. When Click and Alberts designed *Critical Choices*, an online job-ready skills program for welfare recipients, they limited text to essential information which was written at a sixth grade reading level. In addition, the information was grouped into chapters that could each be completed in less than an hour. To assist with reading, an online dictionary was added so that participants could look up words without having to ask for assistance. Lessons were converted into slideshows with audio and visuals that required little or no reading. Surveys and other interactive activities were added which included looking for information by linking to other websites (Click & Alberts, 2005). No results of this pilot program were available at the time this paper was written.

Olsen, Cohen, Atallah, and Cunningham (2000) developed the Nutrition Information Bulletin Board and Learning Experience, or NIBBLE, for Adult Basic Education, which was an interactive nutrition education website for low-literate learners. The lessons were written at the 5th to 7th grade reading levels. Topics included basic nutrition, food groups, shopping, and diet assessment activities. Educators received training on using the website before using it with adult learners. Teachers reported using it with learners at different levels. While some words, such as “carbohydrates,” were initially difficult, the students learned to read them. Most teachers also found it useful for their English as a second language students, except for those who were still mostly Spanish-speaking (Olsen et al., 2000).

Clients receiving services from the Supplemental Nutrition Program for Women, Infants, and Children, or WIC, are also eligible for EFNEP. WIC clients in Washington State preferred a WIC website for nutrition education compared to lecture type of instruction that had little or no interaction (Birkett, Johnson, Thompson, & Oberg, 2004). The lecture type of instruction discouraged clients from returning to WIC for more nutrition education because it was not client-centered and lacked feedback. The website was desirable to clients because it was accessible at all hours, was accessible to fathers and other caregivers, and was deemed credible in terms of the information provided. Clients suggested that website topics and content include basic information on nutrition, health, and child development, as well as meal planning, cooking on a

budget, ways to include kids in cooking activities, getting kids to eat new foods, and recipes (Birkett et al., 2004).

In 2004, the *Wichealth.org* website was implemented in the WIC Midwest Region which includes Illinois, Indiana, Michigan, Minnesota, Ohio, Washington, and Wisconsin (Bensley et al., 2006). Research on the use of this website found that over 39,000 WIC participants accessed it during the implementation period of October 2004 to September 2005. Most clients were parents of WIC participants. Approximately 58 percent were between the ages of 18 and 29 years. Most (56 percent) accessed the website at home, 11 percent accessed it at work, 10 percent at their parents' houses, and 7 percent at the library. The remaining 16 percent accessed the website at a friend's house, WIC clinic, Chicago Food Center or other computer site. Eighty-four percent reported that they would use the internet to learn about other WIC eating topics, and 80 percent reported that they liked learning from the Web better than other WIC education methods, such as traditional group lessons (Bensley et al., 2006).

The internet provides opportunities for individualized nutrition education that can mimic the one-on-one teaching that occurs in EFNEP home visits. In a review of literature, Brug, Oenema, and Campbell (2003) found that computer-tailored nutrition education is more effective at motivating clients to make healthier food choices than is printed general nutrition information. When clients receive individualized feedback, they pay more attention to it, process it more intensely, and appreciate it more than general intervention materials. In addition, computer tailoring was found to be as successful among people with lower education (not specified as to grade level attained or as less than a high school education) as those with higher education (Brug et al., 2003).

The Nebraska *Learn at Home* EFNEP program offers seven lessons: *MyPyramid*, *Resource Management*, *Meal Planning and Shopping*, *Fruit and Vegetable Group*, *Milk Group*, and *Physical Activity* (University of Nebraska-Lincoln, n.d.). Lessons are estimated to take 15 to 25 minutes to complete. Each lesson is limited to one web page, and the client scrolls down the page to read the lesson. The lessons consist of text and cartoon-type graphics, and do not have audio. Clients set a mini-goal at the end of each lesson, and answer review questions which are submitted to a program database.

The *Eat Well for Less* program from Oregon State University Extension Service (2006) has three learning modules: *Pyramid Power*, *We Wish You Well*, and *Stretching Your Food*

Dollars. In module one, clients learn the parts of MyPyramid including food groups, oils, discretionary calories, and physical activity. In module two, clients learn about food contamination and food safety rules. In module three, clients learn how to plan meals and stretch their food dollars. Each module is estimated to take 20 minutes to complete. Lesson pages are limited to a short page of text and graphics that clients see on the monitor screen without scrolling. At the bottom of each page is a link that takes clients to the next page. All graphics are photographs. These modules do not have audio. When clients complete a module, they take a quiz to review what they have learned and receive their scores immediately after completing the quiz. According to the author, this program was pilot tested in 10 other states and with high school students. The modules have been used with food stamp eligible audiences, and the author noted that knowledge change and intention to change behaviors were well-documented (USDA-Food Stamp Nutrition Connection, 2007a)

The *Healthy Futures* program from Virginia Cooperative Extension Service (n.d.) has 10 online lessons: *Committing to Healthy Lifestyle Practices*, *Healthy Choices*, *Stretching Your Food Dollar*, *Keeping Your Food Safe*, *Heart Disease and Diabetes*, *Figuring Out Fat, Fiber, Fruits and Vegetables: Get'em in Your Diet!*, *The Importance of Calcium in Your Diet*, and *Physical Activity*. Lessons are from nine to 40 minutes long, and are a recorded video. Graphics are both photographs and cartoon graphics. Lessons are narrated by various Extension professionals. No information was available on whether clients were encouraged to set goals or complete lesson reviews or quizzes.

Campbell, Honess-Morreale, Farrell, Carbone, and Brasure (1999) designed *StampSmart*, a computer-assisted and individualized nutrition education program for low-income women enrolled in the Food Stamp Program in North Carolina. This intervention focused on reducing dietary fat. Clients accessed the 30 minute program at the Food Stamp office. They watched *Sisters at Heart*, a video soap opera about heart health, and then answered questions on food intake, dietary behaviors, and nutrition knowledge. After completing the questions, clients received tailored feedback and suggestions for reducing fat in their diet. Follow-up surveys revealed that clients had improved their knowledge and eating behaviors in regards to fat intake (Campbell et al., 1999).

The USDA's consumer research to obtain feedback on updating the Food Guidance System resulted in the original Food Guide Pyramid being replaced with MyPyramid. The new

system incorporated a more personalized approach with positive reinforcements and suggestions for obtaining good health in small incremental steps. The MyPyramid Food Guidance System also included a website, *MyPyramid.gov*, which was launched in April 2005. Besides food and nutrition information, the website provides the MyPyramid Tracker in which internet users can enter their food intake and physical activity, and receive a detailed assessment and personal eating plan (USDA-Center for Policy and Promotion [CNPP], 2005). At the one year anniversary of MyPyramid, 68 percent of people who responded to a MyPyramid website satisfaction survey reported that the website had prompted them to take action regarding their health. When asked why they had visited the website, the most frequent response was to change their diet and eat healthier (USDA, 2006).

CHAPTER 10 - Study Description / Methodology

Assessment of Local Internet Use

Prior to development of *Food and Nutrition Bytes*, the 12 new online nutrition lessons, local internet usage was evaluated. To assess use, Shawnee County EFNEP clients enrolled during the 2005-2006 reporting year were surveyed on their use of the internet, what internet speed they used, and if they were interested in online nutrition lessons (see Appendix A).

Design of Food and Nutrition Bytes Curriculum

Twelve lessons were developed for the *Food and Nutrition Bytes* curriculum: *MyPyramid Basics; Calories In, Calories Out; Grains; Vegetables; Fruits; Dairy; Meat and Beans; Fats, Sweets, and Salt; Shopping; Cooking; Food Safety; and Feeding Kids*.

The lessons were adapted from the adult EFNEP curriculum developed by Iowa and Kansas State Universities (unpublished) and from the 2005 Dietary Guidelines (USDA, 2005) and MyPyramid Food Guidance System (USDA-CNPP, 2005). Each lesson contained nutrition information related to the topic, shopping tips, food preparation tips, food safety guidelines, and parenting tips related to child feeding and family mealtime.

Because many nutrition and food preparation terms are difficult in terms of literacy and readability, reading levels of each lesson were assessed. To do this, transcripts of the text

portions of the lesson were put into Microsoft Word documents, and the transcripts were then measured for reading levels. Each lesson was evaluated using an online Simple Measure of Gobbledygook, or SMOG, calculator (McLaughlin, 1969; WordsCount, 2007), and also using calculations with the Gunning-Fox literacy formula (Miller, 2001).

The SMOG reading level measures the number of three-syllable or difficult words within a document. A document has a sixth grade reading level if it has no more than seven to 12 difficult words within 30 sentences of text (Utah University Healthcare, n.d.).

The Gunning-Fox literacy formula determines reading level by measuring the number of three-syllable words and also the average number of words in a sentence within approximately 100 words of text. Difficult words are only counted the first time that they appear within the text measured. Other three-syllable words are eliminated if they are made up of two-syllable words and the endings: -s, -es, -'s, -ed, -er, -ing, -est or -ly (Miller, 2001).

To further enhance readability, text content of each new lesson was formatted with topic headings, short sentences and bulleted informational points (Bakker, 1998). Graphics and pictures were also added to each lesson that related to the particular topic discussed. The graphics and pictures used were downloaded from the Food Stamp Nutrition Connection website (USDA-Food Stamp Nutrition Connection, 2007b), USDA website (USDA-Agricultural Research Service, 2006), Food and Health Communications website (Food and Health Communications, n.d.), and Microsoft clipart web pages (Microsoft Office Online, 2007).

To simulate the flip charts that are used in traditional EFNEP individual lessons, the online lessons were formatted into Microsoft Power Point presentations (see Appendix B) and then recorded using *Camtasia Studio 3* software (Techsmith Camtasia Studio, 2005). Voice narration was added during recording, and callouts, which are comment boxes that fade in and out of slides, were also added as necessary to help the client follow important points within each lesson. The narrated script matched the written text for the most part to help with client concentration (Agnew, Kellerman, & Meyer, 1996). The lessons were then produced for online viewing on K-State Online (Kansas State University, 2005).

See Appendices B-1 and B-2 for directions to run, view, and hear a sample *Food and Nutrition Bytes* lesson.

When each lesson file was opened, the particular lesson was loaded into an internet browser and began playing. The slides transitioned automatically, similar to the nutrition

paraprofessional turning the pages of the flip chart as a lesson progressed. The lesson could be stopped and restarted using the tool bar at the bottom of the screen.

Each lesson was limited in length to eight to 11 minutes because people tend to learn less after sitting for 15 minutes (Norris, 2003). Also, since longer lessons require more storage for the video file, larger files may take longer to load on older computers.

The new online lessons were designed to include visual, auditory, and kinesthetic activities to address the learning styles of different clients (Norris, 2003). Clients engaged in interactive activities, and were encouraged to access other website links and try new recipes.

The online lessons differ from group and individual lessons because clients will be learning on their own, online. When the curriculum is launched, each client will be able to work at his or her own pace but will be encouraged to complete one lesson module per week. Each module contains the lesson video, educational handouts, a list of vocabulary words and definitions, worksheets, links to other websites, recipes, and videos of tips and techniques from *Kids a Cookin'*, a Kansas State University food and nutrition education program for parents, children and educators (Kansas Family Nutrition Program, 2006). Once completing a module, clients will be encouraged to set goals and to work on these goals between lessons. The EFNEP nutrition paraprofessional will serve in a support role answering questions through telephone calls, e-mail and regular mail rather than as an on-site educator. Therefore, the online lessons modules must provide all of the necessary information that clients may need as they learn.

Participants

The research study design was sent to the Kansas State University Committee on Research Involving Human Subjects for approval before use, and an exemption was requested since EFNEP has a long history of gathering client data. The exemption was granted. Informed consent was obtained from clients and professionals responding to the study's surveys.

Given the transience of and difficulty in reaching low-income participants, convenience samples of EFNEP clients and potential clients were used. Convenience samples of professionals who serve EFNEP clients directly or indirectly were also used in deference to their work schedules and time commitments. Clients were recruited through community partnerships, other EFNEP Extension Agents, regularly scheduled EFNEP group lessons, and on-site marketing at social service agencies. Cookbooks were distributed to clients as an incentive for completing the

survey. Professionals were recruited through scheduled meetings and programs. Study participants viewed one lesson and then completed a survey.

Assessment of *Food and Nutrition Bytes* Curriculum

Three surveys were developed: one for current EFNEP clients, one for potential clients, and one for professionals (see Appendices C, D and E). The survey for current and potential clients included demographic questions, and what type of class format that they preferred (individual, group or internet), and why. The survey for professionals included questions about the clients that they serve and also their particular profession.

Surveys were designed to assess respondents' perceptions about several attributes of the lessons, including ease of understanding, appropriateness of the pictures and graphics, usefulness of voice narration, usefulness of the information provided, length of lesson, and amount of information.

The surveys were reviewed by a Kansas State University Extension Nutrition Specialist, the Kansas EFNEP coordinator, a Kansas county Extension agent with experience in health and nutrition literacy, and two EFNEP paraprofessionals. Minor adjustments were made for clarity.

Surveys were completed in small groups or in one-on-one settings in a semi-structured format. To assist with reading and understanding, survey questions were read to one-on-one EFNEP clients and potential clients, and responses were recorded on the forms by the interviewer. Clients in small groups completed the surveys themselves, and the interviewer reviewed the surveys when collected to clarify answers and obtain missing data, if possible. Verbal comments made about the lessons were also recorded on the survey forms by the interviewer. Professionals also completed their surveys in small groups or one-on-one settings in a semi-structured format. If time permitted, the particular lesson was discussed with professionals, and the interviewer recorded verbal comments on the survey forms.

Each survey included a five-point Likert scale to rate the various lesson attributes (see Table 1). The Likert scale was chosen for a number of reasons. First, this tool measures respondents' attitudes and provides information that is easy to standardize for statistical measure (Waddington, 2000). Also, it is relatively easy for clients to complete, even if they had low-literacy reading skills. In addition, the Likert scale can be quickly administered when there are time constraints with both clients and professionals, and when the interviewer is inexperienced.

Table 1. Likert scale ratings used to assess Food and Nutrition Bytes lessons

Response Scale	Easy to Understand	Helpful Pictures	Helpful Audio	Usefulness of Topic	Length of Lesson	Amount of Information
1	Not At All	Not At All	Not At All	Not At All	Too Short	Too Much
2	Not Very	Not Very	Not Very	Not Very Useful	Somewhat Short	Somewhat Too Much
3	Somewhat	Somewhat	Somewhat	Somewhat Useful	Just Right	Just Right
4	Easy	Helpful	Helpful	Useful	Somewhat Long	Missing Some
5	Very Easy	Very Helpful	Very Helpful	Very Useful	Too Long	Missing A Lot

Open-ended questions were also added to each question section to probe for further information and to allow for all client and professional comments.

Data Analysis

Frequencies were analyzed by Statistical Package for the Social Sciences 12.0 statistical software. Likert scale data for clients were compared to those for professionals using the Mann-Whitney *U* Test. This test is appropriate for non-parametric data that are non-normally distributed and include continuous dependent variables that are discrete numbers, such as those in a Likert rating, where the two data samples are independent of each other (Morgan, Leech, Gloeckner, & Barrett, 2004). Data were considered significantly different if the p value was less than or equal to 0.05. Client data from two larger samples, namely, the *Grains* and the *Cooking* lessons, were analyzed for within-sample associations using Kendall’s tau-b. This test is used on nonparametric data in which the values are ordered (Agresti & Finlay, 1997). Associations measured included age, gender, education, and race and were considered significant if the p value was less than or equal to 0.05.

Comments on all surveys were reviewed and common themes were summarized.

CHAPTER 11 - Results

Local Internet Usage of Shawnee County EFNEP Clients

During the 2005 to 2006 EFNEP reporting year, Shawnee County EFNEP had a total of 451 clients with 313 new clients enrolled during this reporting year. Of the total 451, 42 percent were Hispanic, 40 percent were white, 14 percent were black, two percent were American Indian, and two percent were Asian or Hawaiian or Pacific Islander.

According to 2005 U.S. Census Bureau data, 86 percent of total Shawnee County residents were white, 9.1 percent were black, 1.4 percent were American Indian, 1.1 percent were Asian, 0.1 percent were Hawaiian or Pacific Islander and 2.3 percent reported two or more races. White people who were not Hispanic totaled 78.6 percent, and 8.4 percent of Shawnee County residents reported that they were Hispanic (U.S. Census Bureau, 2005).

A total of 269 Shawnee County EFNEP clients were surveyed on their internet usage during the 2005 to 2006 reporting year. Incarcerated clients were not surveyed because they do not have access to the internet. Ten client surveys were not available for review.

With the help of a bilingual paraprofessional, 76 (28 percent of the total surveyed) Spanish-speaking-only clients reported that they did not use the internet. Another 13 (5 percent) did not report whether or not they used the internet but they did report that they were not interested in taking nutrition lessons online. Two (1 percent) did not answer the question. Eighty-five percent of Spanish-speaking-only clients had less than a 12th grade education and 37 percent had a sixth grade education or less.

A total of 178 (66 percent of the total) English-speaking clients were surveyed. Seventy-four (28 percent) reported that they did not use the internet, and 29 (11 percent) did not answer the question. Seventy-five clients (28 percent of the total surveyed) had access to the internet. Of the 75 clients who used the internet, 23 (31 percent) were male and 52 (69 percent) were female (see Figure 2). Thirty-three (44 percent) were between 18 to 30 years, 23 (31 percent) were between the ages of 31 and 40, 16 (21 percent) were between the ages of 41 to 50, and 3 (4 percent) were between the ages of 51 to 60.

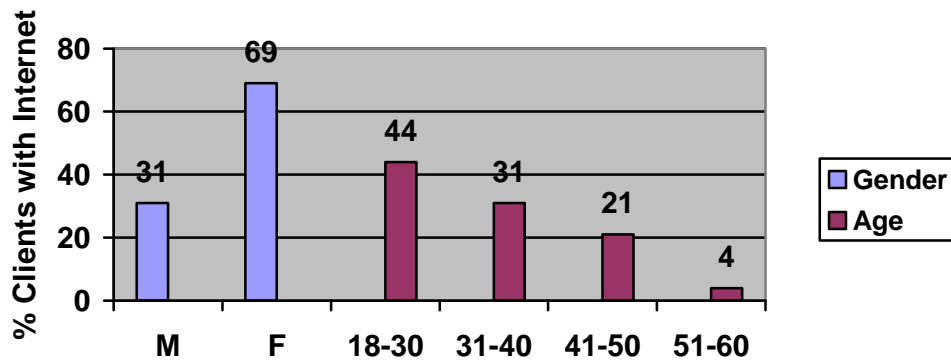
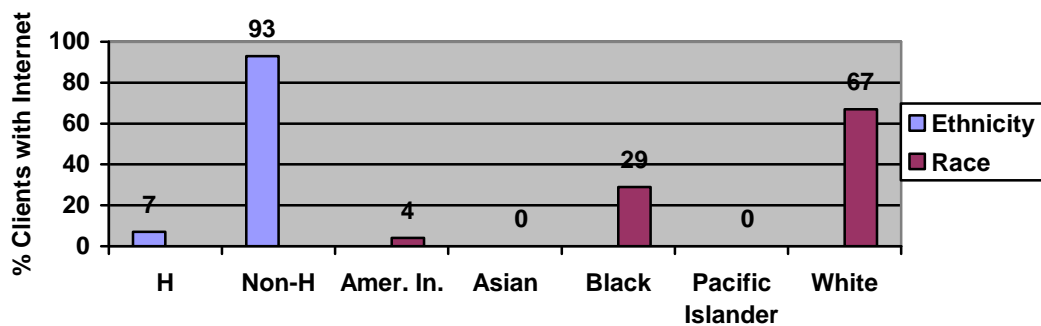


Figure 2. Gender and age (in years) of Shawnee County EFNEP clients with internet access

In terms of ethnicity of 75 Shawnee County EFNEP internet users, five (seven percent) were English-speaking Hispanics, and 70 (93 percent) were non-Hispanic (see Figure 3). Three (four percent) were American Indian, 22 (29 percent) were black and 50 (67 percent) were white. None were Asian nor Hawaiian or Pacific Islander.



H-Hispanic
Non-H-Non-Hispanic
Amer. In.-American Indian

Figure 3. Ethnicity and race of Shawnee County EFNEP clients with internet access

A total of 37 (49 percent) clients had completed high school or equivalent (see Figure 4). Nineteen clients (25 percent) had less than a high school education, and 19 had completed some college or higher level of education.

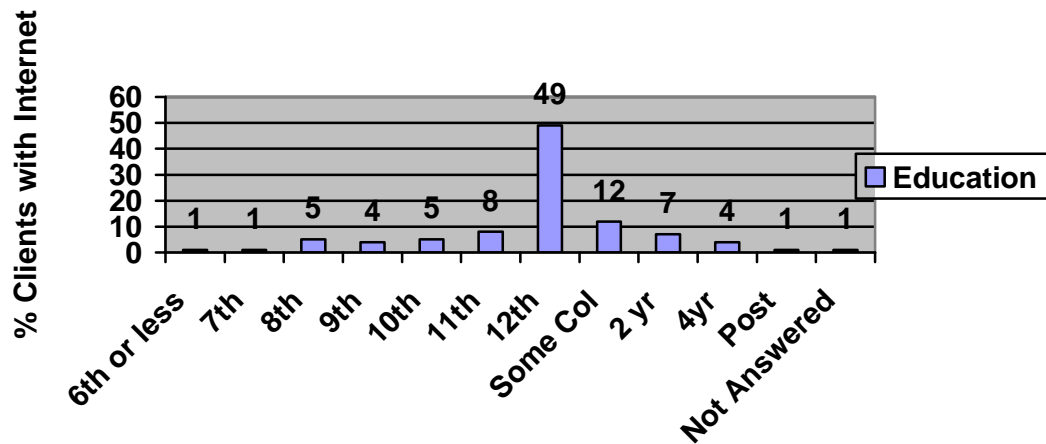


Figure 4. Education levels in grades of Shawnee County EFNEP clients with internet access

Fifty-two (69 percent) clients surveyed indicated that they had a high speed internet connection (see Figure 5). Only four (5 percent) had dial-up, and 19 (25 percent) did not indicate the type of connection that they had.

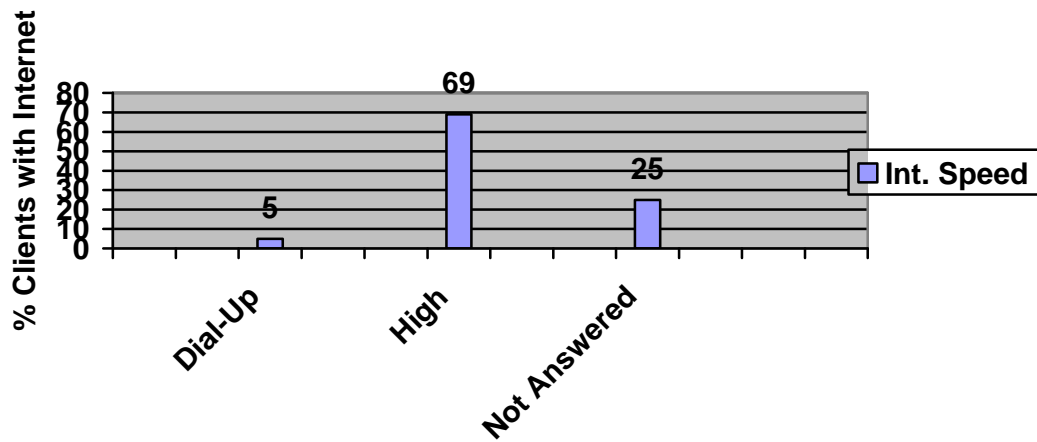


Figure 5. Internet speed used by Shawnee County EFNEP clients

Forty-one clients (55 percent) indicated that they were interested in taking online nutrition lessons, 29 (39 percent) indicated that they were not interested, and five (7 percent) did not answer the question (see Figure 6).

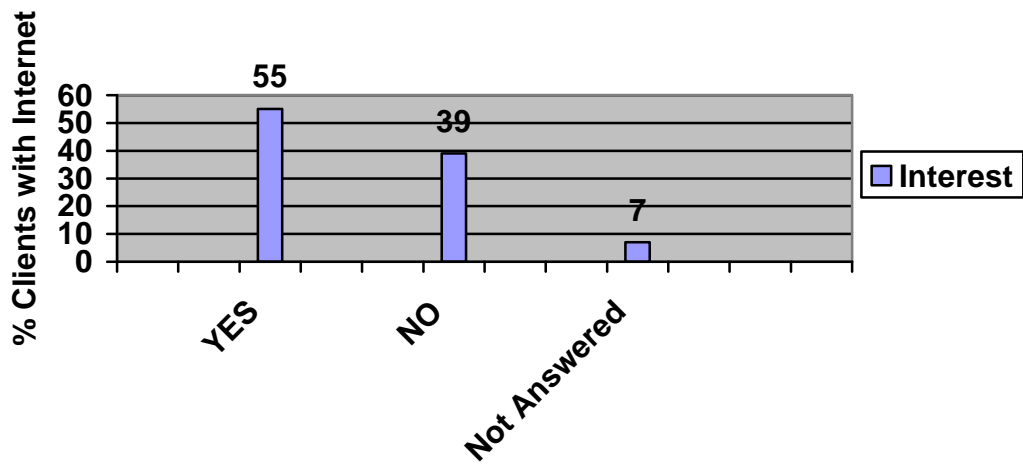


Figure 6. Interest of Shawnee County EFNEP clients in taking online nutrition lessons

Reading Levels of *Food and Nutrition Bytes* Lessons

Reading levels of the eight to 11 minute lessons were targeted for a sixth to eighth grade level. According to the SMOG reading level, only four lessons (*Meat and Beans; Shopping; Food Safety, and Feeding Kids*) met the targeted reading levels (see Table 2). All of the lessons met the targeted reading levels when the Gunning-Fox formula was used.

Table 2. Reading levels of online EFNEP lessons

Name of Lesson	Reading Grade Level Calculated by SMOG Online Calculator	Reading Grade Level Calculated by Gunning-Fox Formula
MyPyramid Basics	8.9	7.0
Calories In, Calories Out	9.9	7.4
Grains	8.4	7.0
Vegetables	9.6	6.7
Fruits	8.9	6.5
Dairy	8.5	7.8
Meat & Beans	7.7	6.1
Fats, Sweets, & Salt	9.6	8.0
Shopping	7.6	5.7
Cooking	8.8	6.3
Food Safety	7.4	5.8
Feeding Kids	7.4	5.4
Average	8.56	6.64

Description of Clients and Professionals Surveyed

Surveys were completed in Crawford, Douglas, Riley, Sedgwick, Shawnee, and Wyandotte counties. A total of 88 people from the EFNEP target audience were surveyed after they viewed one lesson. Nine potential clients were not enrolled in EFNEP. Clients were reached at agencies where they accessed services, such as substance abuse treatment centers, correctional facilities, job training sites and education programs (see Table 3).

Table 3. Numbers and location of participating EFNEP and potential clients, by lesson

Name of Lesson	Sample Size		Agency	Location
MyPyramid Basics	5	5	Women’s Recovery Center	Sedgwick County
Calories In, Calories Out	6	7	Women’s Recovery Center SRS ¹ Office	Crawford County Shawnee County
Grains	10	15	YWCA Career Assistance Job Success Welfare-to- Work Program	Shawnee County
Vegetables	5	5	Job Success Welfare-to- Work Program	Shawnee County
Fruits	3	3	Head Start	Shawnee County
Dairy	7	7	Community Corrections	Sedgwick County
Meat & Beans	4	6	Job Success Welfare-to- Work Program SRS ¹ Office	Shawnee County
Fats, Sweets, & Salt	5	5	Job Success Welfare-to- Work Program	Shawnee County
Shopping	5	6	Job Corp Job Training EFNEP one-on-one client	Riley County Wyandotte County
Cooking	22	23	Parallax Substance Abuse Center SRS ¹ Office	Sedgwick County Shawnee County
Food Safety	4	4	Wichita Area Vocational Technical School GED Program	Sedgwick County
Feeding Kids	2	2	SRS ¹ Office	Shawnee County
Total Clients		88		

SRS-Social and Rehabilitation Services

Table 4 provides a summary of the demographics of clients surveyed. Sixty-five percent were female and 35 percent were male. Data were missing on gender for five participants. Fifty-three percent were age 30 or younger, and 47 percent were over 30 years. Data were missing on age for 11 participants. Regarding education, 30 percent had less than a high school diploma and 70 percent had a high school diploma or higher. Data on education were missing for 11 participants. Ninety percent of participants were non-Hispanic, with data missing on ethnicity on seven participants. Sixty-four percent were white, 25 percent were black, nine percent were American Indian, and two percent were Pacific Islander. Data on race were missing from seven participants.

Table 4. Demographics of EFNEP and potential clients, by lesson

Name of Lesson	Sample Size	Gender		Age in Years		Grade		Ethnicity		Race				
		M	F	≤ 30	> 30	< 12	≥ 12	H	NON-H	W	B	AI	A	PI
MyPyramid Basics	5	0	5	2	2	3	2	0	4	4	0	0	0	0
Calories In, Calories Out	7	0	7	1	5	2	5	1	6	6	1	0	0	0
Grains	15	5	10	7	7	1	13	2	13	9	4	1	0	1
Vegetables	5	3	1	2	2	3	1	0	4	3	1	0	0	0
Fruits	3	3	0	2	1	1	2	0	3	3	0	0	0	0
Dairy	7	2	5	4	3	1	6	1	6	3	3	1	0	0
Meat & Beans	6	1	4	4	1	5	1	0	6	3	3	0	0	0
Fats, Sweets, & Salt	5	1	4	1	4	0	4	1	4	3	1	1	0	0
Shopping	6	0	6	4	1	0	4	1	4	3	1	1	0	0
Cooking	23	12	8	9	9	5	13	1	19	12	4	3	0	1
Food Safety	4	2	2	3	1	1	2	0	3	2	1	0	0	0
Feeding Kids	2	0	2	2	0	1	1	0	2	1	1	0	0	0
TOTALS	88	29	54	41	36	23	54	7	74	52	20	7	0	2
PERCENTAGES		35	65	53	47	30	70	10	90	64	25	9	0	2

H-Hispanic
 Non-H-Non-Hispanic
 W-White
 B-Black
 AI-American Indian
 A-Asian
 PI-Pacific Islander

Eighty-one professionals who serve EFNEP clients directly or indirectly were surveyed after they viewed one lesson. They included: 16 community volunteers, 12 EFNEP paraprofessionals, eight home visitors, seven Family and Consumer Sciences professionals and teachers, seven Parents as Teachers Educators, six Extension Agents, four Social Services professionals, four Head Start Family Services staff, three public health dietitians, three Food Stamp Nutrition Education staff, two public health nurses, two Community Action staff, one Kansas State University nutrition specialist, one Social and Rehabilitation Services professional, the Kansas EFNEP Coordinator, one Food Stamp Nutrition Education program assistant, one health department professional, one Health and Wellness Coordinator, and one clinical nurse (see Table 5).

Table 5. Numbers and locations of participating professionals, by lesson

Name of Lesson	Sample Size		Agency Name	County Location	Occupations
MyPyramid Basics	1 1	2	None	Riley Shawnee	FCS ¹ Teacher EFNEP Coordinator
Calories In, Calories Out	2 1 1	4	Wyandotte County EFNEP	Wyandotte	Extension Agent Program Assistant EFNEP Paraprofessional
Grains	3 2 2 1	8	Lifestyle Improvement Coalition	Shawnee	Social Service Public Health RD ² Community Volunteer Health/Wellness Coordinator
Vegetables	1 4	5	Sedgwick County EFNEP	Sedgwick	Extension Agent EFNEP Paraprofessional
Fruits	1 3	4	Head Start EFNEP	Shawnee	Family Services EFNEP Paraprofessional
Dairy	3 2 1 1 1	8	Topeka Association of Family and Consumer Sciences	Shawnee	Teachers FCS ¹ Professional Retired Public Health RD ² Community Volunteer
Meat & Beans	7 1 8 1 2 2 1	22	Home Visitation Action Team	Shawnee	Parents as Teachers Health Department Home Visitor Social Service Public Health Nurse Community Action SRS ³ Professional
Fats, Sweets, & Salt	3	3	Head Start	Shawnee	Family Advocates
Shopping	3 1 1	5	Kansas State University- Nutrition EFNEP	Riley Wyandotte	Food Stamp Nutrition Staff Nutrition Specialist EFNEP Paraprofessional
Cooking	10	10	Master Food Volunteers	Douglas	Community Volunteers
Food Safety	2 3 1	6	Program Development Committee	Shawnee	Extension Agent Community Volunteers Nurse
Feeding Kids	1 3	4	Crawford County EFNEP	Crawford	Extension Agent Paraprofessionals
Total		81			

¹FCS-Family and Consumer Sciences

²RD-Registered Dietitian

³SRS-Social and Rehabilitation Services

Perceived Understanding, Acceptance, and Usefulness of *Food and Nutrition Bytes Curriculum*

Overall, 10 of 12 *Food and Nutrition Bytes* lessons were perceived by both clients and professionals as being easy to understand, with helpful pictures and audio, and useful information, and also were optimal in length and amount of information. One client who viewed the *Shopping* lesson had this comment: “You got every topic with pictures and power points in eight minutes. You can’t beat that. Thank you!”

Two lessons, *MyPyramid Basics* and *Feeding Kids*, were withdrawn from further analysis after initial evaluations and comments revealed the content was too general to be useful.

Five EFNEP clients in a substance abuse program evaluated the *MyPyramid Basics* lesson. Only two of the five found the lesson “Easy” to understand. Two rated it “Not At All” easy to understand and one person rated it “Somewhat” easy. Both professionals who rated the lesson described it as “Easy” to understand but one noted that more explanation may be necessary to explain the MyPyramid food group slogans.

Two clients reviewed the *Feeding Kids* lesson and, while they both rated it “Easy” to understand, neither had children in the age ranges discussed. One noted that she wanted more information for feeding her toddler. Four professionals also rated the lesson similarly, and made the suggestions of being more specific for feeding guidelines by age.

For the 10 lessons retained in the study, the average rating by the clients and professionals groups for each attribute of each lesson was at the first or second most-desirable rating. The only exception was for the usefulness of information rating for the *Food Safety* lesson which was slightly lower. Indeed, individual ratings by clients and professionals for each attribute of the 10 lessons were also generally high. Only one client rated one lesson at the lowest rating, and for just one attribute, but rated the rest of the attributes at the first most-desirable rating. Similarly, one professional ranked one attribute of one lesson with the least-desirable rating. She commented that she serves Spanish-speaking clients and they do not have internet access so the lesson is not useful to them. Another professional also rated another lesson as “Too Short” in length but did not comment on the reason for the rating.

Calories In, Calories Out Lesson

Seven low-income client participants evaluated the *Calories In, Calories Out* lesson. Four of the seven rated this lesson as “Very Easy” to understand, two rated it as “Easy” and one rated it “Somewhat” easy to understand (see Figure 7). Three of six rated the pictures as “Helpful” and two rated them “Very Helpful” in understanding the lesson. One participant did not rate the pictures. Four found the voice narration “Helpful,” and three rated it “Very Helpful” in following the lesson. Three found that the information presented was “Useful,” two found it “Very Useful” and two found it “Somewhat Useful.” Six found the length of the lesson to be “Just Right,” and all seven rated the amount of information “Just Right.”

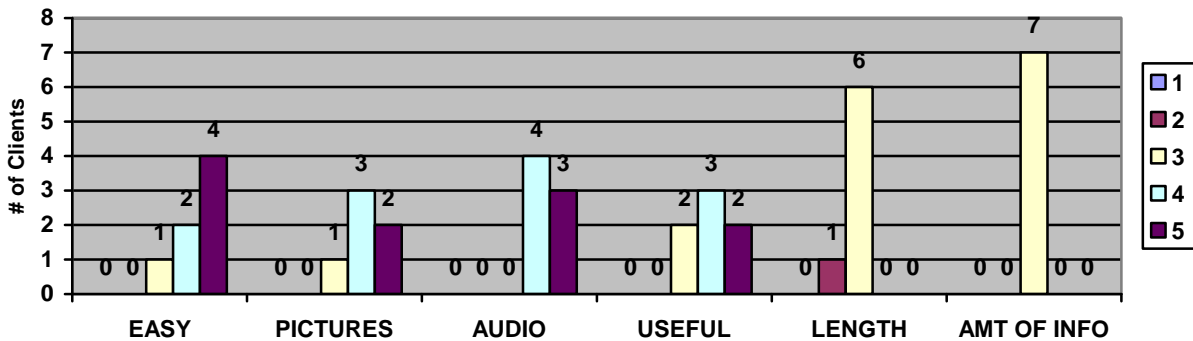


Figure 7. Clients' Likert scale frequency data for attributes of Calories In, Calories Out lesson, N=7

Two of the four professionals rated the *Calories In, Calories Out* lesson as “Easy” to understand, one rated it “Very Easy,” and one rated it “Somewhat” (see Figure 8). Three rated the pictures as “Helpful” in understanding the lesson. Two rated the voice narration “Very Helpful” in following the lesson, one rated it “Helpful,” and one rated it as “Somewhat” helpful with a comment that more enthusiasm was needed in the tone of voice. Two rated the information presented as “Useful.” All four found the length of the *Calories In, Calories Out* lesson and the amount of information to be “Just Right.”

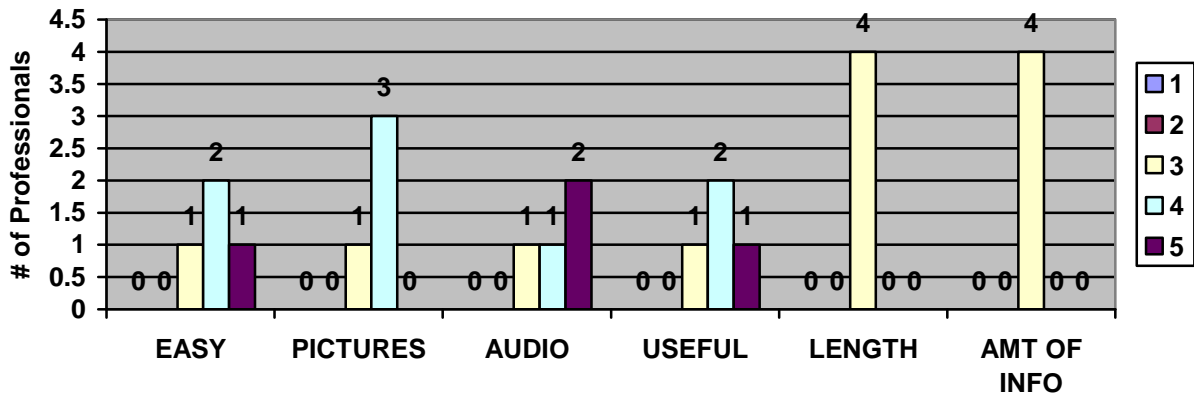


Figure 8. Professionals' Likert scale frequency data for attributes of Calories In, Calories Out lesson, N=4

Grains Lesson

Fifteen low-income participants evaluated the *Grains* lesson. Ten of 15 rated this lesson as “Very Easy” to understand, three found it “Easy”, one found it “Somewhat” easy, and as noted previously, one client rated is as “Not At All” easy to understand (see Figure 9). Nine of 14 rated the pictures as “Very Helpful” in understanding the lesson. One participant did not rate the pictures. Ten of 15 found the voice narration “Very Helpful” in following the lesson, and nine found the information presented as “Very Useful.” Eleven found the length of the lesson to be “Just Right,” and 14 rated the amount of information as “Just Right.”

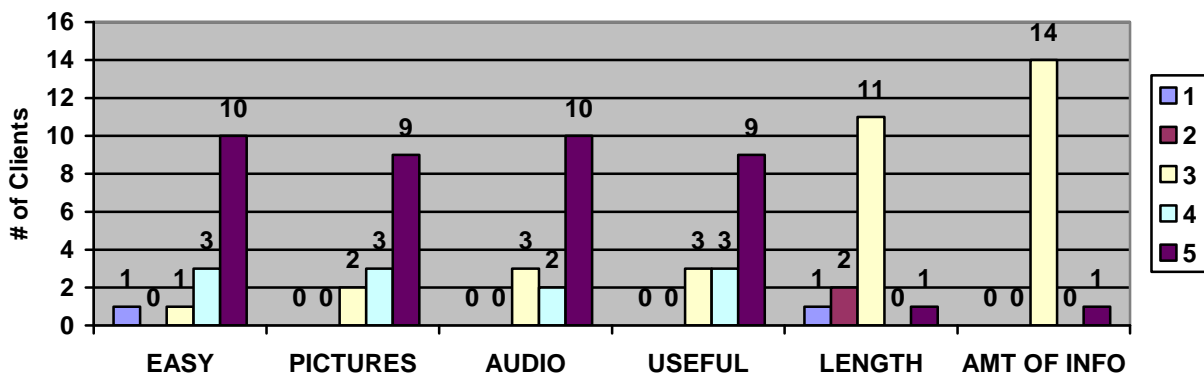


Figure 9. Clients' Likert scale frequency data for attributes of Grains lesson, N=15

Five of eight professionals rated the *Grains* lesson as “Easy” to understand, and two found the lesson “Very Easy” (see Figure 10). Four rated the pictures as “Helpful” in

understanding the lesson, and three rated them “Very Helpful.” One professional rated the pictures as “Not Very” helpful with the comment that more pictures were needed. Five found the voice narration “Very Helpful” in following the lesson, and four of seven found the information presented as “Very Useful.” One participant did not rate the usefulness. All eight found the length of the lesson to be “Just right,” and five of seven found the amount of information was “Just Right.” One participant did not rate the amount of information.

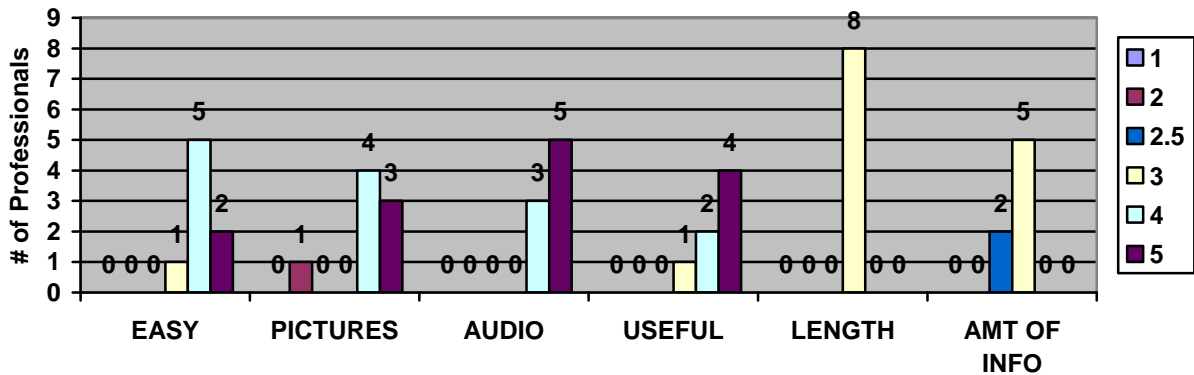


Figure 10. Professionals' Likert scale frequency data for attributes of Grains lesson, N=8

Vegetables Lesson

Five low-income participants evaluated the *Vegetables* lesson. Four of five rated this lesson as “Very Easy” to understand, rated the pictures as “Very Helpful” in understanding the lesson, found the voice narration to be “Very Helpful” in following the lesson, and rated the information presented as “Very Useful” (see Figure 11). Three of five found the length of the lesson to be “Just Right,” and all five found the amount of information was “Just Right.”

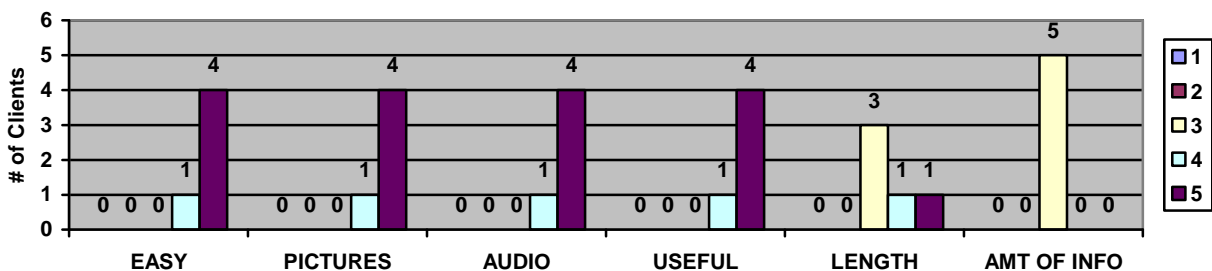


Figure 11. Clients' Likert scale frequency data for attributes of Vegetables lesson, N=5

Four of five professionals rated the *Vegetables* lesson as “Very Easy” to understand (see Figure 12). Three of five rated the pictures as “Helpful” in understanding the lesson, and two rated them as “Very Helpful.” Three of five found the voice narration “Very Helpful” in following the lesson, and all five found the information presented was “Very Useful.” Four of five found the length of the lesson to be “Just Right,” and all five found the amount of information was “Just Right.”

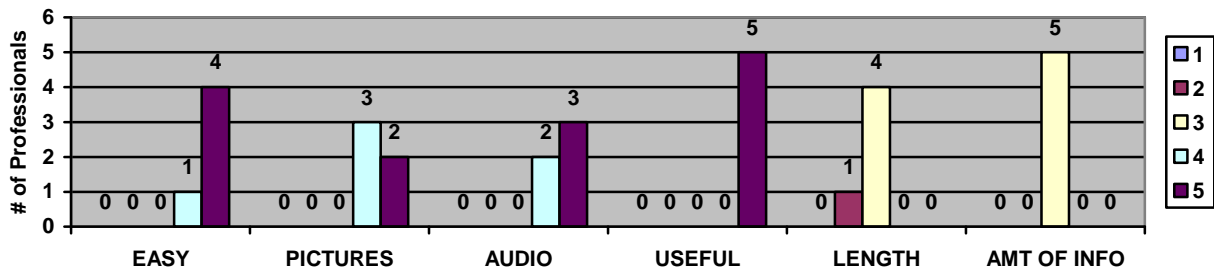


Figure 12. Professionals' Likert scale frequency data for attributes of Vegetables lesson, N=5

Fruits Lesson

Three low-income clients evaluated the *Fruits* lesson. All three rated this lesson as “Very Easy” to understand, and the pictures as being “Very Helpful” in understanding the lesson (see Figure 13). They all found the voice narration “Very Helpful” in following the lesson and the information presented as “Very Useful.” All three found the length of the lesson and the amount of information was “Just Right.”

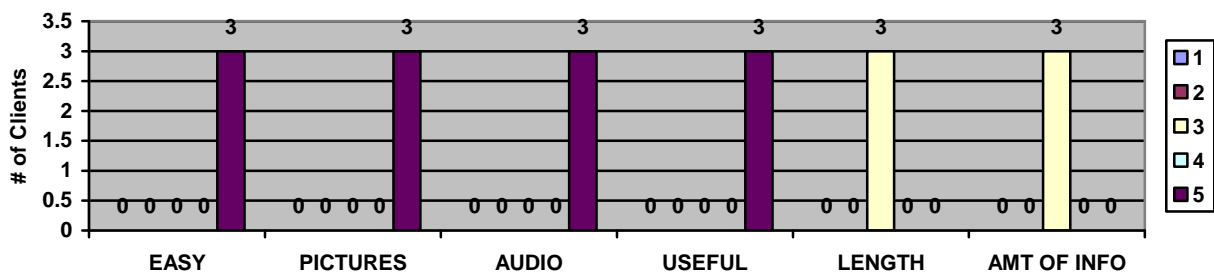


Figure 13. Clients' Likert scale frequency data for attributes of Fruits lesson, N=3

Three of four professionals rated the *Fruits* lesson as “Very Easy” to understand, and the pictures “Very Helpful” in understanding the lesson (see Figure 14). All four found the voice narration “Very Helpful” in following the lesson and the information presented as “Very Useful.” All also found the length of the lesson and amount of information was “Just Right.”

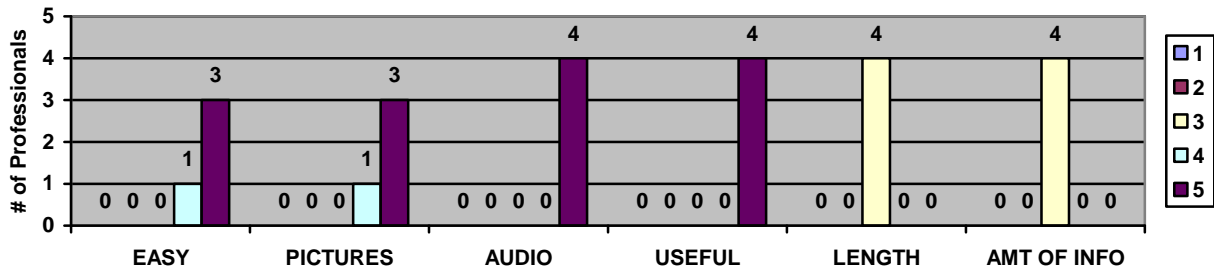


Figure 14. Professionals' Likert scale frequency data for attributes of Fruits lesson, N=4

Dairy Lesson

Seven low-income participants evaluated the *Dairy* lesson. Five of seven rated this lesson as “Very Easy” to understand (see Figure 15). Three rated the pictures as “Very Helpful” in understanding the lesson, and two rated them as “Helpful.” Five of seven found the voice narration “Very Helpful” in following the lesson. Three found the information presented was “Very Useful” and two rated it as “Useful.” All seven found the length of the lesson to be “Just Right,” and six of seven found the amount of information was “Just Right.”

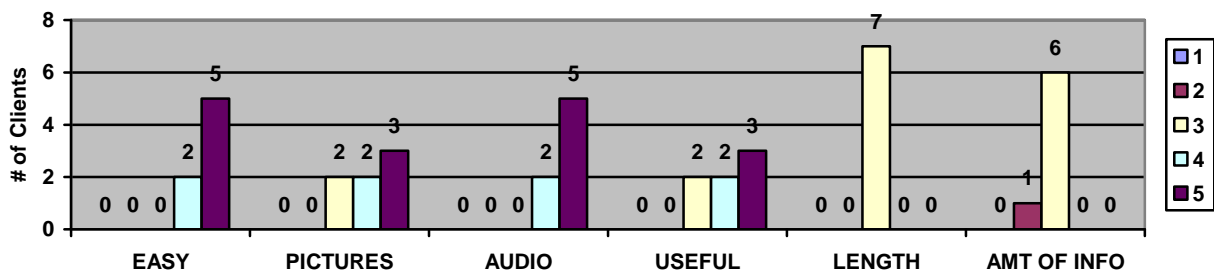


Figure 15. Clients' Likert scale frequency data for attributes of Dairy lesson, N=7

Four professionals rated the *Dairy* lesson as “Very Easy” to understand and four rated it as “Easy” to understand (see Figure 16). Five of seven rated the pictures “Helpful” in understanding the lesson and one rated them as “Very Helpful. One participant did not rate the

pictures. Six of eight found the voice narration “Helpful” in following the lesson and two rated it “Very Helpful.” Four of seven rated the information presented as “Useful,” and three rated it as “Very Useful.” One participant did not rate the usefulness of the information. All eight also found the length of the lesson as “Just Right,” and six of seven rated the amount of information as “Just Right,” with data missing from one professional on this question.

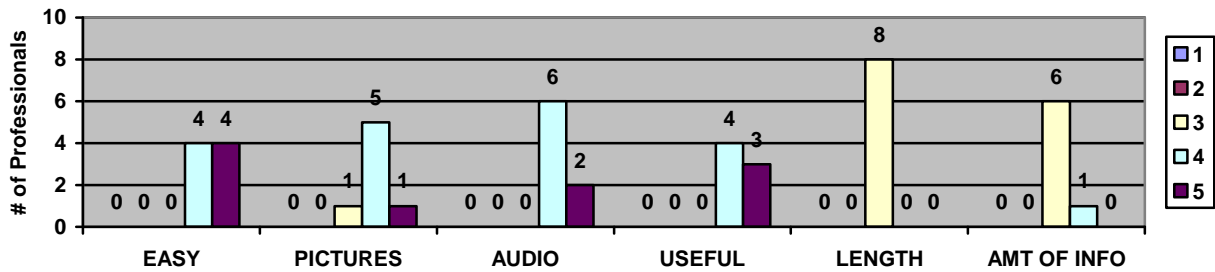


Figure 16. Professionals' Likert scale frequency data for attributes of Dairy lesson, N=8

Meat and Beans Lesson

Six low-income participants evaluated the *Meat and Beans* lesson. Three of the six rated this lesson as “Very Easy” to understand, and the remaining three rated it as “Easy” to understand (see Figure 17). Four rated the pictures “Helpful” in understanding the lesson and the remaining two rated them as “Very Helpful.” The voice narration was rated similarly. Five of six found the information presented to be “Very Useful,” and all six found the length of the lesson and the amount of information to be “Just Right.”

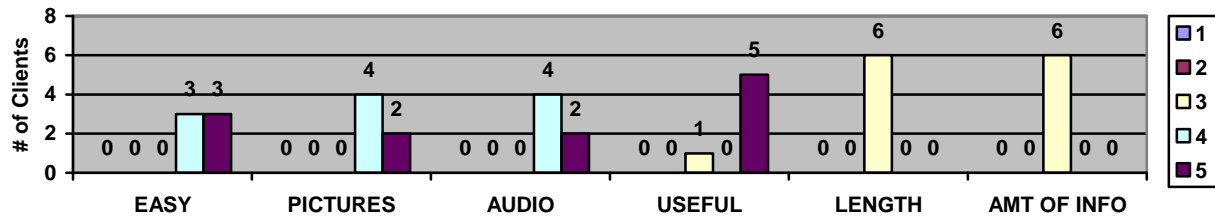


Figure 17. Client's Likert scale frequency data for attributes of Meat and Beans lesson, N=6

Thirteen of 22 professionals rated the *Meat and Beans* lesson as “Very Easy” to understand and nine rated it as “Easy” to understand (see Figure 18). Nine rated the pictures “Very Helpful” and another nine rated them “Helpful” in understanding the lesson. Eleven found the voice narration “Very Helpful” in following the lesson, and ten found the voice narration “Helpful.” Twelve rated the information presented as “Useful” while six rated it “Very Useful.” As noted, one rated it as “Not at All” useful because she only works with Spanish-speaking adults and they do not have access to the internet. Eighteen found the length of the lesson to be “Just Right,” and 16 of 21 rated the amount of information as “Just Right.” One professional did not rate the amount of information.

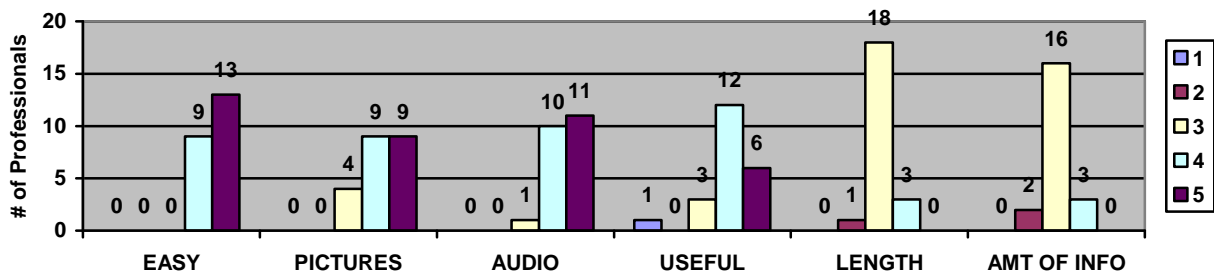


Figure 18. Professionals' Likert scale frequency data for attributes of Meat and Beans lesson, N=22

Fats, Sweets, and Salt Lesson

Five low-income participants evaluated the *Fats, Sweets, and Salt* lesson. Three of the five rated this lesson as “Easy” to understand, and two rated it as “Very Easy” to understand (see Figure 19). All five rated the pictures as “Very Helpful” in understanding the lesson, and three of five found the voice narration “Very Helpful” in following the lesson. Three found the information presented as “Very Useful,” and two rated it as “Somewhat” useful. Four found the length of the lesson to be “Just Right,” and all five found the amount of information “Just Right.”

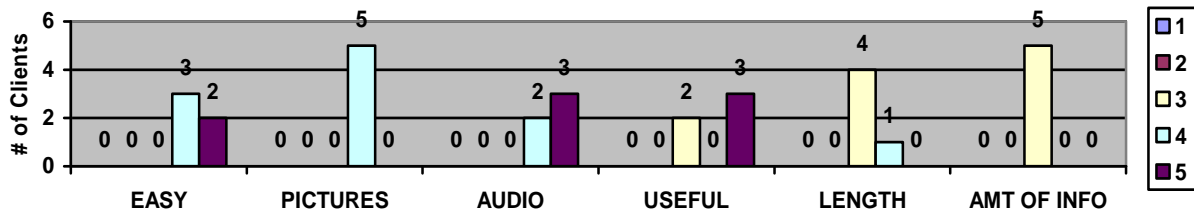


Figure 19. Clients' Likert scale frequency data for attributes of Fats, Sweets, and Salt lesson, N=5

Two of three professionals rated the *Fats, Sweets, and Salt* lesson as “Easy” to understand and one rated it as “Very Easy” (see Figure 20). All three rated the pictures as “Helpful.” Two found the voice narration “Helpful” in following the lesson and one found it “Very Helpful.” Two found the information presented “Very Useful” and one found it “Useful.” Two found the length of the lesson to be “Just Right,” and one rated it as “Somewhat Short.” All three rated the amount of information as “Just Right.”

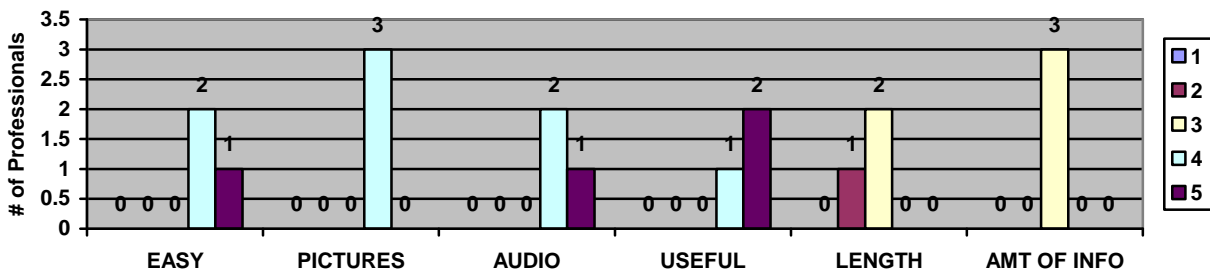


Figure 20. Professionals' Likert scale frequency data for attributes of Fats, Sweets, and Salt lesson, N=3

Shopping Lesson

Six low-income participants evaluated the *Shopping* lesson. Five of the six rated this lesson as “Very Easy” to understand (see Figure 21). Three rated the pictures “Very Helpful” in understanding the lesson, and two found the pictures “Helpful.” One participant did not rate the pictures. Three found the voice narration “Very Helpful” in following the lesson, and two found the narration “Helpful.” Three found the information presented as “Very Useful” and two found

the information “Useful.” All six found the length of the lesson and the amount of information to be “Just Right.”

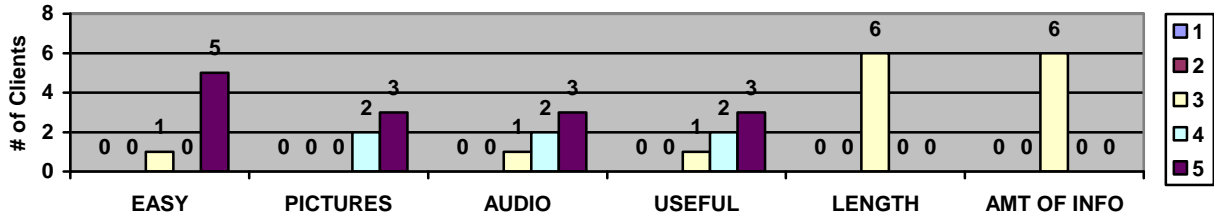


Figure 21. Clients' Likert scale frequency data for attributes of Shopping lesson, N=6

Four of five professionals rated the *Shopping* lesson as “Very Easy” to understand (see Figure 22). Three rated the pictures “Helpful” in understanding the lesson and the voice narration “Very Helpful” in following the lesson. All five found the information presented was “Very Useful” and the length of the lesson to be “Just Right.” Four rated the amount of information “Just Right.” One professional did not rate the amount of information.

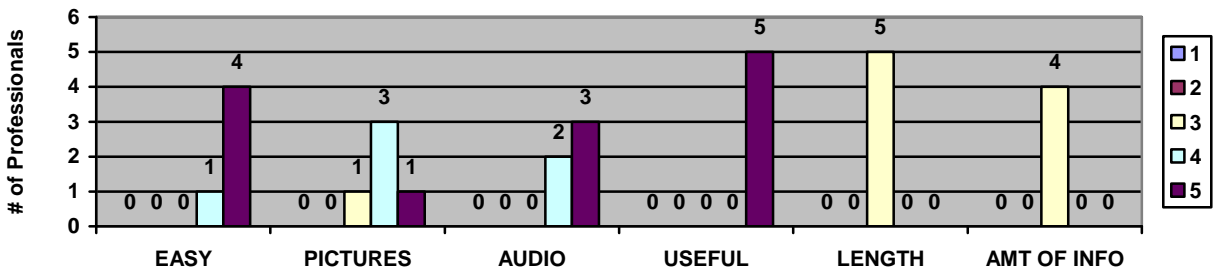


Figure 22. Professionals' Likert scale frequency data for attributes of Shopping lesson, N=5

Cooking Lesson

Twenty-three low-income participants evaluated the *Cooking Lesson*. Fifteen of 22 rated this lesson as “Very Easy” to understand (see Figure 23). Data were missing from one participant on this question. Twelve of 23 rated the pictures “Very Helpful” with understanding the lesson, and seven found them “Helpful.” Thirteen found the voice narration “Very Helpful” with following the lesson, and 11 found the information presented “Very Useful.” Eighteen

found the length of the lesson to be “Just Right,” and 20 rated the amount of information “Just Right.”

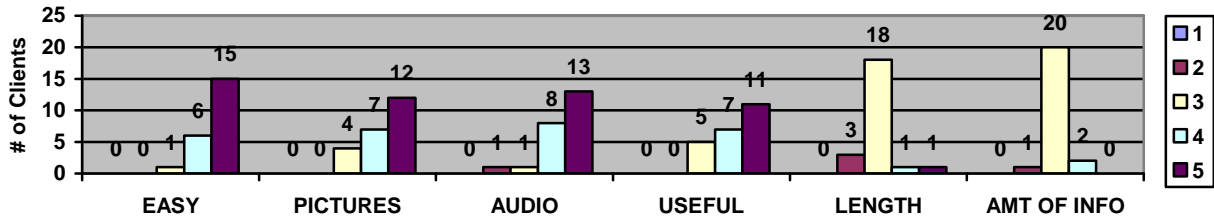


Figure 23. Clients' Likert scale frequency data for attributes of Cooking lesson, N=23

Five professionals rated the *Cooking* lesson as “Very Easy” to understand, and five rated it as “Easy” (see Figure 24). Five rated the pictures “Very Helpful” with understanding the lesson, and four rated them “Helpful.” Eight found the voice narration “Very Helpful” with following the lesson. Five found the information presented “Very Useful,” and four found the information “Useful.” One professional did not rate the usefulness of the lesson. Nine found the length of the lesson to be “Just Right,” and seven rated the amount of information “Just Right.”

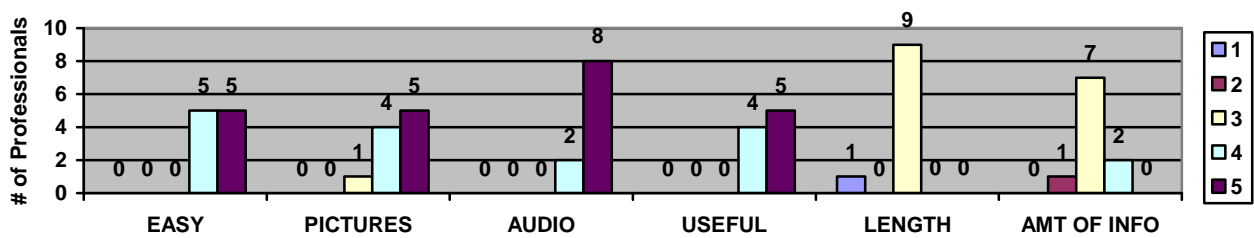


Figure 24. Professionals' Likert scale frequency data for attributes of Cooking lesson, N=10

Food Safety Lesson

Four low-income participants evaluated the *Food Safety* lesson. Three rated this lesson as “Very Easy” to understand (see Figure 25). Two rated the pictures “Very Helpful” with understanding the lesson, and one rated them “Helpful.” Two found the voice narration “Very Helpful” with following the lesson, and two found it “Helpful.” Two found the information

presented “Somewhat” useful, one found it “Useful” and one found it “Very Useful.” One participant commented that this information was not new to him as he had already completed the EFNEP program. Two found the length of the lesson to be “Just Right,” one found it “Somewhat Short” and one found it “Too Long.” All four rated the amount of information “Just Right.”

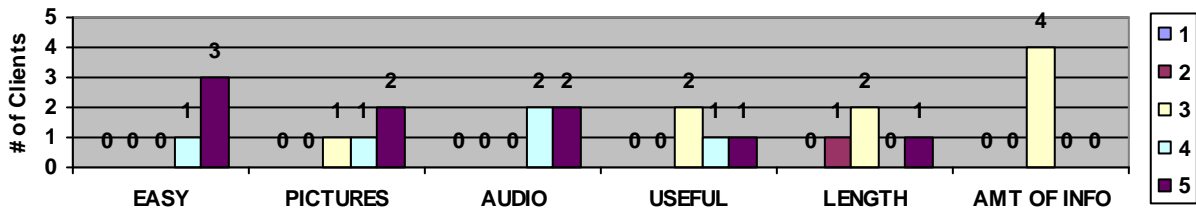


Figure 25. Clients' Likert scale frequency data for attributes of Food Safety lesson, N=4

Four of six professionals rated the *Food Safety* lesson as “Very Easy” to understand, and two rated it “Easy” (see Figure 26). Five rated the pictures “Helpful” with understanding the lesson, and five found the voice narration “Very Helpful” with following the lesson. Three found the information presented “Useful” and one found it “Very useful.” Two professionals did not answer this question. All six found the length of the lesson and the amount of information to be “Just Right.”

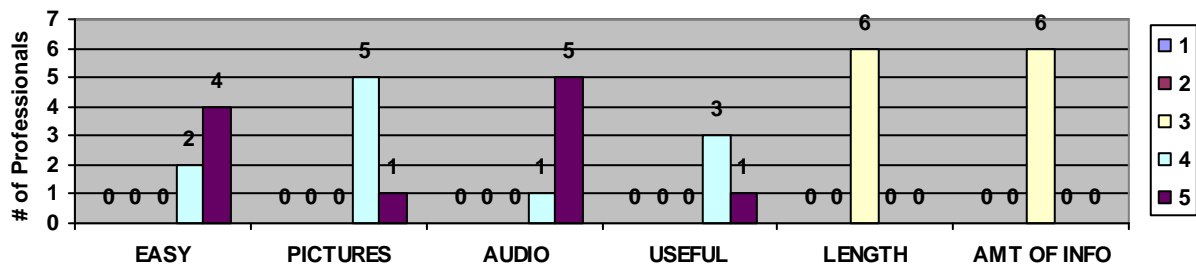


Figure 26. Professionals' Likert scale frequency data for attributes of Food Safety lesson, N=6

Client and Professional Comments

Comments from clients were less in number than those from professionals. Twenty comments from clients expressed their interest in portion sizes and amounts. Six comments noted the usefulness of ideas for cooking with children in the *Cooking* lesson. In terms of suggestions for lesson improvements, a few clients noted that there were not very many pictures or graphics

or that the pictures and graphics did not make a difference in helping to understand the lesson. One client noted: “Pictures + Auto (sic) speaking = Excellent.” However, a few comments from professionals included adding more variety in the audio.

Professionals provided comments in regards to pictures and graphics and how important they are for the low-income audience in addition to the audio and text. Several suggested more pictures of portion sizes of foods as well as of cooking utensils and equipment, and of unit pricing. Three commented that the narration and slides were too fast. A few comments were that phrases and words that may be difficult to understand.

Differences between Clients and Professionals

The means and modes of the Likert data for each lesson were calculated (see Tables 6 and 7). The means of the Likert data are to be interpreted loosely because we cannot assume that the values between Likert ratings are equal (Lowry, 2007). For example, one person may have perceived a bigger difference between “Somewhat” and “Helpful” compared to another person. The mean is presented with the mode in order to provide a comparison between an average score and the score most often chosen. The mode was used to compare differences between client and professional scoring.

Table 6. Likert scale data of first four Likert scale questions: means and modes, by lesson

Name of Lesson	Sample Size	Easy to Understand	Helpful Pictures	Helpful Audio	Usefulness of Information
Calories In, Calories Out	C 7	4.4/5	4.2/4	4.4/4	4.0/4
	P 4	4.0/4	3.8/4	4.3/5	4.0/4
Grains	C 15	4.4/5	4.5/5	4.5/5	4.4/5
	P 8	4.1/4	4.1/4	4.6/5	4.4/5
Vegetables	C 5	4.8/5	4.8/5	4.8/5	4.8/5
	P 5	4.8/5	4.4/4	4.6/5	5.0/5
Fruits	C 3	5.0/5	5.0/5	5.0/5	5.0/5
	P 4	4.8/5	4.8/5	5.0/5	5.0/5
Dairy	C 7	4.7/5	4.1/4	4.7/5 ^a	4.1/4
	P 8	4.5/4 ²	4.0/4	4.3/4.0	4.4/4
Meat and Beans	C 6	4.5/4 ²	4.3/4	4.3/4	4.7/5 ^a
	P 22	4.6/5	4.2/4 ²	4.5/5	4.0/4
Fats, Sweets, and Salt	C 5	4.4/4	4.0/4	4.6/5	4.2/4
	P 3	4.3/4	4.0/4	4.3/4	4.7/5
Shopping	C 6	4.7/5	4.6/5	4.3/5	4.3/5 ^a
	P 5	4.8/5	4.0/4	4.6/5	5.0/5
Cooking	C 23	4.6/5	4.3/5	4.4/4 ²	4.2/5
	P 10	4.5/4	4.4/5	4.8/5	4.6/5
Food Safety	C 4	4.8/5	4.3/5	4.5/4	3.8/3
	P 6	4.7/5	4.2/4	4.8/5	4.3/5

C—Client Data

P—Professional Data

¹Lesson attributes were rated using a 5-point scale: 1 being “Not at All” and 5 being “Very.”

²Multiple modes exist. The smallest mode is presented.

^aTrends towards differences between clients and professional results exist.

Table 7. Likert scale data of last two Likert scale questions: means and modes, by lesson

Name of Lesson	Sample Size		Length ¹	Amount of Information ²
	C	P		
Calories In, Calories Out	C	7	2.9/3	3.0/3
	P	4	3.0/3	3.0/3
Grains	C	15	2.9/3	3.1/3 ^a
	P	8	3.0/3	2.9/3
Vegetables	C	5	3.6/3	3.0/3
	P	5	2.8/3	3.0/3
Fruits	C	3	3.0/3	3.0/3
	P	4	3.0/3	3.0/3
Dairy	C	7	3.0/3	2.9/3
	P	8	3.0/3	3.1/3
Meat and Beans	C	6	3.0/3	3.0/3
	P	22	3.1/3	3.1/3
Fats, Sweets, and Salt	C	5	3.2/3	3.0/3
	P	3	2.7/3	3.0/3
Shopping	C	6	3.0/3	3.0/3
	P	5	3.0/3	3.0/3
Cooking	C	23	3.0/3	3.0/3
	P	10	2.8/3	3.1/3
Food Safety	C	4	3.3/3	3.0/3
	P	6	3.0/3	3.0/3

C—Client Data

P—Professional Data

¹Lesson attribute was rated using a 5-point scale: 1 being “Too Short,” 3 being “Just Right,” and 5 being “Too Long.”

²Lesson attribute was rated using a 5-point scale: 1 being “Too Much,” 3 being “Just Right,” and 5 being “Missing A Lot.”

^aClient results are significantly different than professional results ($p \leq 0.05$).

With the question “Was the lesson easy to understand and follow?,” clients and professionals most frequently scored all 10 of the lessons as “Easy” (Likert scale score = 4) or “Very Easy” (Likert scale score = 5) (see Table 6¹). Clients most frequently perceived two lessons, *Meats and Beans*; and *Fats, Sweets, and Salt*, as “Easy” to understand. They most frequently scored the rest of the lessons as “Very Easy” to understand. Professionals most frequently scored five lessons (*Calories In, Calories Out; Grains; Dairy; Fats, Sweets, and Salt; and Cooking*) as “Easy” to understand. The five lessons that they scored as “Very Easy” to understand were *Vegetables, Fruits, Meat and Beans, Shopping, and Food Safety*. No significant differences were found between the ratings of clients and professionals on perceived understanding.

The pictures and graphics were most frequently scored by both groups as a four or five (see Table 6). Clients rated the pictures and graphics in four lessons as “Helpful” (Likert scale score = 4) including: *Calories In, Calories Out; Dairy; Meat and Beans; and Fats, Sweets, and Salt*. The pictures and graphics in five lessons that were rated as “Very Helpful” (Likert scale score = 5) included: *Grains, Vegetables, Fruits, Shopping, Cooking, and Food Safety*. Professionals rated the pictures and graphics in the *Fruits* and the *Cooking* lessons as “Very Helpful.” Professionals rated the pictures and graphics in eight lessons as “Helpful.” No significant differences were found between the perceptions of clients and professionals on acceptability of pictures and graphics for any lesson.

Clients and professionals most frequently rated the helpfulness of the voice narration as “Helpful” or “Very Helpful” (Likert scale scores = 4 or 5) (Table 6). Clients most frequently scored the audio as “Helpful” (Likert scale score = 4) in four lessons: *Calories In, Calories Out; Meat and Beans; Cooking and Food Safety*. Clients scored the audio in the remaining six lessons as “Very Helpful.” Professionals scored the audio as “Helpful” in two lessons: *Dairy; and Fats, Sweets, and Salt*. They scored audio in the other eight lessons as “Very Helpful.” No significant differences were found between the ratings of clients and professionals on the acceptability of the voice narration. The *Dairy* lesson showed trends toward differences between clients and professionals on voice narration (Mann-Whitney U = 15.0, p = 0.082), with clients finding it more helpful than professionals.

The perceived usefulness of the information provided in each lesson was most frequently rated as four, “Useful,” or five, “Very Useful,” by both clients and professionals with the exception of one lesson (see Table 6). For the *Food Safety* lesson, clients most frequently scored the information as a three or “Somewhat” useful. Clients rated three lessons (*Calories In, Calories Out; Dairy; and Fats, Sweets, and Salt*) as having “Useful” information. Clients rated the remaining six lessons as having “Very Useful” information. Professionals rated three lessons as having “Useful” information including: *Calories In, Calories Out; Dairy; and Meat and Beans*. They rated seven lessons as having “Very Useful” information. Scores by clients showed trends toward differences from those by professionals on usefulness of the information in the *Meat and Beans* lesson (Mann-Whitney U = 34.5, p = 0.057) and in the *Shopping* lesson (Mann-Whitney U = 7.5, p = 0.080). These trends suggest that clients found the information more useful than professionals.

Clients and professionals most frequently perceived the length of all lessons to be “Just Right” (Likert scale score = 3) (see Table 7). No significant differences were found between clients and professionals on acceptability of the length of the lessons.

In terms of the amount of information in each lesson, clients and professionals most frequently scored the lessons as “Just Right” (Likert scale score = 3) (see Table 7). Client scores were significantly different from those of professionals regarding the amount of information in the *Grains* lesson (Mann-Whitney U = 35.0, $p = 0.039$). Clients perceived this lesson as having a little too much information while professionals perceived that it was missing some information.

Associations within Client Samples

For two lessons, *Grains* and *Cooking*, associations within the client samples were measured for age, gender, education, and race relative to the Likert scale score.

With the *Grains* lesson, since most clients had a high school education, the association between scores and education was not measured. With regards to age, a significant association was linked with the ratings of pictures and graphics. The over-30 year old clients rated the pictures and graphics higher than did those 30 years and younger (Kendall tau-b = 0.593, $p = 0.002$). No associations were found between the Likert scores for this lesson and gender or race of the clients.

Associations linking age, gender, education, or race to client Likert scores for attributes of the *Cooking* lesson were also measured. No associations were found between age and client scores. A negative trend was found between usefulness of the *Cooking* lesson and clients’ education level. Clients with less than a high school education showed a trend of finding the information more useful than those with a high school diploma or higher (Kendall tau-b = -0.348, $p = 0.059$). A significant association was found between race and perceived understanding of the lesson. Whites found the lesson more easy to understand than did non-whites (Kendall tau-b = -0.477, $p = 0.020$).

Client Preference of Lesson Formats

Clients were also surveyed on the type of EFNEP lesson format they would like, and 28 (32 percent) responded that they were more interested in internet lessons than individual or home visits. The number one reason offered was that they could work at their own pace and the lessons would be more convenient. An equal percentage of people preferred group lessons because of

interaction, feedback, and sharing of ideas. Eleven (13 percent) people preferred individual lessons because the lesson format is more personal and makes learning easier. Three people were very interested in all three formats; three people preferred group or internet, but not individual lessons; two people preferred either individual or group but not internet lessons; and thirteen did not answer the question.

CHAPTER 12 - Discussion

Local and National Internet Usage Trends

Shawnee County EFNEP serves a diverse population with high percentages of Hispanic (42 percent) and black clients (14 percent) compared to local census statistics (8 and 9 percent respectively). Understandably, local internet usage among Shawnee County EFNEP clients was somewhat lower than national averages but followed similar trends.

Percentages of the local sample using the internet were lower among the 18 to 30 year old group (44 percent), and 31 to 40 year old group (31 percent) compared to national averages (87 and 88 percent, respectively) for these age ranges. Whites in the EFNEP sample had the highest percentage (67 percent) of usage similar to the national average (73 percent) (Pew Internet and American Life Project, 2007b). Twenty-nine percent of blacks locally used the internet, which was half as much as the national rate of 58 percent, and only seven percent of Hispanics in this sample used the internet compared to 56 percent of all Hispanics nationally (Fox & Livingston, 2007).

Clients in the local sample had lower incomes, compared to the national rates which included people from all income levels. This could explain why the local rates were lower than national averages. None of local Spanish-speaking-only EFNEP clients who responded to the questions used the internet or were interested in taking nutrition lessons online compared to the national average of 31 percent of Spanish-speaking Hispanics accessing the internet (Fox & Livingston, 2007). Besides having low-incomes, 85 percent of the local Spanish-speaking-only clients had less than a high school education with 37 percent having a sixth grade education or less. The Pew report points out that less than a high school education and low English proficiency are significant factors in low usage of the internet (Fox & Livingston, 2007).

Forty-nine percent of clients with a high school education used the internet compared to 51 percent at the national level (Pew Internet and American Life Project, 2007b).

Regarding rates for internet speed used, 69 percent of EFNEP clients used high-speed internet, which was similar to the national rate of 63 percent (Fox, 2005).

The local internet usage survey had some limitations. It was a convenience sample of clients who were already enrolled in established EFNEP program delivery methods. The survey questions were added to the adult record form, and responses were considered voluntary. Many potential clients who might enroll only in an online program were not surveyed. In addition, twelve percent did not answer the survey possibly because of suspicion about how the information would have been used or because of lack of diligence in completing the forms. Some clients may have answered that they did not use the internet even when they did because they may have not wanted to disclose this information.

Readability of Food and Nutrition Bytes Lessons

Because clients will be learning on their own in an online program, easy readability of the *Food and Nutrition Bytes* lessons was a priority. Given the variability in readability formulas, two formulas were used to assess reading levels of the online lessons. The SMOG reading levels for *Food and Nutrition Bytes* lessons averaged a grade level of 8.56 with a range from 7.4 to 9.9 grade levels. The Gunning-Fox reading levels averaged a grade level of 6.64 with a range from 5.4 to 8.0 grade levels.

The SMOG formula measures all the three-syllable or difficult words within the passage of a document (McLaughlin, 1969). This formula is useful in helping authors evaluate difficult words to determine if easier words may be more appropriate. However, many difficult nutrition words have no substitutions. Difficult words within each lesson such as “vegetable” or “saturated” were repeated several times. This increased the calculated SMOG grade levels.

The Gunning-Fox reading formula also calculates reading level based on number of three-syllable or difficult words, but each difficult word is only counted the first time it appears in the passage (Miller, 2001). The Gunning-Fox formula may be a more appropriate measurement for the *Food and Nutrition Bytes* lessons because the difficult words are only counted once.

In addition, the average number of words per sentence is included in the Gunning-Fox grade level measure (Miller, 2001). The online lessons were written in short informational points. Sentence length is not reflected in the SMOG grade level measurement (McLaughlin, 1969). The *Food and Nutrition Bytes* lessons build on each other. Clients will be exposed to difficult words in one lesson that are repeated in another, making the second lesson easier to understand.

As noted previously, nearly 50 percent of the U.S. population read at or below an eighth grade level but most internet information is written at a 10th grade level or higher (Zarcadoolas et al., 2002). Lesson information was presented in short, simple sections that were easy to manage, as recommended by Finnegan (2006). In addition, reading levels for these EFNEP lessons were targeted to be no higher than an eighth grade level to insure that online learners can understand the information presented, per advice of Birru et al. (2004).

Bakker (1998) makes the point that readability formulas have limitations. He warns that completely deleting difficult words and only using short sentences to decrease the reading level may lead to choppy writing that is still difficult to read. He advises that topic headings, bulleted information points, and pictures and graphics – as well as the client’s motivation – all contribute to the reading levels of documents. All of these points were considered when the new EFNEP online lessons were being developed.

Perceived Understanding, Acceptance and Usefulness of *Food and Nutrition Bytes* Curriculum

In general, the perceived understanding, acceptance and usefulness of the new curriculum were generally high for both clients and professionals. In evaluating the differences between perceptions of clients and professionals surveyed, more weight was given to client scores since they are the target audience.

Two lessons had content that was perceived to be too general to be useful. The *MyPyramid Basics* lesson will be improved and re-tested to meet the objectives before including it as an introductory lesson for the *Food and Nutrition Bytes* curriculum. The *Feeding Kids* lesson will be broken into several age-specific lessons: *Feeding Infants*, *Feeding Toddlers*,

Feeding Preschoolers, Feeding Grade School-Aged Children, Feeding Middle School-Aged Children and Feeding Teens.

The usefulness of the *Food Safety* lesson was rated by clients as only “Somewhat” useful. The reason for the lower rating could be the small sample size (N = 4,) or the fact the clients surveyed may have already been exposed to food safety education. As previously noted, one client commented that the information was not new to him, and he gave this lesson the lower rating. A high number of EFNEP clients have acceptable food safety skills at entry to the program, indicating exposure to food safety training from other sources (Procter, 2006).

The trend ($p = 0.082$) toward differences in the perceived helpfulness of the voice narration in the *Dairy* lesson may underscore the importance of including audio with online lessons for the EFNEP population, as suggested by Click and Alberts (2005) who designed the *Critical Choices* curriculum for welfare recipients. The professionals who rated this lesson were mostly teachers with high levels of education and reading skills, thus perhaps reducing their appreciation of narration. Different voices may also help with maintaining the client’s attention and adding role-play conversations between a “nutrition educator” and “client” may also help with learning. All lesson narrations will be reevaluated, based on the suggestions provided.

In the *Meat and Beans* lesson, the trend ($p = 0.057$) toward differences in perceived usefulness of the information may suggest food preference or lifestyle differences between clients and professionals. Clients found this lesson more useful than professionals, perhaps because they were more interested in how to include expensive protein foods in their diet while living on a limited budget. One professional recommended including more information on vegetarian diets. The trend toward statistically significant differences may also just be related to the differences in sample size with comparing the smaller (N = 6) client sample to the larger (N = 22) professional sample.

In the *Shopping* lesson, the trend ($p = 0.080$) toward differences in perceived usefulness of information suggests that this type of lesson was not as important to the clients surveyed as it was to the professionals. The client sample was composed of single young women with small children who lived on-site in a job training program. The professionals surveyed were Kansas Food Stamp Nutrition Education staff and a K-State nutrition specialist. In addition to the basics of menu planning and grocery shopping, the lesson will be improved by adding information on quick meals and then retested.

A significant difference ($p = 0.002$) was found between client and professional ratings on the desired amount of information in the *Grains* lesson. The difference underscores the necessity of providing only essential information in each lesson so that clients are not overwhelmed. On average, clients rated the *Grains* lesson as having a little too much information and professionals rated it as not having quite enough. One client commented that he did not like grains and another did not agree with recommendations for serving new types of grains to children. Professionals, on the other hand, suggested adding more explanation about the parts of the grain kernel and related nutrients, and adding a review at the end.

For the *Vegetables* lesson, two of the five clients rated it too long. One client commented that the lesson “just kind of drug on.” Perhaps this topic was not interesting to some clients and perhaps too much information was provided on varieties of vegetables that are new to clients. The information in this lesson will be reevaluated, edited and retested.

For the *Grains* lesson, clients 30 years and younger found the pictures and graphics to be less helpful than clients over 30 years of age. All lessons will be reevaluated in terms of the pictures and graphics, based on the significant ($p = 0.002$) association in the *Grains* lesson and the suggestions provided by clients and professionals. Pictures more suitable to this audience will be researched and added.

Associations were found in the perceived usefulness of information in the *Cooking* lesson and two characteristics of the clients. These included a trend ($p = 0.059$) relating to education and a significant ($p = 0.020$) association relating to race. Clients with less than a high school education perceived the information in the lesson to be more useful than those with a high school education, suggesting importance of including information on basic cooking procedures in lessons for those with less schooling. The significant association found between race and perceived levels of understanding underscores the need to design lessons that are sensitive to diverse audiences. Names of cooking equipment and utensils were listed but not all had corresponding pictures. Of the pictures included, most were of cooking items. Only one picture of a family cooking was used. Perhaps adding more pictures of diverse families cooking will enhance the perceived understanding of this lesson. This lesson will be edited and re-tested.

Despite the comments by professionals that the lessons’ video may be too fast, the speed will remain the same. Slowing the videos down will increase the storage size of the computer file, which can affect how fast the video loads. In addition, Gregov and Marrero (2007) stressed

that there are “zero tolerances” for delays in online learning. Indeed, one client commented, “I read faster than they talk.” If clients need to review a particular part of a lesson, they can stop the video and replay that section.

Similar to the advice of Gregov and Marrero (2007), some comments pertained to the importance of interactive activities within the lessons. A few people suggested adding games and quizzes to the curriculum. In addition, some suggested that a short review of the topics be included at the end of each lesson. *Camtasia* software has the ability to add quizzes (TechSmith Camtasia Studio, 2005).

Food and Nutrition Bytes Curriculum and Other Online Nutrition Education

Interest in online lessons among EFNEP clients and potential clients is notable. More than half (55 percent) of clients surveyed in the preliminary internet usage study indicated that they are interested in online nutrition lessons, despite low rates of current internet usage. Thirty-two percent of clients surveyed in *Food and Nutrition Bytes* lesson surveys preferred online lessons because of the flexibility and convenience of working on the lessons according to their schedules. Another 32 percent indicated that they preferred group lessons because of the interaction and feedback. Interaction and feedback can be added to the online lessons through the use of e-mail, message boards and chat rooms. For the clients preferring one-on-one visits, online lessons may be successful if nutrition educators maintain frequent interaction with these clients.

For clients who are resistant to or cannot access online learning, *Food and Nutrition Bytes* lessons can be used in traditional settings if the nutrition educator or client has a computer or DVD player. The videos can be saved in either an online or DVD format and played without internet connection.

The *Food and Nutrition Bytes* curriculum is similar to other EFNEP online programs in information, goals and objectives for clients, but differs in length and how the information is provided. The Nebraska and Oregon online programs are simple web pages that clients complete in approximately 15 to 25 minutes (University of Nebraska-Lincoln, n.d.; Oregon State University Extension Service, 2006). *Food and Nutrition Bytes* lessons are limited to eight to 11

minutes and then clients can access supporting information within the modules. Unlike *Food and Nutrition Bytes*, both of these programs lack audio. The client must read the lessons. These programs do have review quizzes at the end of each lesson or module.

Food and Nutrition Bytes is more similar to the EFNEP *Healthy Futures* program by Virginia Cooperative Extension Service (2006). Both use recorded videos with audio, and the information is presented in short segments. Both of these programs play automatically so scrolling is very limited. As noted by Zarcadoolas et al. (2002), low-literate clients may have trouble with scrolling so online programs should have web pages that stay mainly within the browser window. Some of the *Healthy Futures* lessons are longer than *Food and Nutrition Bytes* lessons but, as previously noted, have links to subtopics so that clients can choose what sections they want to see if they do not want to view the entire lesson at one sitting. The Virginia program has interactive questions within some lessons but does not have review quizzes at the end.

This study's results are also similar to previous research projects involving non-EFNEP online nutrition education. *Food and Nutrition Bytes* lessons appear to be appropriate for adult learners of different education levels, similar to the results found with NIBBLE (Olsen et al., 2000). A difference between the two programs is that *Food and Nutrition Bytes* clients will learn on their own rather than in a classroom with a teacher nearby, as is the setting with NIBBLE. In addition, *Food and Nutrition Bytes* uses more up-to-date technology with recorded lesson videos in addition to other learning media, rather than solely web pages of text like those found in NIBBLE.

Food and Nutrition Bytes lessons also had easy-to-understand and helpful information similar to the information on the *Wichealth.org* website (Bensley et al., 2006). Compared to *Wichealth.org*, *Food and Nutrition Bytes* contained more in-depth information on each of the food groups of MyPyramid as well as having lessons on shopping, cooking, and food safety. These topics were requested by WIC clients who are also potential EFNEP clients according to Birkett et al. (2004). Tips on feeding children of all ages are found within each of the *Food and Nutrition Bytes* lessons, whereas the *Wichealth.org* website focuses more on parent-child feeding behaviors for children zero to five years of age. The *Wichealth.org* site also offers information to WIC clients based on their readiness to change in regard to nutrition practices, according to the transtheoretical model of behavior change. Once WIC clients enter a module, their answer to a question links them to another web page with information about their response. The web page

may be information provided by *Wichealth.org* or by other websites such as *Kids a Cookin'* or *Mealtime.org*. Similarly, *Food and Nutrition Bytes* has links to appropriate websites within each module, although clients were not offered information based on their change readiness.

People of all ages and non-traditional students are internet learners today (Gregov & Marrero, 2007). Online learning offer unique opportunities for low-income clients who have typically not done well in traditional school settings (Click & Alberts, 2005). More and more people are getting connected with the internet with highest increases among blacks and those with less than a high school education. *Food and Nutrition Bytes* was developed to meet the needs of low-income and minority audiences.

Limitations

This study has a number of limitations. As noted, because of the transient nature of low-income clients, convenience samples were used, many of which included clients already enrolled in EFNEP. This limits the study because we did not reach those potential clients who would only participate in the EFNEP program via the internet. Only nine of the clients surveyed were people not already enrolled in EFNEP. Six of these clients were reached at SRS. The other three were surveyed at a scheduled nutrition class for Head Start parents. These Head Start classes are poorly attended even when incentives are offered.

When examining the lessons individually, sample size may have been a limitation. Many EFNEP groups and professionals' groups were small in number which affected the number of surveys completed for some lessons. If more clients and professionals had been surveyed on each lesson, more significant differences and associations might have occurred, and the relationships determined by the data analysis may have actually been stronger.

Collectively, however, the scores of Likert scale data from all samples indicated similar trends among all lessons. Overall, the total number of clients and professionals surveyed was most likely adequate for assessing perceived understanding, acceptance, and usability of the online lessons.

Differences among low-income clients may also exist based on where clients were surveyed and their type of situation. Each sample of clients may have been more, or less, interested in the particular lesson that they viewed based on their type of situation.

Clients may have rated the lesson attributes higher because of the technology used rather than because of the content of the lessons. One client who evaluated the *MyPyramid Basics* lesson was very interested in how the *Camtasia* software worked. Another client who reviewed the *Shopping* lesson exclaimed to the researcher, “That’s your voice on there! How did you do that?”

Time constraints may have been an issue affecting responses of clients. With the exception of the six surveys completed at SRS, clients viewed lessons and completed the surveys within the time frame of another class or service rather than truly being able to learn at their own pace. For example, there was not enough time for clients to view the lesson a second time, if desired, and those who had reading difficulties may have felt pressured to finish their surveys to keep up with others in their group.

Convenience samples of professionals were used in order to be sensitive to their work schedules and time commitments. Only one General Education Development (GED) teacher completed a survey. Input from these professionals was considered desirable since they often work with limited readers or adults who learn more easily outside of the traditional classroom. Attempts to survey other GED teachers were unsuccessful. Once lesson revisions are completed, attempts to survey GED teachers again will be made.

Interviewer bias was also a limitation. The interviewer/surveyor and lesson designer were the same person and that person was also inexperienced with interviewing. Attempts were made to administer the surveys consistently but some differences did occur based on the client sample and the questions that they asked or if they needed the survey read to them. Clients and professionals may have also rated the lessons higher to be sensitive to the surveyor/designer rather than rating the lesson objectively.

Future Research

Food and Nutrition Bytes lessons will be reevaluated and fine-tuned based on the findings of this study. The *MyPyramid Basics* lesson will be improved, and *Feeding Kids* will be broken into several age-specific lessons. Voice narrations of all lessons will be reviewed, and different voices and role-play conversations will be added. Pictures and graphics in all lessons will be reevaluated and added so that they are more suitable for all audiences. Once adjustments are made, the lessons will be retested.

A review segment will also be added at the end of each lesson to reinforce concepts learned. These segments will be interactive. Clients will play a game or take a quiz, and will learn their scores as soon as they complete the review activity. A review quiz will be added to the end of each lesson, with the answers of the quizzes to be e-mailed to the nutrition educator. She can then provide specific feedback to the client. In addition, online learners will be encouraged to engage in “learn by doing” activities, such as trying new recipes and setting small goals to work on between lessons to simulate hands-on activities that are provided in traditional one-on-one and group EFNEP lessons.

To keep the length of the lessons short and the amount of information in each lesson to acceptable levels, supporting information for each lesson will be available in modules in the online program. As previously noted, each module will include the video lesson, lesson transcript, list of nutrition words and definitions, lesson handouts, recipes, and links to other websites. For example, the *Shopping* module will have information on quick meals for busy families. Each video lesson will provide the most essential information, and clients can access more information as desired from the module.

The usability of the online *Food and Nutrition Bytes* modular curriculum needs to be evaluated to make sure clients can easily access the lessons, download the handouts, and connect to other websites. To do this, each online module will be developed into an HTML page similar to *Kids a Cookin'* web pages that have simple but pertinent graphics and descriptions of materials available (Kansas Family Nutrition Program, 2006). This type of formatting for each module also needs to be tested with clients.

The next phase of research process would be to develop and validate online data collection tools so that EFNEP clients can be enrolled and then graduated when they fulfill the requirements of the program. K-State Online technology offers a survey system which can be adapted for the EFNEP 24-hour food recall and behavior checklist questionnaire (Kansas State University, 2005). Once the data are submitted, they can be extracted and entered into the NEERS5 reporting system. The key will be designing the food recall questionnaire so that clients understand how to estimate amounts eaten and complete the recall without assistance. In addition, they will need to be able to read and understand the behavior checklist and mark the appropriate answers based on their practices.

The final aspect of research would compare outcomes of EFNEP clients who have completed the online program to those who have completed traditional one-on-one or group lessons to determine if this new program delivery method is a viable option for reaching and teaching clients.

Online learning may substantially change EFNEP. While traditional delivery methods of one-on-one learning and group lessons have demonstrated positive outcomes, online educational opportunities may increase efficiency and effectiveness as a new generation of learners look to the internet for information and help with their health. *Food and Nutrition Bytes* may reach more clients and providing settings that support learning and positive behavior change.

CHAPTER 13 - Conclusion

The findings of this study provide direction for developing online nutrition lessons appropriate for the EFNEP audience. The initial internet usage survey indicated that 55 percent of EFNEP clients were interested in taking nutrition lessons online, even though internet usage rates were low. The curriculum will be available in non-internet formats such as DVDs or flash drives in which the lessons can be viewed without internet access. A marketing plan will be needed to reach and enroll those clients who will only take nutrition lessons online.

The *Food and Nutrition Bytes* curriculum provides in-depth diet and physical activity information in short, simple, and easy-to-read segments. The average reading grade level for the lessons, based on the Gunning-Fox formula, was 6.64. Both clients and professionals indicated that the lessons were easy to understand. The up-to-date technology used to record the lessons and voice narration enhanced perceived understanding. Clients appreciated pictures and graphics as well as audio in order to understand the lessons while learning on their own. Professionals rated these attributes similarly. Clients and professionals also found the eight to 11 minute lessons to be the desired length and to have the right amount of information.

For the most part, clients found the information to be useful to themselves and to their families. Professionals indicated that lesson information would be useful for their low-income clients. In future work, each lesson will be accompanied by modules that will provide supporting information that clients can access if they want to learn more.

While more weight was given to client responses, positive opinions of professionals were desirable because they provide access to potential EFNEP clients and will be an important part of future marketing plans for the *Food and Nutrition Bytes* curriculum.

It is not anticipated that *Food and Nutrition Bytes* will replace one-on-one or group teaching methods. The EFNEP paraprofessional will still provide coaching and feedback to encourage clients to finish the program. In addition, some EFNEP clients may prefer to only participate in traditional delivery methods and eliminating these methods would deny them access to the EFNEP program.

It is our finding that online *Food and Nutrition Bytes* lessons offer an alternative curriculum for successful nutrition education. This option has the potential to serve more clients compared to traditional one-on-one and group lessons alone, which will increase efficiency and effectiveness within the EFNEP program. The *Food and Nutrition Bytes* curriculum will be considered successful if nutrition, food resource management, and food safety practices of EFNEP clients completing the online program are shown to be acceptable and comparable to those completing traditional lessons.

Choosing and preparing healthy and safe foods while living on a limited budget is difficult when people lack the knowledge and skills needed to make optimal nutrition choices necessary for the prevention of chronic disease. Low-income and food-insecure families may buy affordable but not healthy foods. Nutrition education programs such as EFNEP teach low-income people how to feed themselves and their families a nutritious diet. *Food and Nutrition Bytes* offers potential EFNEP clients another option for accessing nutrition education.

CHAPTER 14 - References

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