

THE PERCEPTION OF HYBRID NUTRITION EDUCATION AMONG LIMITED INCOME
FAMILIES IN TENNESSEE

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ABSTRACT

The issue of obesity continues to be a concern in the US. Throughout the years, research has shown that adopting healthier eating habits and increasing physical activity can help people lead healthier lives. Families of low socioeconomic status suffer disproportionately from poor health. Nutrition education programs have been successful in supporting program participant's efforts towards health; however, recruiting and retaining program participation has been challenging. Completing a series of face-to-face classes has been difficult for this population due to various barriers they face. Providing distance-based opportunities, such as hybrid nutrition education programs, could assist in overcoming some of these barriers. The purpose of this research is to determine how low-income audiences in Tennessee perceive nutrition education delivered in a blended learning method. Data was collected from Tennesseans from six rural, three suburban, and four urban counties, who received supplemental assistance or whose income was at or below 185% of the poverty guidelines developed by the Department of Health and Human Services. Eighty participants complete an online Likert-style survey consisting of questions concerning their experiences with technology, nutrition education and nutrition information. A thematic analysis of the qualitative data identified what participants wanted to experience in a hybrid nutrition education program. The findings of this study indicated a relationship between participants' perception and where they live, and how they currently receive nutrition information. There was no significant relationship between participants' preferred delivery method and where they live, their access to technology, and how they currently receive

nutrition information. Most participants would like to see some form of technology incorporated into a nutrition education program. The majority of the participants disagreed that it would be difficult to participate in a hybrid nutrition education program. Participants expressed they would want to see food demonstrations, receive accurate nutrition information, and kid friendly recipes in a hybrid program. The findings provide direction for future research and future practices in nutrition education.

DEDICATION

This dissertation is dedicated to my children Malcolm Earl Jackson IV and Benjamin Lee Jackson. I pray that you continue to have the faith in God and the courage to follow your dreams. I love you.

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To my parents James Robert and Betty Rowe, my siblings, nieces and nephews and all other family members, thank you for always supporting me.

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LIST OF ABBEVIATIONS

CDC, Center for Disease Control

BMI, Body Mass Index

HEI, Healthy Eating Index

FSP, Food Stamp Program

WIC, Women, Infants and Children

EFNEP, Expanded Food and Nutrition Education Program

SNAP, Supplemental Nutrition Assistant Program

SNAP-Ed, Supplemental Nutrition Assistance Program Education

USDA, United States Department of Agriculture

NIFA, National Institute of Food and Agriculture

UT, University of Tennessee

K-12, Kindergarten through 12th grade

FCS, Family and Consumer Sciences

COVID 19- Coronavirus Disease 2019

RTI, Research Triangle Institute

FNS, Food Nutrition Service

WHO, World Health Organization

CRM, Crisis- Response Migration

IT, Information Technology

PA, Program Assistant

IRB, Institutional Review Board

UTK, University of Tennessee Knoxville

UTC, University of Tennessee at Chattanooga

SPSS, Statistical Package for the Social Sciences

QDA, Qualitative Data Analysis

GED, General Education Development

CHAPTER I

INTRODUCTION

Obesity can have an adverse effect on an individual's overall health. Obese individuals are at increased risk for diabetes mellitus, cardiovascular disease, hypertension, and certain cancers (Hruby et al., 2016; Ogden, Lamb, Carroll, & Flegal, 2010). Today, seven of the 10 leading causes of death in the United States are chronic diseases, and almost 50% of Americans live with at least one chronic illness (Centers for Disease Control and Prevention, 2013). The American Heart Association reported that 77.9 million adults have high blood pressure (Go et al., 2013). Research also shows that 25.8 million or 8.3% of adults in the United States (U.S.) have diabetes, and heart disease causes 1:3 deaths in the U.S. (Go et al., 2013; Ogden et al., 2010). People who suffer from these types of chronic diseases experience limitations in function, health, activity, and work, affecting the quality of their lives as well as the lives of their families (Centers for Disease Control and Prevention, 2013). Health risk behaviors such as poor nutrition and lack of exercise or physical activity, can contribute to obesity that is linked to chronic disease, which in turn may impose substantial economic costs on individuals and society (Centers for Disease Control and Prevention, 2013; Dietary Guidelines Advisory Committee, 2015; Hruby et al., 2016).

The issue of obesity continues to be a concern in the United States. A person's Body Mass Index (BMI) determines a person's overweight or obesity level. This number provides a reliable indicator of body fat percentages for most people and is used to screen for weight

categories that may lead to health problems (Center for Disease Control and Prevention, 2015). Overweight individuals are those with a Body Mass Index (BMI) greater than 25, and obese individuals are those with a BMI greater than 30 (Ogden et al., 2010). Several national surveys have indicated that prevalence rates of obesity continue to increase (Houle, Holt, Gillespie, Freedman, & Reyes, 2009; Hruby et al., 2016). In 2015-2016, the prevalence of obesity was 39.8% for adults and 18.5% among youth in the United States (Hales, Carroll, Fryar, & Ogden, 2017). Continued increases in obesity rates affect the overall health of individuals as well as the economic health of the country.

Rising medical spending is emblematic of the rising rate of obesity. The estimated annual medical cost of obesity and obesity-related health issues in the United States was \$147 billion in 2008; the medical cost per year for people who are obese was \$1,429 higher per person than those of healthy weight (Finkelstein, Trogon, & Cohen, 2009). Finkelstein et al. (2009) also found the increased prevalence of obesity was responsible for almost \$40 billion of increased medical spending through 2006, including \$7 billion in Medicare prescription drug costs. Engaging in healthy behaviors dramatically reduces the risk of illness due to chronic diseases and the cost to treat those illnesses (Centers for Disease Control and Prevention, 2013; Dietary Guidelines Advisory Committee, 2015).

While the issue of obesity affects all income levels, families of low socioeconomic status suffer disproportionately from poor health (McFerren, 2007). In their research, Fan, Wen, and Li (2020) found that overall, the prevalence of obesity was higher for lower-income women than for higher-income women. Diets are particularly deficient among low-income Americans, especially regarding their consumption of fruits and vegetables (Dong & Lin, 2009). This population was more likely than higher-income populations to consume poor diets (24% vs.

15%), less likely to satisfy the Healthy Eating Index (HEI) standard for the fruit component (13% vs. 22%), and less likely to meet the HEI standard for vegetables (19% vs. 24%) (Fox & Cole, 2004). Children with lower family incomes were found to be less physically fit, have higher BMI scores, and have higher prevalence of obesity than children with higher family incomes (Jin & Jones-Smith, 2015). Reyes, Klotz, and Herring (2013) found that low-income mothers believed that consuming healthy foods, like fruits and vegetables, would lead to healthy babies and limit the physical discomforts of pregnancy. Despite this belief, mothers chose foods that were high in fats and sugars because of taste, cost, and convenience. Also, mothers had several misconceptions about the definition of healthy foods (Reyes, Klotz, & Herring, 2013).

Low-income adults have a higher incidence of chronic diseases associated with being overweight and obese, as do their children (Baldyga & Petersmarck, 2005; Gibson, 2003; Hales et al., 2017). Scientists agree that the rapid rise in overweight and obesity rates is linked to an increase in a number of chronic diseases (Evans, Newton, Ruta, MacDonald, & Morris, 2000). Obesity contributes to chronic diseases in children including diabetes, asthma, sleep apnea, and gallbladder disease (Center for Disease Control and Prevention, 2015). In comparison with higher-income children, participants of the Food Stamp Program (FSP) had a significantly greater mean BMI (19.8 vs. 19.2) and were significantly more likely to be overweight (12% vs. 9%) (Fox & Cole, 2004). The rate of body mass index (BMI) gain nearly doubled during the COVID-19 pandemic compared to a pre-pandemic period, according to a survey of 432,302 kids aged 2 to 19 years (Lange et al., 2021). Children who were overweight or obese and younger school-aged children reported the fastest rate of gain (Lange et al., 2021).

The Center for Disease Control (CDC) examined trends in obesity prevalence among Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) participants

between two and four years old during 2000-2014. Overall obesity prevalence increased from 14.0% in 2000 to 15.5% in 2004 and decreased from 15.9% in 2010 to 14.5% in 2014 (Pan et al., 2016). During 2010–2014, the prevalence of obesity decreased significantly among non-Hispanic whites, non-Hispanic blacks, Hispanics, American Indian/Alaska Natives and Asians/Pacific Islanders. During this same period, decreases were shown in 34 of the 56 WIC state agencies in the states, the District of Columbia, and the U.S. territories, (Pan et al., 2016). Despite these declines, the obesity prevalence among children aged between two and four years in WIC remained high compared with the national incidence of 8.9% among children aged between two and five years in 2011–2014 (Ogden, Carroll, Frayer, & Flegal, 2015). Initiatives to work with parents and other stakeholders to promote healthy pregnancies, breastfeeding, quality nutrition, and physical activity for young children in multiple settings are needed to ensure healthy child development (Bensley, Anderson, Bruski, Mercer, & Rivas, 2011).

Recent studies have found the anomaly that people who are most food-insecure are at more risk for obesity than those who are food-secure (Franklin et al., 2012; Vedovato et al., 2015). More specifically, obesity among food insecure people occurs in part because they are subject to the same challenging cultural changes as other Americans. This population also faces unique challenges in adopting and maintaining healthy behaviors (Dollahite, Olson, & Scott-Pierce, 2003; Vedovato et al., 2015). Low-income individuals are likely able to obtain enough calories, but these calories may come from cheap foods that are calorie dense and nutritionally poor (Ammerman, Hartman, & DeMarco, 2017). Low-income parents of young children have reported interests in acquiring practical information on nutrition, food, recipes, and parenting provided in supportive settings using approaches that include interaction with other parents to improve the health of them and their families (Dickin, Hill, & Dollahite, 2014).

Nutrition education programs such as the Expanded Food and Nutrition Education Program (EFNEP) and Supplemental Nutrition Assistance Program Education (SNAP-Ed) intend to reach low socioeconomic populations in communities to empower them to live healthier lives (EFNEP, 2014; Food and Nutrition Service, 2016). Funded by the United States Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA), EFNEP uses education to support program participants' efforts toward self-sufficiency and nutritional health and well-being (Chipman, 2018). Participants in EFNEP attend interactive lessons in a convenient location in their neighborhood. During these 45-60-minute sessions, paraprofessionals indigenous to their area instruct participants. Participants receive nutrition, food safety, and food resource management information; observe cooking demonstrations; and sample simple, low-cost recipes they can prepare at home. These lessons are facilitated interactively to keep participants engaged.

SNAP-Ed strives to improve the likelihood that persons eligible for the Supplemental Nutrition Assistance Program (SNAP) will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans and USDA food guidance (USDA, 2014). Funded by USDA Food and Nutrition Services (FNS), SNAP-Ed is conducted through local community-driven coalitions to meet the needs of SNAP recipients. Programming addresses healthy eating, food insecurity, physical activity, and obesity prevention by developing and using evidence-based interventions designed for a wide range of low-resource settings.

While EFNEP has been beneficial to this audience in Tennessee, recruiting and enrolling people in the program have been challenging and time-consuming. Several factors including transportation, childcare, fear of failure, past school experiences, and time have been identified

as barriers that prevent this population from participating and completing nutrition education programs (Atkinson et al., 2010; Leung et al., 2013; McFerren, 2007; University of Tennessee Extension, 2015). Participant numbers are sometimes low in comparison to the total number of food stamp recipients in the counties (University of Tennessee Extension, 2015). Although participants enjoy the interaction with the group and building a relationship with the program assistant, consistently attending a series of face-to-face classes has become difficult for many people.

To assist families in overcoming these barriers, agencies have the opportunity to provide distance-based educational opportunities, such as hybrid nutrition education programs. Clientele with limited time availability and cuts in personnel within Extension offices have increased the need for more effective indirect nutrition education delivery methods (Francis, Martin, & Taylor, 2011). Moreover, the Internet is becoming the preferred way for consumers to quickly receive health information (Neuenschwander, Abbott, & Mobley, 2012). Blended learning, a mixture of virtual or online and face-to-face learning, can provide the interaction of the face-to-face classes as well as the convenience of self-directed learning (Schuster, 2012).

Future Extension clients who have participated in blended learning such as Kindergarten through 12th (K-12) grade and higher education students will expect the use of these approaches in Extension nutrition programs (Schuster, 2012). In 2000, it was reported that Internet penetration rose across all income levels, and the fastest growth was in lower-income groups (Neuenschwander et al., 2012). If the Internet access rates are on the rise among the low-income population, it is essential to investigate the potential use of the Internet and other technologies for nutrition education purposes within this population (Neuenschwander et al., 2012). Using

blended learning approaches can make Extension classes more relevant and learner-focused (Schuster, 2012).

Access to technology has been considered an additional barrier for low-income families. However, Neuenschwander et al. (2012) found that most (68%) low-income individuals reported having a mobile phone, and of those with a mobile phone, over half (56%) had a phone with text, camera, or other capabilities. Lohse (2013) found that 72% of Internet users living in households earning less than \$30,000 a year look online for health information. Neuenschwander et al. (2012) also discovered that half of the low-income population had a working computer in their home, and of this number, 78% also had an Internet connection. Those without home computers are still able to have access. A report by the Institute of Museum and Library Services revealed that 44% of those Americans living below the poverty line use their local library to access computers and the Internet (Becker et al., 2010). These statistics suggest that access to technology may only be perceived as a barrier for low-income families.

Statement of the Problem

Utilizing technology to deliver nutrition education to low-income individuals has been tested in other states through various nutrition education programs (Au et al., 2017; Bensley et al., 2011; Lohse, 2013; Neuenschwander, Abbott, & Mobley, 2013). This method of program delivery has not been implemented in Tennessee. While a vast amount of research has been conducted concerning barriers for low-income audiences, less exists on methods of utilizing technology to address some of those barriers. In those studies, members of the low-income audience were not included in the process to discuss interventions that might remove these barriers (Atkinson et al., 2010). While some research has suggested that this population in rural

and urban areas does not have access to technology to participate in online learning, recent studies indicate that access to the Internet and bandwidth is becoming less of a limiting factor for nutrition education efforts in these areas (Leak et al., 2014).

Purpose of the Study

The purpose of this study determined the perception of a hybrid nutrition education program among limited-income families in Tennessee. Specific research questions included:

1. Is the perception of hybrid nutrition education for limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?
2. Is the preferred method of nutrition education delivery among limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?
3. What are the expectations of a hybrid nutrition education class among limited income families in Tennessee?

Importance of the Study

The transportation, cost, and time barriers faced by low-income families make positive health practices even more challenging to undertake than for other families (Atkinson et al., 2010). However, focusing efforts on increasing knowledge about nutrition and physical activity recommendations and improving skills such as cooking and food budgeting have the potential to make it easier for families to make informed choices and implement new strategies. In the years ahead, it is essential for Extension educators to keep up with technology and mobile learning

tools and approaches used in K-12, higher education, and general society as well as to incorporate these approaches into programming (Schuster, 2012).

This study is needed to assess limited-income families' perception of hybrid nutrition education to determine how receptive this population would be to a hybrid delivery method for nutrition education. Collecting information on attitudes and behaviors related to nutrition, physical activity, technology use, and information seeking from this population can assist in the assessment of the needs and strengths of this population. This information can be useful to the University of Tennessee Extension in making decisions about the development and implementation of technology in EFNEP, SNAP-Ed, and other nutrition education programs working with this population. Perception of a hybrid program is pursued in the hope of improving the success of the program in reaching the target population and examining what strategies would motivate them to begin and complete the program.

Theoretical/Conceptual Framework

When beginning a research study, it is important to consider relevant theory behind the knowledge base event to be researched (Sinclair, 2007). Theories provide frameworks for interpreting environmental observations and serve as a bridge between research and education. (Schunk, 2012). Health behavior theories describe the relations among variables influencing a behavior and specify targets for facilitating behavior change (Achterberg & Miller, 2004) .

While nutrition education does not have a dominant theory specific to the discipline, a number of theories have been used with low-income audiences including the Health Belief Model, Theory of Planned Behavior, and Social Cognitive Theory (Achterberg & Miller, 2004; Baker et al., 2020). Theory aids program planners in defining both a target audience and proven methods for

producing behavior change within that audience (Baker et al., 2020). The overall goal of this study was to identify influences that effect participants' perception and preferences and discover delivery methods that can assist low-income families in completing nutrition education programs in hopes of improving food choices and eating habits.

Social cognitive theory, proposed by Albert Bandura, provided the basis of the theoretical framework for this study (Bandura, 1991, 2006). Development of this theory began as Bandura explored the influences on social behavior (Schunk, 2012). In response to behaviorism, Bandura argued that conditioning was not the only method of learning (Schunk, 2012). Social cognitive theory stresses the idea that much of human learning occurs in a social environment (Bandura, 1977, 1991, 2006). By observing others, people acquire knowledge, rules, skills, strategies, beliefs, and attitudes (Schunk, 2012). Three major concepts of social cognitive theory that influenced this research were observational learning, triadic reciprocal interactions, and self-regulation.

Learning through direct experiences is not always necessary. Observational learning promotes the idea that learning can take place through observing others (Bandura, 1991). Bandura (2008) states that learning can occur when observers successfully demonstrate a new behavior that they would not have been able to display prior to exposure, even when motivation was high. This allows the learner the opportunity to gain knowledge and process the information before demonstrating the action. Bandura (2008) identified four processes that influence observational learning. They are attention, retention, reproduction, and reinforcement.

During the first process, the learner must be attentive to the model they are observing (Bandura, 2008). This is crucial to accomplish the second process, which is retention (Bandura, 2008). If the observer is not attentive to the model, they will not be able to retain information or

actions of the activity they observed. It is important for the observer to have a method of review to assist in retention (Schunk, 2012). This can be accomplished through watching videos of the model, asking questions, and taking notes. The third process is reproduction (Bandura, 2008). This is where the observer physically reproduces the skill they observed. Bandura (1991) stated this skill can be refined through practice, corrective feedback, and re-teaching. The final process, motivation, influences observational learning because people form expectations about anticipated outcomes of actions based on consequences experience by them and models (Schunk, 2012). The data gathered from this research can assist in identifying the level of experience participants had with technology. Demonstrating steps to access the online components of a hybrid nutrition education program for participants would be an example of observational learning. This will also increase the self-efficacy for participants who are less knowledgeable of using technology.

Bandura (1982, 2001) discussed human behavior within a framework of triadic reciprocal interactions among environmental factors, personal factors, and aspects of the behavior. Figure 1 gives a visual explanation of this concept. A person's external factors can influence internal factors that can also influence behavior to the event or activity. Each concept can shape the other. In the context of this research, the researcher sought to understand if participants place of residence or access to technology (environment) influences, their perception and preference (person) of hybrid nutrition education that could influence their completion of a hybrid program (behavior). Successful efforts to change behavior depend on identification of the positive supports and the detractors in each of the three constructs (Schunk, 2012). Understanding these factors can assist the researcher in the instructional design process for a hybrid nutrition education program.

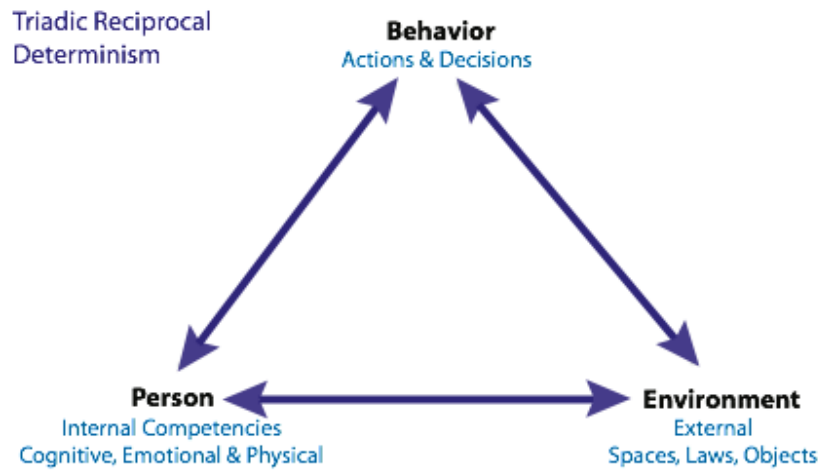


Figure 1 Triadic Reciprocal Interactions Model

In social cognitive theory, human behavior is extensively motivated and regulated by the ongoing exercise of self-influence (Bandura, 1991). Central to this concept is self-regulation. This is the process whereby individuals activate and sustain behavior, cognitions, and affects, which are systematically oriented toward the attainment of goal (Zimmerman & Schunk, 2001). In learning situations, self-regulation requires that learners have choices (Schunk, 2012). When provided guidance and direction, these choices allow the learner to achieve their desire to control the events that affect their lives (Bandura, Freeman, & Lightsey, 1999). Independent instruction can assist in building a person’s self-efficacy encouraging them to set and achieve goals (Schunk, 2012).

In relation to this research, self-regulation is critical in the successful completion of a hybrid nutrition education program by an engaged participant. Learners have choices in participation, methods, outcomes, and in the social settings (Bandura, 1991; Bandura et al., 1999). When engaged, learners can choose to enroll in and participate in a nutrition education

program (participate), choose to utilize the hybrid method to overcome barriers in their personal lives (methods), choose to self-monitor and remain engaged in program activities to complete the program (outcomes), and choose to arrange their environment, when possible, to be conducive to learning (social settings). Gaining insight on participants' ability to self-regulate and their level of self-efficacy can assist the researcher in the instructional design process.

The conceptual framework in this study notes that successful completion of a nutrition education program by low-income families is the result of several factors and influences. While many of these factors and influences have been researched, few have included members of the low-income audience in the process. The review of the literature included these factors and how they influence completion of nutrition education programs.

Definition of Terms

- Body Mass Index (BMI):calculated weight in kilograms divided by height in meters squared, rounded to one decimal place (Centers for Disease Control and Prevention, 2022).
- Expanded Food Nutrition Education Program (EFNEP): A federal Extension program that currently operates through the 1862 and 1890 Land-Grant Universities (LGUs) in every state, the District of Columbia, and the six U.S. territories, American Samoa, Guam, Micronesia, Northern Marianas, Puerto Rico, and the Virgin Islands. It is designed to assist low-income audiences and address critical societal concerns.

Paraprofessional staff provide education in nutrition and physical activity to low-income families (EFNEP, 2014).

- Family and Consumer Science (FCS) Agents: provide research and evidence-based information in nutrition, human development, financial management, and healthy home environment to county residents through the University of Tennessee Extension Service.
- Food insecurity: lack of access to an adequate food supply so that basic needs can be met (Jilcott, Wall-Bassett, Burke, & Moore, 2011)
- Food stamp recipient: an individual living in the United States whose income is less than or equal to 130% of the federal poverty guidelines, who has limited assets, and who meets various nonfinancial criteria.
- Healthy Eating Index (HEI): a measure of diet quality that assesses conformance to the Dietary Guidelines for Americans (Food and Nutrition Service, 2022).
- Hybrid learning: providing education through face-to-face and online delivery methods.
- National Institute of Food and Agriculture (NIFA): provides leadership and funding for programs that advance agriculture-related sciences. This is the funding source for EFNEP.
- Nutrient dense foods: foods and beverages that provide vitamins, minerals, and other substances that may have positive health effects, with relatively few calories (USDA, 2010).
- Hybrid nutrition education: providing basic nutrition education through face-to-face and online delivery methods.
- Obese: having a BMI of greater than 30 (Center for Disease Control and Prevention, 2016).
- Poverty guidelines: the federal government's statistical poverty thresholds used by the Census Bureau to prepare statistical estimates of the number of individuals and families

in poverty. The Health and Human Services (HHS) Department uses its issued poverty guidelines for administrative purposes such as determining eligibility for specific federal programs (US Department of Health and Human Services, 2018).

- Supplemental Nutrition Assistance Program (SNAP): USDA Food and Nutrition Service (FNS) food assistance program that offers nutrition assistance to millions of eligible, low-income individuals and families and provides economic benefits to communities (Food and Nutrition Service, 2016).
- University of Tennessee Extension (UT Extension): part of the Land-Grant University system of University of Tennessee Institute of Agriculture.

Methodological Assumptions

The assumptions of this study are:

- The survey accurately measured this population's perception of hybrid nutrition education and preference of methods of nutrition education delivery.
- The sample population answered questions truthfully.
- That a response rate of at least 75% is representative of the population of limited income families in Tennessee.

Limitations/ Delimitations

There are some limitations to this study. Participants selected for this study may have found it difficult to participate due to multiple barriers, such as childcare or transportation. As mentioned, these barriers are similar to what prevents them from participating in nutrition education interventions. Another limitation is that honesty and truthfulness may be limited due

to lack of trust. Participants receiving supplemental assistance may perceive EFNEP or SNAP-Ed as part of the large federal bureaucracy and an intrusion in their personal lives. This research was conducted during the height of the Coronavirus Disease 2019 (COVID-19) pandemic. Pandemic-related anxiety may have affected participants' ability to answer questions truthfully. These anxieties may have also affected FCS Agents' and Program Assistants' ability to recruit participants to participate in the study. Participants may have found it difficult to participate due to illness related to COVID-19 or stresses from the COVID-19 pandemic.

There are also some delimitations to this study. To answer the specific research questions, the focus of this study was limited to Tennessee families with an income of or less than 185% of the United States poverty guidelines. The study results were limited to the results of the survey instrument created for this study.

CHAPTER II

LITERATURE REVIEW

The past decades have seen a heightened rate of obesity among socioeconomically disadvantaged populations and ethnic groups (Smith, Colón-Ramos, Pinard, & Yaroch, 2016). In the State of Tennessee, 13.6% of the population are in poverty (U.S. Census Bureau, 2021) and 785,000 people receive SNAP benefits (Tennessee Department of Human Services, 2022). These rates are disproportionately higher among minority populations (Figure 2) (U.S. Census Bureau, 2020). Low income and rural populations face unique barriers when attempting to engage in healthful nutrition, physical activity, and weight control behaviors (Atkinson et al., 2010; Neuenschwander et al., 2013). This literature review provides a comprehensive description of nutrition education delivered in a hybrid method. This review discusses the need for nutrition education, barriers faced by limited income audiences, perceptions of online learning, and technology and nutrition education.

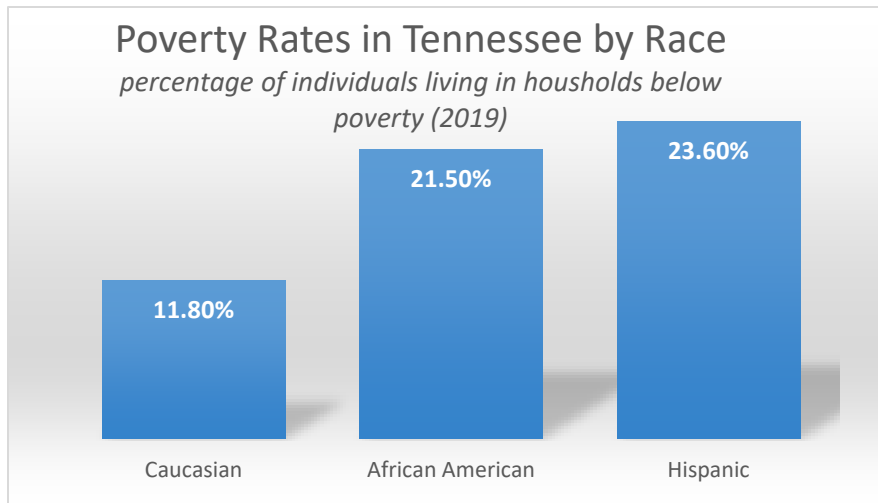


Figure 2 Poverty Rates in Tennessee by Race

Need for Nutrition Education for Low-Income Families

Despite the increased public awareness of the vital role that food choices, dietary practices, and physical activity have on health, the diets and physical activities of most Americans are not consistent with the recommendations of the Dietary Guidelines for Americans (Dietary Guidelines Advisory Committee, 2015; Guenther et al., 2009). Most Americans eat fewer fruits (Whatnall, Patterson, Ashton, & Hutchesson, 2017), vegetables, whole grains, and fat-free or low-fat milk products than recommended while consuming too much saturated fat, sweetened beverages, and sodium (Middaugh, Fisk, Brunt, & Rhee, 2012; Rustad & Smith, 2013). As the relationships among diet, health, and disease prevention have become more evident, nutrition education and the promotion of healthy eating behaviors and lifestyles continue to receive increased attention (Fox, Hanson, & Briefel, 2007; Rustad & Smith, 2013).

Effective nutrition education programs can enable individuals to improve their health and prevent diet-related chronic diseases (Campbell, Honess-Moreale, Farrell, Carbone, & Barasure, 1999; Whatnall et al., 2017). Nutrition education is defined as:

Any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition related behaviors conducive to health and well-being; it is delivered through multiple venues and involves activities at the individual, community, and policy levels (Contento, 2008, pp. 176-177).

Critical reviews examining its effectiveness have demonstrated that nutrition education can make a significant contribution to improved dietary practices (Fox & Cole, 2004).

Dietary intervention programs for lower income and minority populations are particularly needed because these groups suffer a disproportionate burden of diet-related chronic disease morbidity and mortality (Campbell et al., 1999; Vedovato et al., 2015). Many studies have demonstrated associations between income level, overall life expectancy, and rates of chronic disease including diabetes, hypertension, and obstructive lung diseases (Baron et al., 2014). Alkon et al. (2013) stated that nutrition and cooking education designed to encourage individuals to manage health risks is unlikely to be successful in low-income communities. However, other research has shown that nutrition education can assist low-income families in making healthier food choices (Ben-Shalom, Fox, & Newby, 2012; Dickin et al., 2014; Dollahite et al., 2003; Guenther & Luick, 2015).

According to a study conducted by Altarum Institute and Research Triangle Institute (RTI) International, well-designed nutrition education programs can lead to healthier food choices among low-income families (Hersey, Cates, Blitstein, & Williams, 2014). The study evaluated three SNAP programs in three different states and found that children participating in certain nutrition education programs increased their daily fruit and vegetable consumption at home by a quarter- to a third-cup and were more likely to choose low-fat or fat-free milk. Participating seniors consumed about a half-cup more fruits and vegetables daily (Hersey et al., 2014).

Dollahite et al. (2003) analyzed the relationship between graduation from EFNEP and the food insecurity status of individuals. Food insecurity scores of graduates decreased significantly more than scores of terminated participants (Dollahite et al., 2003). Terminated participants are participants that did not complete the program. Dollahite, Pijai, Scott-Pierce, Parker, and Trochim (2014) also assessed the effectiveness of EFNEP on nutrition behaviors post-education and longitudinally and found that participants who completed at least six of the eight sessions reported that behaviors significantly improved from pre to posteducation compared to participants who did not receive the intervention. In addition, there was evidence of temporal stability in behavior change eight weeks after completing the program when participants continued to report behavior changes similar to those reported immediately post education (Dollahite et al., 2014).

Nutrition education is well accepted among low-income families (Au, Whaley, Gurzo, Meza, & Ritchie, 2016). The Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA) released a study providing clear evidence that well-designed nutrition education programs can lead to healthier food choices by participants in SNAP (Long et al., 2013). SNAP participants have even suggested providing more nutrition education and meal planning tips would help to improve their dietary intake (Leung, Musicus, Willett, & Rimm, 2017). Participants in other research studies found recipes and class activities helpful and reported improvements in nutrition knowledge, food preservation skills and home cooking behaviors for themselves and their children; they also reported that classes promoted a sense of community (Lu et al., 2021). In a qualitative study conducted by Balestracci et al. (2019), elementary students reported increased empowerment, bravery to try new foods, and nutrition

knowledge. Students enjoyed the program but suggested increasing the duration and frequency of lessons and including peer-to-peer education (Balestracci et al., 2019).

Burney (2002) found that nutrition education has also made an economic impact. A cost-benefit analysis of EFNEP in Tennessee showed that for every dollar spent to implement the program, \$2.48 is saved on food expenditures (Burney, 2002). Research conducted by Dollahite, Kenkel, and Thompson (2008) produced outcome data indicating food and nutrition behavior changes resulting from EFNEP were likely to improve future health and reduce health care costs. In 2020, EFNEP graduates reported a collective food cost savings of \$549,195 (Chipman, Morriss, & Cherry, 2021). These savings can reduce the need for emergency food assistance for program participants and save money for other necessities.

Seguin-Fowler et al. (2021) examined the effects of cost-offset (half-price) Community Supported Agriculture (CSA) plus tailored nutrition education for low-income households with children. Following one growing season of CSA participation, changes in children's diet quality, body mass index, and physical activity; caregivers' nutrition knowledge, attitudes, behaviors, and diet quality; and household food access and security were examined (Seguin-Fowler et al., 2021). Cost-offset CSA plus tailored nutrition education for low-income households improved important caregiver and household outcomes within just one season of participation; most notably, both self-reported and objectively measured caregiver fruit and vegetable intake and household food security improved (Seguin-Fowler et al., 2021). While these studies demonstrate how nutrition education can improve the quality of life of individuals, it is also important to consider the issue of participants completing these programs.

Barriers Low-Income Populations Face

Traditionally, the nutrition education lessons taught by EFNEP have been delivered through face-to-face teaching methods. However, this population faces multiple obstacles with this technique. Low-income families have been found to be more transient than higher-income families, and consistently reaching them via traditional face-to-face methods can be a challenge (Neuenschwander et al., 2012).

Low-income families in rural areas face various barriers when receiving nutrition education. Living in rural areas, specifically in the southern region of the United States, reduces chances on one receiving nutrition education (Brown-Guion, Youngerman, Hernandez-Tejada, Dismuke, & Egede, 2013). Many studies have shown that people living in rural areas travel farther to receive care, are less likely to have access to health care services, visit health care providers less often, and have poorer health status than those in other areas (Brown-Guion et al., 2013; Hale, Cotten, Drentea, & Goldner, 2010). Haynes-Maslow, Osborne, and Pitts (2019) identified barriers to implementing direct education in rural communities included lack of healthy food and physical activity infrastructure to reinforce messages taught in class, funding restrictions, transportation for SNAP-Ed staff and the perception that this was also a problem for participants, and SNAP-Ed staff being seen as outsiders (not from the community). Large geographic areas and lack of public transportation restrict program delivery options for those in rural areas (Campbell, Koszewski, & Behrends, 2013). Effective programs are needed to help rural residents reduce high risks for obesity and unhealthy lifestyles (Trivedi et al., 2015).

Despite the availability of health education and food-assistance programs, many participants are not aware of these programs (Atkinson et al., 2010; McFerren, 2007). Lack of knowledge and skills about nutrition and cooking prevent them from choosing and preparing

healthy meals and poor budgeting knowledge limit their ability to purchase the groceries they need (Atkinson et al., 2010). Along with awareness, Atkinson et al. (2010) found significant barriers mentioned by low-income residents such as dealing with the challenges of paying bills, trying to find work, or caring for sick children, created some difficulty in viewing nutrition or physical activity as priorities. These barriers are similar to what McFerren (2007) discovered. A frequently mentioned barrier to participating in any program was time. Research participants felt they were too busy taking care of their children to get involved in a nutrition program (McFerren, 2007).

Other research participants mentioned the fear of failure as a barrier to nutrition class participation and completion (Atkinson et al., 2010; Campbell et al., 2013; McFerren, 2007). Their past educational experiences had been negative, and the participants were fearful of experiencing those negative feelings again in nutrition classes. Participant's motivation has important roles in completing the program; therefore, assessing participants' initial stage of readiness can help educators tailor content to support participants' motivation for behavior change (Cooper, Barale, Funaiole, Power, & Combe, 2016).

Perception of Online Learning

Engaging in an online-learning process requires a certain level of comfort with computer and web technologies (Lee & Witta, 2001). However, Carnevale (2000) found that regardless of the learning format, students took into consideration knowledgeable instructors, interaction with instructors, and additional features that create a sense of community when evaluating courses for merit. Further, Sanders and Morrison-Shetlar (2002) cited the importance of student attitudes toward technology as a significant determining factor in the educational benefits of online

learning resources and experiences (Buzzetto-More, 2008). Thurmond, Wambach, Connors, and Frey (2002) also determined student characteristics such as age, the perception of computer skills, knowledge of electronic communication technology, number of web courses taken, and distance from the main campus, did not influence student satisfaction; satisfaction was determined by what takes place in the online classroom.

While little research has been conducted on the perception of online learning among low-income populations, Bensley et al. (2014) found among WIC participants, there was an increased interest in receiving future nutrition education using the Internet. Stotz, Lee, Rong, and Murray (2017) examined perceptions of nutrition educators regarding the feasibility of an e-Learning nutrition education program tailored to low-income families. This research identified motivation to use the e-learning program as a barrier for families but described effective methods to get them engaged such as step-by-step instructions to answer a real dilemma or problem in their lives (Stotz et al., 2017). An example of this would be a cooking video with basic instruction for food preparation. The research also identified ease of use and interactive components with immediate feedback performance assessments as ways to enhance the user feelings of engagement (Stotz et al., 2017).

Buzzetto-More (2008) found that the use of hybrid learning methodologies in higher education increases students' course satisfaction, whereas students found course websites to be helpful resources that will have an impact on higher education in the future. Results from the study enforce the assertion that e-learning as a supplement to face-to-face instruction enhances the overall learning experience and that online learning can provide learners with more choices, greater flexibility, expanded resources, and increased opportunities (Buzzetto-More, 2008).

Mahawar and Nandedkar (2019) concluded that availability, flexibility, and convenience are the key features of e-learning, which make it an important suggested tool for learning.

Technology and Nutrition Education

Increased use of the Internet during the past decade has opened the door to a variety of ways to address public health issues, including behaviorally based nutrition education (Bensley et al., 2011). In research conducted by Stotz, Lee, and Hall (2018), participants described their use of the internet as constant, daily, and obsessive. YouTube is commonly used platform used by 81% of Americans, up from 73% in 2019 (Auxier & Anderson, 2021). Facebook remains one of the most widely used social media platforms with 69% of adults saying they use this site for information (Auxier & Anderson, 2021). Many adolescents, including those from lower socioeconomic groups, have access to social media and text messaging programs, suggesting these are potential methods of targeting this population (Jones, Eathington, Baldwin, & Sipsma, 2014; Whisner, Bruening, & O'Brien, 2016).

Mobile technology is changing our society and how our program participants learn (Schuster, 2012). Internet access for low-income individuals is increasingly commonplace because of free Wi-Fi in many public spaces and affordable Internet-accessing devices such as smartphones (File & Ryan, 2013). Cell phone use by low-income families is similar to rates of cell phone use by those of higher socioeconomic status (Swindle, Ward, Whiteside-Mansell, Bokony, & Pettit, 2014). In 2004, a survey conducted by the Pew Internet and American Life Project found that over half of those surveyed said they sought out information about diet, nutrition, vitamins, or nutritional supplements online (Neuenschwander et al., 2012). Au et al.

(2016) findings suggested that if online education platforms were built into available options for nutrition education, WIC participants would use them.

Bensley et al. (2011) found Internet nutrition education intervention to be a viable education method for many WIC clients who chose it. The Internet nutrition education modules provided information clients found relevant and useful, it moved clients along the stages of change continuum in both adult and child fruit and vegetable consumption, and it demonstrated that WIC clients maintained the nutrition education and behavior they learned (Bensley et al., 2011). The convenience of completing the educational modules at home, free from distractions, and reducing client time in traveling to the WIC clinics, were viewed by WIC clients as benefits to this program (Au et al., 2016; Bensley et al., 2011).

Oregon State Extension used distance learning with EFNEP and SNAP participants and found that there were generally positive attitudes towards using the Internet for food and nutrition resources (Campbell et al., 2013). Results from this study demonstrated that graduates in Nebraska from these two Extension-based programs were able to improve nutrition-related behaviors and intakes after being taught via distance education (Campbell et al., 2013).

Atkinson et al. (2010) interviewed community stakeholders to determine assets, challenges, and opportunities for implementation of technology for nutrition education. It was discovered that stakeholders believed an online nutrition education intervention would help meet some community needs and that residents would become more interested in nutrition and physical activity (Atkinson et al., 2010). They also felt that further developing computer and Internet skills might lead to increase career opportunities for those who participated (Atkinson et al., 2010).

Research has shown that both online and traditional in-person education can successfully promote positive nutritional behavior change. When evaluating online and in-person nutrition education, Au et al. (2017) found few differences between education modalities and results did not suggest a pattern of one modality being superior to the other. Sneed, Franck, and Vineyard (2017) found that low-income participants trusted information from nutritionists but prefer to receive nutrition information through social media and online sources rather than the traditional face-to-face method. However, Neuenschwander et al. (2013) found that some topics might be more difficult or complex to understand and should be addressed in-person. In these instances, a combination of online and in-person education can be a feasible option for those needing more in-person contact (Neuenschwander et al., 2013). Blended learning can be a valuable method of delivering nutrition education to low-income adults, but it could also be a way of retaining participants and reinforcing nutrition information on a longer-term basis (Neuenschwander et al., 2012).

The Effects of Coronavirus 19 on Online Learning

In March 2020, the World Health Organization (WHO) classified the COVID-19 outbreak as a pandemic (WHO, 2020). Social distancing and other measures adopted by many countries caused lockdowns in many sectors, including transportation, tourism, sports, entertainment, and education. (Bandyopadhyay, 2020). This required educational institutions to transform their education activities from face-to-face to distance learning through technology (Morgan, 2020). While many institutions were not ignorant to the implementation of online learning, the urgent migration to online platforms had benefits and limitations (Adedoyin & Soykan, 2020). Researchers have identified challenges and opportunities the COVID-19

pandemic had on online learning and some best practices for implementing remote learning during the pandemic (Adedoyin & Soykan, 2020; Bacher-Hicks & Goodman, 2021; Faza, Santoso, & Putra, 2021; Morgan, 2020; Quang & Tri, 2021).

The immediate digital transformation of instructional delivery came with several logistical challenges and attitudinal modifications (Faza et al., 2021). Chen, Nelson, Xu, Bonilla, and Jones (2021) identified one factor that impacts learning is the capability of the teacher and students to connect to the Internet. Online learning in its entirety is dependent on technological devices and the Internet. Instructors and students with bad internet connections are liable to be denied access to online learning (Adedoyin & Soykan, 2020). Students with outdated technological devices might find it challenging to meet up with some technical requirements of online learning (Chen et al., 2021). Those with internet connections that are too weak to complete assignments may be denied access to online learning (Quang & Tri, 2021). Unreliable infrastructure, such as limited access and unstable internet connectivity, introduce negative attitudes to the online learning experience (Bervell & Arkorful, 2020; van Rensburg, 2018).

Another identified factor as a challenge is socio-economics (Adedoyin & Soykan, 2020; Quang & Tri, 2021). Bacher-Hicks and Goodman (2021) found that COVID-19 caused substantial disruptions to student's learning, particularly for disadvantaged students. Fishbane and Tomer (2020) discovered that students without Internet access could be left to deal with the COVID-19 outbreak on their own, showing that as the level of poverty increased in the community, the rate of internet accessibility declined rapidly. Students with little or no means to afford broadband connections have the greatest need and are at the greatest risk to have challenges in online learning (Quang & Tri, 2021). Researchers predict the effects of the

pandemic will substantially increase achievement gaps between students from low- and high-income households far into the future (Bacher-Hicks & Goodman, 2021).

The digital competence of students and instructors was also found to be a challenge. Students and instructors with low digital competence are liable to lack behind in online learning (Adedoyin & Soykan, 2020). In facilitating online learning, lecturers are required to have sufficient skills for using online learning tools and multiple methods of learning that are suitable (Shlenskaya, Karnaukhova, Son, & Lapteva, 2020; van Rensburg, 2018). Aini, Budiarto, Putra, and Rahardja (2020) identified challenges of online learning from a lecturer's perspective included lack of training. To resolve any difficulties faced by the lecturer, institutions must provide technical and administrative support to its employees and students (Aldowah, Al-Samarraie, & Ghazal, 2019).

While there have been great challenges identified, researchers have also identified opportunities brought on by the immediate implementation of online learning because of the pandemic. The Crisis-Response Migration (CRM) method forced the implementation of online learning by institutions (Quang & Tri, 2021). While this immediate digital transformation was met with challenges, it provided institutions the opportunity to identify various ways technology could enhance and possibly replace other delivery methods (Bai, Gao, & Goda, 2020; Faza et al., 2021). According to Manfuso (2020), educators now have a clear roadmap that they can use to engage large stakeholders in education to begin the process of developing a new market for instructional delivery. The implementation of online learning is also believed to increase educators' informational technology (IT) expertise (Faza et al., 2021). Online learning provides the facilitator a chance to gain new experience and develop technological skills and creativity (van Rensburg, 2018).

To adapt to the COVID-19 pandemic, Sibrian, Hutapea, Dunbar, and Kawar (2022) researched the effects of a new virtual format utilized by new graduate clinical nurses. The purpose of this research was to share strategies that incorporated adult learning principles of a successful transition to virtual learning and to demonstrate how a web-based education strategy could replace in-person instruction without compromising the quality of educational outcomes, participant engagement or learner satisfaction (Sibrian et al., 2022). The program used a learner-centered and self-directed approach that involved learners' applying clinical knowledge in complex scenarios in a controlled environment (Sibrian et al., 2022). Benefits of moving to this virtual format included increased efficiency, streamlined communication, and cost-effective education. However, Sibrian et al. (2022) found that certain topics would be better presented in an in-person setting.

The pandemic brought attention to the large technological divide by socioeconomics. This attention provides the opportunity to reduce the gap. Though choices of how best to remedy these losses may be best left to individual states, districts, or schools, substantial resources should be devoted to these efforts (Bacher-Hicks & Goodman, 2021). Diaz (2020) discovered that in an effort to keep Americans connected during the pandemic, many telecommunications firms, like AT&T and Comcast, made commitments to open Wi-Fi hotspots and not to terminate service to customers who cannot pay their bills. Providing socio-economic support to communities through public and private organizations, institution donations, and other means can assist in reducing the divide (Adedoyin & Soykan, 2020).

Quang and Tri (2021) concluded that despite educational institutions having shifted their delivery platforms to online platforms in a sudden and surprising manner, it is evident that online learning will continue to grow, and education will turn more toward a blend of online and

traditional education. Implementing online learning will continue to be challenging and have drawbacks if it is not well maintained and supported (Aldowah et al., 2019; van Rensburg, 2018). However, it also creates an opportunity to innovate regarding education (Faza et al., 2021). It also introduces a new opportunity to explore tools and platforms for online learning purposes (Bai et al., 2020). As students and instructors gain more knowledge and experience with online education, they will likely learn valuable methods that will continue to improve their experiences.

CHAPTER III

METHODOLOGY

Population and Sample

Tennessee continues to rank among the highest in the nation in relation to federal food assistance. In Tennessee, 13.6% of the population are in poverty (U.S. Census Bureau, 2021), and 785,000 people receive SNAP benefits (Tennessee Department of Human Services, 2022). The goal of the Supplemental Nutrition Assistance Program (SNAP) is to safeguard the health and well-being of the nation's population by ensuring access to nutritious food while helping to pave a pathway to long-term success (USDA, 2014). The target population for this research was Tennesseans, in both rural and urban areas, who received supplemental assistance or whose income was at or below 185% of the poverty guidelines developed by the Department of Health and Human Services. While this income rate is above the 100% poverty guideline, it reaches an audience that qualifies for most supplemental assistance programs. This population would qualify to participate in EFNEP and SNAP-Ed was the target audience for the program and this research.

An open sampling technique was used in this study to recruit and select participants. To gather a diverse sample, EFNEP and SNAP-Ed Program Assistants and Family and Consumer Sciences (FCS) Agents from four urban, three suburban, and six rural counties assisted in identifying potential research participants. A request to the Institutional Review Board (IRB) was made and approved. The sample population was determined, and participants were provided

voluntary informed consent information. This procedure provided information that fully disclosed the research procedure, purpose, risks, and anticipated benefits, including what a reasonable volunteer would want to know before giving consent (Gliner, Morgan, & Leech, 2009).

Instrumentation

The instrument used in this research was adapted from a study conducted by the University of Maryland Extension Service entitled Technology Use and Preferences of Paraprofessional Educators in EFNEP. The adaptation was accepted and approved by the original researcher. The instrument, a Likert-style survey, consisted of questions concerning the participants' experiences with technology, nutrition education, and nutrition information. The survey had one open-ended question allowing the participants to discuss their expectations of a hybrid nutrition education class. Tests for validity included an expert review for content of the instrument. The strength was based on Cohen's effect size guidelines.

Research Design

The proposed research was a non-experimental, correlational research design. The study sought to identify the relationships between the two dependent variables, self-perception of hybrid nutrition education and preferred nutrition education delivery method, and a number of independent variables. The independent variables included area of residence, access to technology, and method of receiving nutrition education. The research was conducted with assistance from county extension agents and program assistants. The researcher provided county extension agents and program assistants with a written statement detailing the purpose of the

study and the expectations of the participants. The researcher and county extension agents contacted WIC clinics, SNAP offices, and other agencies targeting the population to identify participants for the study. The researcher recruited participants for the study from the identified population. This process was included in the IRB request to University of Tennessee at Chattanooga (UTC) and University of Tennessee Knoxville (UTK) and approved by the Assistant Dean for Family and Consumer Sciences (Stephenson, personal communication, February 11, 2019). The IRB approval process included application submissions to UTC and UTK including a Reliance Agreement between the institutions. This agreement ensured that UTC would rely on UT IRB for review and continued oversight of the research. Participation in this project was voluntary for all subjects, and written consent was obtained from all subjects. Human subjects' approval was sought through the IRB.

Participants completed an online Likert-style survey consisting of questions concerning their experiences with technology, nutrition education, and nutrition information. The researcher collected completed surveys and analyzed data using the Statistical Package for the Social Sciences (SPSS) program. Several different analyses were used.

The first research question asked if the perception of hybrid nutrition education for limited income families in Tennessee was associated with their access to technology, where they live, and how they currently receive nutrition information. A Pearson's correlation was used to assess the relationship between perception of hybrid nutrition education and the residence of limited income families in Tennessee, their access to technology and how they currently receive nutrition information. A linear regression analysis determined the predictive relationship between perceived ideas of hybrid nutrition education as it related to participants residence, access to technology, and how they currently receive nutrition information.

The second research question asked if the preferred method of nutrition education delivery among limited income families in Tennessee was associated with their access to technology, where they live, and how they currently receive nutrition information. To answer this question, a Pearson's correlation was used to assess the relationship between preferred delivery method and the residence of limited income families in Tennessee, their access to technology and how they currently receive nutrition information. A linear regression analysis determined the predictive relationship between perceived ideas of hybrid nutrition education as it related to participants residence, access to technology, and how they currently receive nutrition information.

The final research question asked about the expectations of a hybrid nutrition education class among limited income families in Tennessee. The researcher used Qualitative Data Analysis (QDA) Miner and Wordstat 9 software to conduct a thematic analysis of this qualitative data. Participants gave brief, descriptive answers as to what they would like to see included in a hybrid nutrition education program. QDA Miner software coded and analyzed their answers and identified common themes to answer the research question. Wordstat 9 also analyzed their answers and identified the frequency of specific words in their comments to assist in data interpretation.

This research sought to identify how low-income families of Tennessee perceived hybrid nutrition education programs. It also sought to determine if these perceptions correlated or were relatable to where they lived, how they received nutrition information, and their access to technology. The research also sought to determine if a preference in delivery method correlated or were relational to where they lived, how they received nutrition information and their access to technology. Lastly, through qualitative analysis, this research identified expectations

participants had of a hybrid nutrition education program. This information will assist the researcher in the instructional design of a hybrid nutrition education program.

CHAPTER IV

FINDINGS

Introduction

In this chapter, the researcher presents information regarding the data collection methods, the demographics of survey participants, and the statistical analyses of the data used in the research. The purpose of this research study was to determine the perception of a hybrid nutrition education program among limited-income families in Tennessee.

Research Questions

Three research questions guided the methodology and procedures of this study.

1. Is the perception of hybrid nutrition education for limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?
2. Is the preferred method of nutrition education delivery among limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?
3. What are the expectations of a hybrid nutrition education class among limited income families in Tennessee?

Demographics of Participants

The survey tool used in the research was an online survey distributed through Qualtrics. The survey included no form of subject identification within the body of the survey. To gather a diverse sample, Program Assistants and Family and Consumer Sciences (FCS) Agents from four urban, three suburban, and six rural counties assisted in identifying potential research participants. An informed consent was included in the survey and the participants had to consent to move forward in completing the survey. The participants were asked to complete the survey within a 2-week period. However, at the end of the 2-week period, FCS Agents and Program Assistants sent a follow-up reminder and continued to recruit potential participants. At the end of the fourth week, the survey closed, and responses were collected and prepared for analysis.

The research participants consisted of Tennesseans, in both rural and urban areas, who currently receive supplemental assistance or whose income is at or below 185% of the poverty guidelines developed by the Department of Health and Human Services. Of the 119 surveys distributed, 80 surveys were completed. To gain a better understanding of the participants, they were asked to indicate their gender, race, age, highest level of education completed, and area of residence. When asked to select their gender, 92% of the participants identified as female, 7% identified as male, and 1% did not select a gender. The majority of the participants (45%) stated they were between the ages of 26-35 years old, 18 respondents (25%) represented within the 36-45 age range, and 15% represented ages 46-55. When selecting race, 48% of the respondents identified as African American, 44% identified as White, and 7% identified as Hispanic/Latino.

The 80 participants were asked to report their highest level of education. The results identified 33% of respondents had attended college, 29% were high school graduates or received their General Education Development (GED) certificate, and 19% were college graduates. When

asked to indicate the best description of where they lived, 43% of the respondents lived in towns and cities with a population of 10,000-50,000, while 27% lived in central cities with a population over 50,000, and 19% lived in towns under 10,000 (Table 1).

Table 1 Participants' Demographics

In what area do you live? N-72	Frequency	Valid Percent
• Farm	4	5.6
• Towns under 10,000 and rural non-farm	14	19.4
• Towns and cities 10,000-50,000	31	43.1
• Suburbs of cities over 50,000	3	4.2
• Central cities over 50,000	20	27.8
What is your gender? N-71		
• Male	5	7
• Female	65	91.5
• Prefer not to say	1	1.4
What is your race/ethnicity category you identify with? N-70		
• Black or African American	34	48.6
• Hispanic/Latino	5	7.1
• White	31	44.3
What is your highest level of education? N- 72		
• 12 th grade or less	8	11.1
• High school graduate/GED	21	29.2
• Some college	24	33.3
• College graduate	14	19.4
• Post-graduate	5	6.9
What is your age range? N-71		
• 18-25	4	5.6
• 26-35	32	45.1
• 36-45	18	25.4
• 46-55	11	15.5
• 56 or older	6	8.5

Respondents showed various levels of Internet use. When asked how often they use the Internet, 82% of participants selected every day. The most used device when using the Internet was the mobile phone (79%), and Internet use was mostly accessed at participant’s homes (73%). Eighty-one percent use the Internet to look up or read about nutrition or health information (Table 2). Recipes (53%) and healthy eating information (30%) were selected when asked what was researched the most. Seventy percent of participants use social media for health information with Facebook (38%) and Pinterest (21%) being the most popular platforms. However, 63% had never taken a nutrition class online.

Table 2 Participants’ Internet Use

How often do you use the internet? N-74	Frequency	Valid Percent
Never	1	1.4
A few times per month	3	4.1
At least once a week	3	4.1
A few days per week	6	8.1
Everyday	61	82.4
What device do you use the most to access the Internet? N-74		
Computer (desktop or laptop)	11	14.9
Mobile phone	59	79.7
Tablet (such as iPad, iPad mini, Kindle Fire, or Samsung Galaxy)	4	5.4
Where do you most often use the Internet? N-74		
Home	54	73
Other family member’s or friend’s home	3	4.1
Work	9	12.2
Library	2	2.7
School	1	1.4
Other	5	6.8
Do you currently use the Internet to look up or read about nutrition or health information? N-74		
Yes	60	81.1
No	14	18.9

Data Analysis

Research Question 1- Is the perception of hybrid nutrition education for limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?

A Pearson's correlation was used to assess the relationship between perception of hybrid nutrition education and the residence of limited income families in Tennessee, their access to technology, and how they currently receive nutrition information. Seventy-nine participants responded. A significance level of .05 was used. There was no statistically significant correlation between participant's perception of hybrid nutrition education and where they lived, ($r = .10, p=.369$). In addition, there was no statistically significant correlation between participant's perception of hybrid nutrition education and their access to technology, ($r=-.05, p=.64$), ($r=.01, p=.87$), ($r= .09, p=.43$).

There was a statistically significant correlation between participants having a phone and Internet and how often participants used the computer and Internet ($r=-.47, p=.001$). There was also a statistically significant correlation between participants use of Internet to read about nutrition information, social media platforms used to read nutrition information, and types of social media they use to get nutrition information ($r= .271, p=.020$). There was no statistically significant correlation between participant's perception of hybrid nutrition education and how they currently receive nutrition information, ($r = .11, p=.31$).

A linear regression analysis was conducted to determine the predictive relationship between perceived ideas of hybrid nutrition education as it related to participants residence, access to technology, and how they currently receive nutrition information. Overall, there was a significant relationship between the independent variables and their perception of hybrid

nutrition education $p=.028$ (Table 3). There was a statistically significant relationship between their perception of hybrid nutrition education and the independent variables where they live ($b=.281, p=.032$), if they currently use the Internet to read nutrition information ($b=-.286, p=.043$), and if they had ever taken an online class ($b=-.309, p=.012$). Table 4 gives the regression coefficients for perception of hybrid nutrition education.

There can be times when two variables might not show a strong bivariate correlation but may show a strong association in regression. A correlation analysis shows the relationship of one variable with just one other variable. A multiple regression analysis analyzes several independent variables as a group to predict one dependent variable. This can sometimes change the relationship. This is the case with the dependent variable perception and the independent variable residence in this analysis.

Table 3 Regression ANOVA for Perception of Hybrid Nutrition Education

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.255	8	1.282	2.363	.028
Residual	33.088	61	.542		
Total	43.344	69			

Table 4 Regression Coefficients Matrix for Perception of Hybrid Nutrition Education

variable	B	SE B	b	t	Sig.
Constant	4.194	1.256		3.340	.001
In what area do you live?	.184	.084	.281	2.192	.032
How often do you use the Internet?	-.057	.141	-.061	-.404	.687
How do you receive most of your nutrition information now?	.033	.040	.099	.836	.407
Do you currently use the Internet to look up or read about nutrition or health information?	-.578	.280	-.286	-2.066	.043
What is your highest level of education?	.022	.087	.030	.250	.804
What is your gender?	.402	.351	.131	1.143	.257
Have you ever taken a nutrition class online?	-.500	.192	-.309	-2.602	.012

Research Question 2 – Is a preferred method of nutrition education delivery among limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?

A Pearson’s correlation was used to assess the relationship between preferred delivery method and the residence of limited income families in Tennessee, their access to technology, and how they currently receive nutrition information. Seventy-nine participants responded. A significance level of .05 was used.

There was no statistically significant correlation between the participants’ preferred delivery method and where they lived, ($r=.15, p=.18$). There was no statistically significant correlation between the participants’ preferred delivery method and their access to technology, ($r=.08, p=.46$), ($r=.057, p=.63$), ($r=.07, p=.51$). There was a statistically significant correlation

between the respondents preferred delivery method and social media platforms participants use to get information ($r = .273, p = .020$). There was also statistically significant correlation between the social media platforms participants use to get information, their use of the Internet to read about nutrition, and their use of social media to read nutrition information ($r = .271, p = .020$).

A linear regression analysis was conducted to determine the predictive relationship between preferred delivery methods as it related to participants residence, access to technology, and how they currently receive nutrition information. Overall, there were no significant relationships between the independent variables and their preferred delivery method $p = .081$ (Table 5). Table 6 gives the regression coefficients for preferred delivery methods.

Table 5 Regression ANOVA for Preferred Delivery Methods of Surveyed Participants

Model	Sum of Squares	df	Mean Square	f	Sig.
Regression	8.651	g	.961	1.835	.081
Residual	30.900	59	.524		
Total	39.551	68			

Table 6 Regression Coefficients Matrix Preferred Delivery Methods of Surveyed Participants

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2.287	1.256		1.821	.074
How often do you use the internet? (choose only one answer)	-.146	.139	-.163	-1.052	.297
Do you currently use the internet to look up or read about nutrition or health information?	-.345	.276	-.178	-1.250	.216
How do you receive most of your nutrition information now?	.068	.040	.211	1.719	.091
Have you ever taken a nutrition class online	-.281	.191	-.181	-1.473	.146
In what area do you live?	.169	.085	.270	1.995	.051
What is your age range?	-.024	.084	-.033	-.281	.780
What is your gender?	.363	.345	.124	1.051	.297
What is your race/ethnicity category you identify with?	.054	.063	.102	.848	.400
What is your highest level of education?	.137	.087	.198	1.580	.119

Research Question 3- What are the expectations of a hybrid nutrition education class among limited income families in Tennessee?

The last open-ended question sought to identify what participants would like to see in a hybrid program. All comments are shown in Appendix C. Of the 80 respondents, 46 provided written answers to this question. Figure 3 shows a distribution of key words from participant comments. In coding, these comments fit four major themes.

- Cooking- Respondents (n= 19) described an interest in videos of cooking demonstrations and low-cost recipes.

“More help with ways to budget friendly cook”

“Include a step by step guide on how to prepare the food with the correct proportions.”

“Recipes videos and things I can cook for my kids that is healthy that they will like.”

- Physical Activity- Respondents (n=4) described an interest in exercise videos and correct position descriptions.
- Nutrition Information- Respondents (n= 12) described an interest in healthier eating and specific information on nutrients the body needs.

“I would really love to see talk about low carb diets. They seem to be the trend lately and would like to educate myself on the matter.”

- Delivery method – Respondents (n=9) described a preference in blended, in-person, or online only learning.

“I would prefer face to face, right now my kids are on virtual classes, and I see how it takes a toll on them, and right now due to me not having a personal laptop, it’s hard, but I use my phone.”



Figure 3 Cloud Visualization of Key Words from Participant Comments

These data show the overall perception of a hybrid nutrition education program for low-income audiences in Tennessee is positive. The correlation analysis identified a relationship between perception and residence; however, 50.6% of the participants surveyed felt it would not be difficult to participate in a hybrid nutrition education program. When asked if they felt confident that they would learn well in a nutrition education class delivered through a hybrid method, 50.7% agreed and 19.2% strongly agreed. The data also concluded there was not a preferred delivery method based on their residence, access to technology, or current method of receiving nutrition information. With only 17% of those surveyed preferring an in-person only class, the majority would prefer implementation of technology in some form. This population would like a hybrid class that is fun; easy to access; provides food demonstrations in person and through videos; provides quick low-cost recipes that are youth-friendly, and maintains accurate, current nutrition information.

CHAPTER V

DISCUSSION AND CONCLUSION

This study was designed to determine the perception of a hybrid nutrition education program among limited-income families in Tennessee. To examine the relationship, perceptions of hybrid nutrition education were measured in relation to residence, access to technology, and how current nutrition information is received. Additionally, the researcher explored the relationships between delivery method preference and participants' residence, access to technology, and how current nutrition information is received. Participants' expectations of a hybrid nutrition education class were also evaluated. The final chapter of this dissertation restates the research problem, reviews the methodology used in the study, interprets the findings, and discusses the implications.

While a vast amount of research has been conducted concerning barriers for low-income audiences completing nutrition education programs, less exists on methods of utilizing technology to address some of those barriers. In prior studies, members of the low-income audience were not included in the process of discussing interventions that might remove these barriers (Atkinson et al., 2010). While past research suggested this population in rural and urban areas does not have access to technology to participate in online learning, recent studies indicated that access to the Internet and bandwidth is becoming less of a limiting factor for nutrition education efforts in these areas (Leak et al., 2014).

This study was needed to assess limited-income families' perception of hybrid nutrition education to determine how receptive this population would be to a hybrid delivery method for nutrition education. Perception of a hybrid program was pursued to improve the program's success in reaching the target population and examine what strategies would motivate them to begin and complete the program.

As explained in Chapter III, this research used a quantitative approach to measure participants' perception of hybrid nutrition education. Eighty participants from six counties in Tennessee completed an online Likert-style survey consisting of questions concerning their experiences with technology, nutrition education, and nutrition information. A qualitative approach was used to identify what participants would like to experience in a hybrid nutrition education program. This qualitative information was gathered through an open-ended question at the end of the survey.

Limitations

There are some limitations to this study. This research was conducted during the height of the Coronavirus Disease 2019 (COVID-19) pandemic. Pandemic-related anxiety may have affected participants' ability to answer questions truthfully. These anxieties may have also affected FCS Agents' and Program Assistants' ability to recruit participants to participate in the study. Participants selected for this study may have found participation difficult due to multiple barriers, such as childcare, illness, or stresses from COVID-19. As mentioned, these barriers parallel what prevents them from participating in nutrition education interventions. Another limitation is that honesty and truthfulness may be limited due to a lack of trust. Participants

unfamiliar with the facilitator, EFNEP or SNAP-Ed may be hesitant to participate or provide truthful responses (Haynes-Maslow et al., 2019).

Discussion

In this chapter, the data results are interpreted to draw conclusions and discuss the findings and implications of providing nutrition education through a hybrid approach to limited-income families in Tennessee. These findings will provide direction and guidance for developing future nutrition education programs in Tennessee. Lack of access to technology, location of residence, and interest have been perceived as barriers for participants to complete nutrition education programs offered through other means than face-to-face. The most effective way to increase program engagement is to ensure the delivery method is deemed necessary to the priority audience.

Research Question 1. Is the perception of hybrid nutrition education for limited-income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information? The regression analysis showed a predictive relationship between where participants live and how they would perceive a hybrid nutrition education program. There was also a predictive relationship between how they currently receive nutrition information and how they would perceive a hybrid nutrition education program.

Given these findings, nutrition education providers should try to recruit participants to a hybrid nutrition education program. Of the participants surveyed, 47% agreed hybrid learning is just as good as face-to-face only learning and 48% agreed hybrid learning is as effective as online only learning (Table 7). This indicates that participants' perception of hybrid learning is positive. The researcher should consider where participants live and how they currently receive

nutrition information when developing and marketing the program. This supports research that rural SNAP-Ed participants would use online nutrition education resources (Loehmer, Smith, McCaffrey, & Davis, 2018), but may have significant disadvantages in digital skills (Welser, Khan, & Dickard, 2019). Greater marketing techniques and technical support may be needed in communities where e-learning may be considered difficult.

Table 7 Participants' Perception of Hybrid Learning

I believe hybrid learning is just as good as face-to-face only learning. N=79	Frequency	Valid Percent
Strongly disagree	4	5.5
Disagree	5	6.8
Undecided	15	20.5
Agree	35	47.9
Strongly agree	14	19.2
I believe hybrid learning is as effective as online only learning. N=79		
Strongly disagree	4	5.5
Disagree	8	11
Undecided	17	23.3
Agree	35	47.9
Strongly agree	9	12.3

Research Question 2. Is a preferred method of nutrition education delivery among limited-income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information? There was no significant correlation between where participants live, their access to technology, and their preferred delivery method for nutrition education. The findings also showed there was not a significant relationship

between how a participant receives nutrition information and their preference for delivery of nutrition education.

When asked which method participants preferred, only 17% preferred face-to-face only while 42% preferred online only and 39% preferred hybrid (Figure 4). These findings indicate most participants would like to utilize technology as a delivery method. Preference for a hybrid delivery method coincides with Neuenschwander’s (2012) findings that blended learning can be a valuable method of delivering nutrition education to low-income adults. Still, it could also be a way of retaining participants and reinforcing nutrition information on a longer-term basis. Given these findings, every effort should be made to provide a variety of delivery methods to participants.

How would you prefer to receive nutrition education?

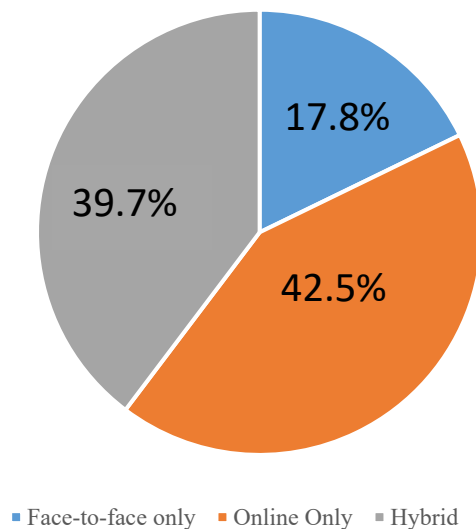


Figure 4 Participants’ Response to Delivery Method Preference for Nutrition Education

Research Question 3. What are the expectations of a hybrid nutrition education class among limited-income families in Tennessee? Participants provided feedback on what they would like to experience in a hybrid nutrition education course. Most of the responses focused on the online portion of the class. Findings indicate participants wanted an online program that was easy to access and use. Surveyed participants wanted a class that provides quick, easy recipes with specific guidance. Most respondents would like to see cooking examples or videos featuring kid-friendly, low-cost recipes. Exercise demonstration videos were also mentioned.

Participants desired to receive accurate information about fad diets and organic foods. Participants were also interested in an online component that provided basic nutrition information concerning health issues, benefits of different foods, and information on vitamins and minerals found in foods. Surveyed participants showed skepticism concerning the accuracy of information found online. Various online platforms offer unreliable information concerning foods and their benefits. They would like to believe the information they receive from a nutrition education class would be factual.

There were mixed responses concerning the delivery method of a hybrid class. Some participants expressed their overload of Zoom meetings and preference for face-to-face meetings, while others stated they would prefer the convenience of online sessions. Participants from both perspectives articulated a desire to include a format for discussion among participants. These findings indicate that a hybrid approach to course delivery would serve both audiences. As programs are developed, the researcher should consider how to market the benefits of a hybrid program during recruitment. Table 8 shows surveyed participants responses to this research question.

Table 8 Participants' Qualitative Responses

What is best for a type one diabetic to eat and still get full?
I think face-to-face learning is a great idea as well as online. I'm better with more hands on lessons and online so I can see what I'm learning about.
Recipe videos and things I can cook for my kids that healthy that they will like
Meal planning
Include a step by step guide on how to prepare the food with the correct proportions
I would prefer online classes it would be easier and more convenient for most people, I think
Exercise
Exercise positions for belly and glutes, keto diet information
Cooking-classes
Recipes, healthy eating, exercise
Some ways to eat healthy
Everything
Online virtual learning only
The truth. There is so much crazy information on the internet you don't know what to believe. I would want to get truthful information from the class.
Affordable, healthy snacks for picky children. High-calorie, smaller volume ideas for weight gain in children and toddlers.
I'm not sure as I have never done one
Maybe more in depth learning than just reading
More help with ways to budget friendly cook. Resources in my area to get food and information mailed to me. Gardening what works and canning preserving our own food.
Healthy eating tips, and plenty of recipes
Group challenges
Kid nutrition suggests and kid friendly veggies recipes
Face-to-face classes should have games and food preparation. Online classes should also have interactive games and chatrooms
I don't know
The basic covering the balances of carbs, protein, & fats that the body needs in each meal.
Cooking demonstrations
More vegetable stir-fry recipes Kid exercises Smoothies/Detox smoothies
Less junk-food more healthy foods. There is so much junk food out there. That nutrition class needs to happen every were to live life and be healthy.
MS Teams/Zoom with a month lab (face-to-face activity)
Fun recipes using fruit and smoothies.
I would really love to see talk about low carb diets. They seem to be the trend lately and would like to educate myself on the matter.
How to cut bad carbs and how to substitute healthier options for common meals.
In the face-to-face lessons, we could do the lesson or topic with some hands-on activities. And on the online classes, we could have a discussion about the class and what changes we did or planning to incorporate in our lives.
Food Demonstrations
I would prefer face-to-face, right now my kids are on virtual classes and I see how it takes a toll on them, and right now due to me not having a personal laptop, it's hard, but I use my phone.
This is new to me so I think in person face-to-face is better for my age group

Recommendations for Practice

A participant's perception of a hybrid program can vary according to the individual. While 23% of surveyed participants agreed it would be difficult to participate in a hybrid program, 30% disagreed, and 20% strongly disagreed (Figure 5). When asked if they felt confident they would learn well in a nutrition education class delivered through a hybrid method, 50.7% agreed and 19.2% Strongly agreed that they would (Figure 6). Potential participants' ideas, fears, or enthusiasm for a hybrid program should be considered; however, assumptions should not be made about this population's interests or ability to participate. For both face-to-face and online learning to be effective, organizations must thoroughly understand the advantages and limitations. Consideration of advantages and limitations of a hybrid program should take place during the instructional design process.

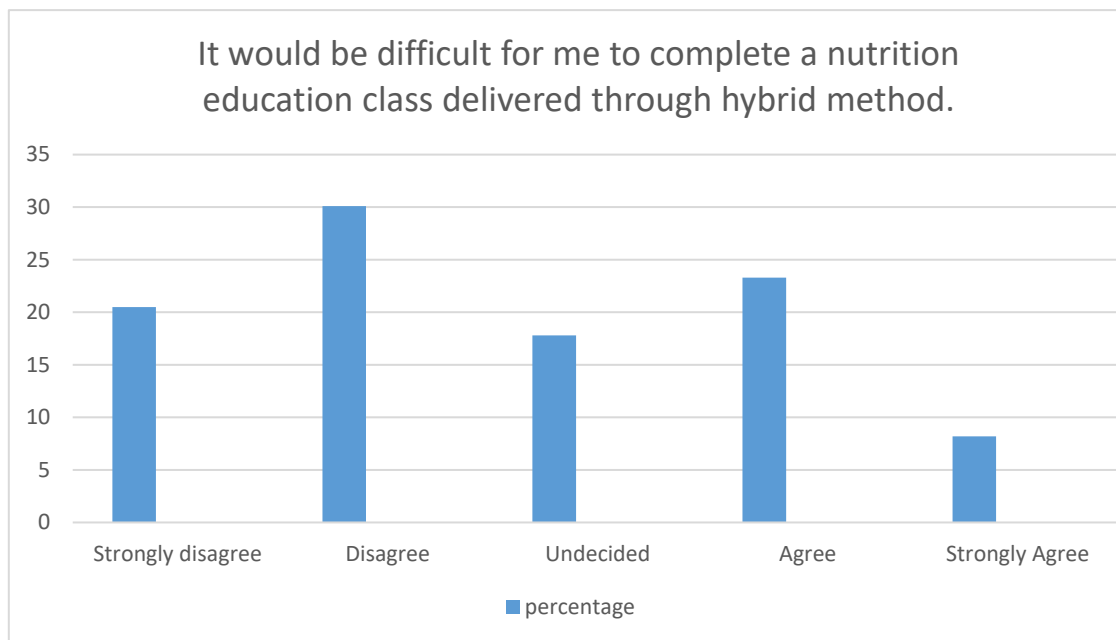


Figure 5 Participants' Response to Completing a Hybrid Nutrition Education Program

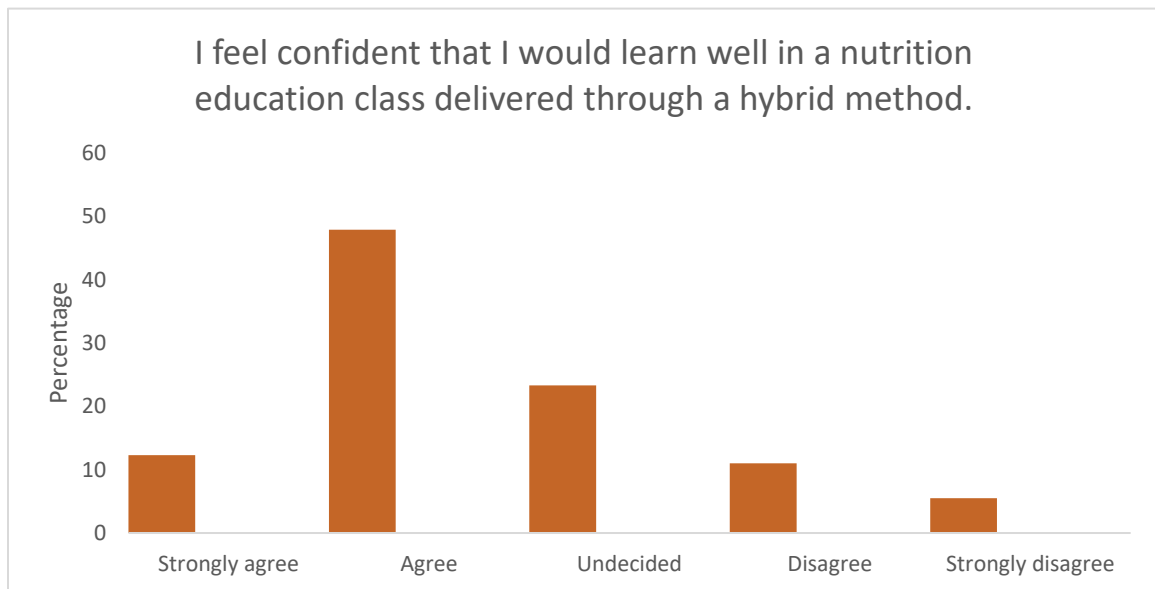


Figure 6 Participants' Response to Confidence in Learning in a Hybrid Nutrition Education Program

Development

Bandura (2008) stressed that a person's behavior both influences and is influenced by personal factors and the social environment. In this research, findings indicate a person's ability to complete a hybrid nutrition education program can be influenced by their perception. If their perception is positive, they may be more successful in completing the program. Their perception can also be influenced by where they live. If they live in an area where internet connection is weak or unstable, they may develop a negative perception of online learning. These findings also indicate that participants are confident in their ability to self-regulate their learning through a hybrid method. When creating programs using a hybrid delivery method, developers should

consider other personal and environmental factors identified in this research that can influence program retention and completion.

Discussion concerning barriers potential participants might face when participating in or completing a traditional in-person nutrition education program included transportation, childcare, and time. A hybrid program would assist in relieving some of those barriers because of its convenience. However, poor implementation of a hybrid program could prevent enrolled participants from completion and deter potential participants from enrolling. Developers should also consider other barriers participants might face when participating in and completing a hybrid nutrition education program. Barriers such as access to technology, ease of use, engagement, and relevant content could concern potential program participants. Creating solutions for these barriers would assist in making a hybrid program a more favorable option for program participants.

Access to technology for low-income families has been a concern for researchers (Fishbane & Tomer, 2020; Hale et al., 2010; Wilson, Wallin, & Reiser, 2003). This study supported previous research that concluded this population has access to technology primarily through mobile devices (Au et al., 2016; File & Ryan, 2013; Swindle et al., 2014). While 86% of surveyed participants stated they have access to technology, increased Internet access does not guarantee equitable services. After the spread of COVID-19, many households had poor Internet service that interfered with students learning at home (Adedoyin & Soykan, 2020; Bacher-Hicks & Goodman, 2021; Faza et al., 2021). Creating programs accessible through mobile devices and computers would be helpful specifically for those in rural communities.

Creating an online portion of a hybrid program that is easy to use for program participants is another consideration for developers. Surveyed participants listed ease of use as

an expectation. These findings are similar to findings from Case, Cluskey, and Hino (2011) and Stotz et al. (2017). When asked what they would like to see in an online portion of a class, a nutrition class participant replied, "Make it easy to use. I don't want to have to do a bunch of digging and clicking to get to what I want" (R. Nance, personal communication, March 25, 2021). Nutrition educators should allow time during in-person sessions to demonstrate accessing online portions of the program. Providing time for hands-on learning and written instructions using graphics and snapshots for those with limited reading skills can improve participants' hybrid experience.

Participants in this research identified engagement and interaction as an expectation of a hybrid nutrition education program. These findings coincide with findings of Benavente, Jayaratne, and Jones (2009). The nutrition educator serves as a facilitator providing information, guiding discussions, and providing resources for participants. This method of delivery requires a high level of self-regulation. Creating a learner-centered constructivist-learning environment encourages the participant to receive knowledge, apply it, solve problems, and discuss their thoughts and ideas. This learning environment can be accomplished through hands-on activities during face-to-face sessions, interactive modules during online sessions, and projects and activities to be completed outside the sessions.

When creating a hybrid nutrition education program, it is recommended that developers include relevant content for participants. Developers might enlist registered dietitians to ensure nutritional content is current and accurate. Surveyed participants suggested information concerning fad diets, organic foods, reducing grocery costs, and solutions for picky eaters as topics of interest. Quick, low-cost, healthy recipes were listed the most as something participants would want to see in a hybrid program. Participants also expressed an interest in

nutrition information concerning diet-specific topics. Educators should conduct food demonstrations in-person and provide recorded demonstrations that participants can view at their leisure. For both online and in-person sessions, nutrition educators should refer the participant to their doctor or registered dietitian for specific health concerns.

Recruitment

Certain strategies should be implemented to draw in the target audience. Innovative techniques may be needed to recruit participants to a hybrid nutrition education program. It is recommended that the developers promote the convenience of a self-paced, online component of the class while still having the ability to meet in-person with others to discuss relevant nutrition topics. This was identified as expectations of a hybrid nutrition education program in this research.

The nutrition education staff should get buy-in from local leaders before starting direct-education programming. Partnerships between nutrition education programs and non-nutrition education organizations are essential in helping to recruit and retain participants (Haynes-Maslow et al., 2019). When recruiting community agencies working with this population, nutrition educators should stress the importance of nutrition education and cooking skills that can enhance their clients' knowledge and provide life skills to assist them in making healthier choices for themselves and their families. When meeting with those in rural areas where Internet connection may be of a lower quality, facilitators might suggest participants use mobile devices to access the class, or the program might provide temporary hot spot devices for participants use. Conducting in-person classes in a central location common to potential participants might also encourage participation.

Educators could enlist the assistance of a reliable teen, young adult, or nutrition educator with experience working with youth to provide activities for children of potential participants during their in-person sessions. This service should be described during recruitment to assist in eliminating the barrier of childcare. The developer should also promote the classes on social media platforms such as Facebook and Pinterest. These platforms were most used by surveyed participants. Former participants may be willing to assist through recorded interviews about their success with the program. These interviews can also be posted on the program's social media platform.

Retention

Retaining participants in the population can be difficult. Many participants encounter multiple barriers, and participating in a nutrition class can seem overwhelming and uninteresting to some (Benavente et al., 2009; Laborie & Stone, 2015). Surveyed participants suggested using games, small group discussions, food demonstrations, and tastings to keep the participants engaged during in-person sessions. It is recommended during online sessions the facilitator should consider making pre-recorded videos that are short and relevant to the topic. Private Facebook pages could be created by the facilitator for the group and encourage participants to post a prepared recipe from the class. Facilitators could create a question for the day or week where participants can respond with their ideas and thoughts.

Recommendations for Further Study

Qualitative research can assist in assessing what gaps need to be filled to increase the retention of program participants. A qualitative study with this population would provide deeper

insight into their perceptions. Understanding how these perceptions are developed and if they could be altered would be beneficial to a program developer. Participants may perceive a hybrid nutrition education program as difficult because of the poor quality of Internet service in their area. In this case, the program designer can consider solutions applicable to the problem. As the instructional design is created, information gained through a qualitative study would assist in determining the best method of implementation.

Future research on the nutrition educator's perception of a hybrid nutrition education program would be valuable. As facilitators, nutrition educators are primary contributors to the success or failure of the program. Their positive or negative perception could influence the participants and affect retention. Identifying any common concerns they have will allow designers to develop strategies and solutions to overcome those concerns. This could be accomplished through training, coaching, and evaluation.

The purpose of implementing a hybrid nutrition education program is to increase the completion rates of program participants. Research has shown that those who have completed nutrition education programs are more likely to continue to make healthier food choices long term (Dollahite et al., 2014). This research identified the preference for this population includes technology in some format. Providing multiple delivery methods allows convenient options for participants to complete the program at their own pace while building relationships through in-person communications. Future research comparing completion rates of hybrid, online only, and face-to-face-only programs of low-income families in Tennessee would provide data to identify the most effective method.

Conclusion

The purpose of this study was to explore the perception of a hybrid nutrition education program among limited-income families in Tennessee. To explain the relationship, perceptions of hybrid nutrition education were measured in relation to residence, access to technology, and how current nutrition information is received. Additionally, the researcher explored the relationships between delivery method preference and participants' residence, access to technology, and how current nutrition information is received. Participants' expectations of a hybrid nutrition education class were also evaluated.

Now more than ever, it is important to be able to demonstrate program impact and its long-term implications. These findings make it easier to identify the needs of potential participants and develop programming to assist in fulfilling those needs. These findings show how technology has the potential to increase success of nutrition education recruitment and participant retention by expanding access and reducing barriers to completing classes. Providing lessons through virtual technology tools can assist in alleviating barriers related to transportation, geography, childcare, and disability. Offering virtual lessons alongside in-person options can increase valuable participant choice related to their preferred learning style and delivery format. Findings from this research showed this population would embrace learning from both in-person and online methods. As we develop new curricula and update current curricula, including a hybrid model for delivery could assist in the long-term success of program participants.

REFERENCES

- Achterberg, C., & Miller, C. (2004). Is one theory better than another in nutrition education? A viewpoint: more is better. *J Nutr Educ Behav*, 36(1), 40-42.
- Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive learning environments*, 1-13.
- Aini, Q., Budiarto, M., Putra, P. O. H., & Rahardja, U. (2020). Exploring e-learning challenges during the global covid-19 pandemic: A review. *Jurnal Sistem Informasi*, 16(2), 57-65.
- Aldowah, H., Al-Samarraie, H., & Ghazal, S. (2019). How course, contextual, and technological challenges are associated with instructors' individual challenges to successfully implement e-learning: A developing country perspective. *IEEE Access*, 7, 48792-48806.
- Alkon, A. H., Block, D., Moore, K., Gillis, C., DiNuccio, N., & Chavez, N. (2013). Foodways of the urban poor. *Geoforum*, 48, 126-135.
- Ammerman, A. S., Hartman, T., & DeMarco, M. M. (2017). Behavioral economics and the supplemental nutrition assistance program: Making the healthy choice the easy choice. *American Journal of Preventive Medicine*, 52(2S2), 145-150.
- Atkinson, N. L., Desmond, S. M., Saperstein, S. L., Billing, A. S., Gold, R. S., & Tournas-Hardt, A. (2010). Assets, challenges, and the potential of technology for nutrition education in rural communities. *Journal Nutrition Education and Behavior*, 42(6), 410-416. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S1499404609003868>
- Au, L. E., Whaley, S. E., Gurzo, K., Meza, M., & Ritchie, L. D. (2016). If you build it they will come: Satisfaction of wic participants with online and traditional in-person nutrition education. *Journal of Nutrition Education Behavior*, 48(5), 336-342.
- Au, L. E., Whaley, S. E., Gurzo, K., Meza, M., Rosen, M. J., & Ritchie, L. D. (2017). Evaluation of online and in-person nutrition education related to salt knowledge and behaviors among special supplemental nutrition program for women, infants, and children participants. *Journal of the Academy of Nutrition and Dietetics*, 117(9), 1384-1395.
- Auxier, B., & Anderson, M. (2021). *Social media use in 2021*. Retrieved from <https://www.pewresearch.org/internet/2021/04/07/social-media-use-in-2021/>

- Bacher-Hicks, A., & Goodman, J. (2021). The covid-19 pandemic is a lousy natural experiment for studying the effects of online learning: Focus, instead, on measuring the overall effects of the pandemic itself. *Education Next*, 21(4), 38-43.
- Bai, Y., Gao, C., & Goda, B. (2020). *Lessons learned from teaching cybersecurity courses during covid-19*. Paper presented at the Proceedings of the 21st Annual Conference on Information Technology Education.
- Baker, S., Garry, A., Ammerman, A. S., Lohse, B., Serrano, E., & Wardlaw, M. K. (2020). Identification of a framework for best practices in nutrition education for low-income audiences. *Journal of Nutrition Education Behavior*, 52(5), 546-552.
- Baldyga, W., & Petersmarck, K. (2005). Reducing health disparities: What is being done, what works. *Preventing Chronic Disease*, 2(2), 1-2.
- Balestracci, K., Sebelia, L., Greene, G., Moore, A., Chappell, K., & Tovar, A. (2019). Perceptions of low-income students completing a nutrition education program. *J Nutr Educ Behav*, 51(7), 834-842.
- Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-147.
- Bandura, A. (1991). Social cognitive theory of self regulation. *Organizational Behavior and Human Decision Process*, 50(2), 248-287.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Bandura, A. (2006). On integrating social cognitive and social diffusion theories. *Communication of Innovations: A journey with Ev Rogers*, 111-135.
- Bandura, A. (2008). Observational learning. *The international encyclopedia of communication*.
- Bandura, A., Freeman, W. H., & Lightsey, R. (1999). Self-efficacy: The exercise of control. In: Springer.
- Bandyopadhyay, S. (2020). Coronavirus disease 2019 (covid-19): We shall overcome. In (Vol. 22, pp. 545-546): Springer.
- Baron, S. L., Beard, S., Davis, L. K., Delp, L., Forst, L., Kidd-Taylor, A., . . . Welch, L. S. (2014). Promoting integrated approaches to reducing health inequities among low-income workers: Applying a social ecological framework. *American Journal of Industrial Medicine*, 57, 539-556.

- Becker, S., Crandall, M. D., Fisher, K. E., Kinney, B., Landry, C., & Rocha, A. (2010). Opportunity for all: How the American public benefits from internet access at U.S. libraries. *Institute of Museum and Library Services*.
- Ben-Shalom, Y., Fox, M. K., & Newby, P. K. (2012). *Characteristics and dietary patterns of healthy and less-healthy eaters in the low-income population*. Alexandria, VA: US Department of Agriculture Retrieved from <http://www.fns.usda.gov/sites/default/files/HEI.pdf>
- Benavente, L., Jayaratne, K. S., & Jones, L. (2009). Challenges, alternatives, and educational strategies in reaching limited income audiences. *Journal of Extension*, 47(6).
- Bensley, R. J., Anderson, J. V., Bruski, J. J., Mercer, N., & Rivas, J. (2011). Impact of internet vs traditional special supplemental nutrition program for women, infants, and children nutrition education on fruit and vegetable intake. *Journal of the American Dietetic Association*, 111(5), 749-755.
- Bensley, R. J., Hovis, A., Horton, K., Loyo, J. J., Bensley, K. M., Phillips, D., & Desmangles, C. (2014). Accessibility and preferred use of online web applications among WIC participants with internet access. *Journal of Nutrition Education and Behavior*, 46(3S), S87-S92.
- Bervell, B., & Arkorful, V. (2020). LMS-enabled blended learning utilization in distance tertiary education: Establishing the relationships among facilitating conditions, voluntariness of use and use behaviour. *International Journal of Educational Technology in Higher Education*, 17(1), 1-16.
- Brown-Guion, S. Y., Youngerman, S. M., Hernandez-Tejada, M. A., Dismuke, C. E., & Egede, L. E. (2013). Racial/ethnic, regional, and rural/urban differences in receipt of diabetes education. *The Diabetes Educator*, 39(3), 327-334.
- Burney, J. (2002). EFNEP: A nutrition education program that demonstrates cost-benefit. *Journal of American Dietetic Association*, 102(1), 39-45.
doi:[https://doi.org/10.1016/s0002-8223\(02\)90014-3](https://doi.org/10.1016/s0002-8223(02)90014-3)
- Buzzetto-More, N. A. (2008). Student perceptions of various 3-learning components. *Interdisciplinary journal of E-Learning and Learning Objects*, 4, 113-135.
- Campbell, C. E., Koszewski, W. M., & Behrends, D. (2013). The effectiveness of distance education, using a blended methods of delivery, for limited resource audiences in the nutrition education program. *Journal of Extension*, 109(9).
- Campbell, M. K., Honess-Moreale, L., Farrell, D., Carbone, E., & Barasure, M. (1999). A tailored multimedia nutrition education pilot program for low-income women receiving food assistance. *Health Education Research*, 14(2), 257-267.
- Carnevale, D. (2000). Study assesses what participants look for in high-quality online courses. *Chronicle of Higher Education*, 47(46).

- Case, P., Cluskey, M., & Hino, J. (2011). Online nutrition education: Enhancing opportunities for limited-resource learners. *Journal of Extension*, 49(6), 1-7.
- Center for Disease Control and Prevention. (2015). Childhood obesity facts. Retrieved from <http://www.cdc.gov/obesity/data/childhood.html>
- Center for Disease Control and Prevention. (2016). Defining adult overweight and obesity. Retrieved from <https://www.cdc.gov/obesity/adult/defining.html>
- Centers for Disease Control and Prevention. (2013). Preventing chronic diseases and reducing health risk factors. Retrieved from cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/overview/diseasesandrisk.htm
- Centers for Disease Control and Prevention. (2022). Healthy weight: Body mass index. Retrieved from <https://www.cdc.gov/healthyweight/assessing/bmi/>
- Chen, C.-f., Nelson, H., Xu, X., Bonilla, G., & Jones, N. (2021). Beyond technology adoption: Examining home energy management systems, energy burdens and climate change perceptions during COVID-19 pandemic. *Renewable and Sustainable Energy Reviews*, 145, 111066.
- Chipman, H. (2018). 2017 Impacts: Expanded food and nutrition education program. Retrieved from <https://nifa.usda.gov/sites/default/files/efnep-2018-annual-report.pdf>
- Chipman, H., Morriss, S., & Cherry, C. (2021). 2020 Impacts: Expanded food and nutrition education program. Retrieved from <https://www.nifa.usda.gov/efnep-2020-national-data-report>
- Contento, I. R. (2008). Nutrition education: Linking research, theory, and practice. *Asia Pacific Journal of Clinical Nutrition*, 17(1), 176-179.
- Cooper, B. R., Barale, K., Funaiolo, A., Power, T. G., & Combe, A. (2016). Participant and household characteristics associated with graduation from the expanded food and nutrition education program. *Journal Nutrition Education and Behavior*, 48(7).
- Diaz, J. (2020). Internet providers won't cut off users over unpaid bills for 60 days. *The New York Times*. Retrieved from <https://www.nytimes.com/2020/03/14/business/internet-providers-coronavirus.html>
- Dickin, K. L., Hill, T. F., & Dollahite, J. S. (2014). Practice-based evidence of effectiveness in an integrated nutrition and parenting education intervention for low-income parents. *Journal of the Academy of Nutrition and Dietetics*, 114(6), 945-950.
- Dietary Guidelines Advisory Committee. (2015). *Dietary guidelines for Americans 2015-2020*: Government Printing Office.

- Dollahite, J., Kenkel, D., & Thompson, C. S. (2008). An economic evaluation of the expanded food and nutrition education program. *J Nutr Educ Behav*, 40(3), 134-143.
- Dollahite, J., Olson, C., & Scott-Pierce, M. (2003). The impact of nutrition education on food insecurity among low-income participants in efnep. *Family and Consumer Sciences Research Journal*, 32(2), 127-139.
- Dollahite, J., Pijai, E. I., Scott-Pierce, M., Parker, C., & Trochim, W. M. (2014). A randomized controlled trial of a community-based nutrition education program for low-income parents. *Journal of Nutrition Education Behavior*, 46(2), 102-109.
- Dong, D., & Lin, B. H. (2009). Consumption by low-income americans: Would a price reduction make a difference? *Economic Research Report- United States Department of Agriculture*, 70.
- EFNEP. (2014). About efnep. Retrieved from <http://www.nifa.usda.gov/nea/food/efnep/about.html>
- Evans, J. M., Newton, R. W., Ruta, D. A., MacDonald, T. M., & Morris, A. D. (2000). Socio-economic status, obesity and prevalence of Type 1 and Type 2 diabetes mellitus. *Diabetic medicine*, 17(6), 478-480.
- Fan, J. X., Wen, M., & Li, K. (2020). Associations between obesity and neighborhood socioeconomic status: Variations by gender and family income status. *SSM-Population Health*, 10, 100529.
- Faza, A., Santoso, H. B., & Putra, P. O. H. (2021). *Challenges and opportunities of online learning implementation during the covid-19 pandemic: Lecturers' perspective*. Paper presented at the 2021 4th International Conference on Information and Communications Technology (ICOIACT).
- File, T., & Ryan, C. (2013). *Computer and internet use in the united states*. Retrieved from <https://www.census.gov/history/pdf/2013computeruse.pdf>
- Finkelstein, E. A., Trogdon, J. G., & Cohen, J. W. (2009). Annual medical spending attributable to obesity: Payer-and service- specific estimates. *Health Affairs*, 28(5), W822-W831.
- Fishbane, L., & Tomer, A. (2020). As classes move online during covid-19, what are disconnected students to do. *Brookings Institute*. Retrieved from <https://www-proquest-com.proxy.lib.utc.edu/docview/2380614220>
- Food and Nutrition Service. (2016). Supplemental Nutrition Assistance Program. Retrieved from <http://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program-snap>
- Food and Nutrition Service. (2022). Healthy Eating Index. Retrieved from <https://www.fns.usda.gov/healthy-eating-index-hei>

- Fox, M. K., & Cole, N. (2004). *Nutrition and health characteristics of low-income populations: Volume I, food stamp program participants and nonparticipants*. Retrieved from http://www.ers.usda.gov/media/331314/efan04014-1fm_1_.pdf
- Fox, M. K., Hanson, C., & Briefel, R. (2007). *Nutrition education research brief: Message framing, use of interactive technology to tailor messages, and intervention intensity*. Retrieved from <https://ideas.repec.org/p/mpr/mprres/9bff52e91e0048ddb064c872afce59e2.html>
- Francis, S. L., Martin, P., & Taylor, K. (2011). Revising an extension website for limited resource audiences using social marketing theory. *Journal of Extension*, 49(6). Retrieved from <http://www.joe.org/joe/2011december/a7.php>
- Franklin, B., Jones, A., Love, D., Puckett, S., Macklin, J., & White-Means, S. (2012). Exploring mediators of food insecurity and obesity: A review of recent literature. *Journal of Community Health*, 37(1), 253-264. doi:10.1007/s10900-011-9420-4
- Gibson, D. (2003). Food stamp program participation is positively related to obesity in low income women. *Journal on Nutrition*, 133(7), 2225-2231.
- Gliner, J. A., Morgan, G. A., & Leech, N. L. (2009). *Research methods in applied settings* (Vol. 2). New York, NY: Routledge Publishing.
- Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Bordon, W. B., . . . Turner, M. B. (2013). Heart disease and stroke statistics—2013 update: A report from the American Heart Association. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23239837>
- Guenther, P. M., Juan, W. Y., Lino, M., A., H. H., Fungwe, T. V., & Lucas, R. (2009). Diet quality of low-income and higher income Americans in 2003-04 as measured by the healthy eating index-2005. *Federation of American Societies for Experimental Biology*, 23(S1), 540.
- Guenther, P. M., & Luick, B. R. (2015). Improved overall quality of diets reported by expanded food and nutrition education program participants in mountain region. *J Nutr Educ Behav*, 47(5).
- Hale, T. M., Cotten, S. R., Drentea, P., & Goldner, M. (2010). Rural-urban differences in general and health related internet use. *American Behavioral Scientist*, 53(9), 1304-1325.
- Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). *Prevalence of obesity among adults and youth: United States, 2015-2016*. (288). Hyattsville, MD: National Center for Health Statistics Retrieved from <https://www.cdc.gov/nchs/data/databriefs/db288.pdf>
- Haynes-Maslow, L., Osborne, I., & Pitts, S. J. (2019). Examining barriers and facilitators to delivering SNAP-ED direct nutrition education in rural communities. *American Journal of Health Promotion*, 33(5), 736-744.

- Hersey, J. C., Cates, S. C., Blitstein, J. L., & Williams, P. A. (2014). *Snap-ed can improve nutrition of low-income americans across life span*: RTI Press/RTI International.
- Houle, B., Holt, J., Gillespie, C., Freedman, D. S., & Reyes, M. (2009). Use of density-equalizing cartograms to visualize trends and disparities in state-specific prevalence of obesity: 1996-2006. *Am J Public Health, 99*(2), 308-312.
doi:10.2105/AJPH.2008.138750
- Hruby, A., Manson, J. E., Qi, L., Malik, V. S., Rimm, E. B., Sun, Q., . . . Hu, F. B. (2016). Determinants and consequences of obesity. *American Journal of Public Health, 106*(9), 1656-1662.
- Jilcott, S. B., Wall-Bassett, E. D., Burke, S. C., & Moore, J. B. (2011). Association between food insecurity, supplemental nutrition assistance program (snap)benefits, and body mass index among adult females. *Journal of American Dietetic Association, 111*(11), 1741-1745.
- Jin, Y., & Jones-Smith, J. C. (2015). Associations between family income and children's physical fitness and obesity in california, 2010–2012. *Preventing Chronic Disease, 12*.
- Jones, K., Eathington, P., Baldwin, K., & Sipsma, H. (2014). The impact of health education transmitted via social media or text messaging on adolescent and young adult risky sexual behavior. *Sexually transmitted diseases, 41*(7), 413-419.
- Laborie, K., & Stone, T. (2015). *Interact and Engage*. Alexandria, VA: ATD Press.
- Lange, S. J., Kompaniyets, L., Freedman, D. S., Kraus, E. M., Porter, R., Blanck, H. M., & Goodman, A. B. (2021). Longitudinal trends in body mass index before and during the COVID-19 pandemic among persons aged 2–19 years—United States, 2018–2020. *Morbidity and Mortality Weekly Report, 70*(37), 1278.
- Leak, T. M., Benavente, L., Goodell, S., Lassiter, A., Jones, L., & Bowen, S. (2014). EFNEP graduates' perspectives on social media to supplement nutrition education: Focus group findings from active users. *J Nutr Educ Behav, 46*(3), 203-208.
- Lee, C.-Y., & Witta, E. L. (2001). *Online students' perceived self-efficacy: Does it change?* Paper presented at the National Convention of the Association for Educational Communications and Technology, Atlanta, GA. Retrieved from <https://files.eric.ed.gov/fulltext/ED470094.pdf>
- Leung, C. W., Hoffnagle, E. E., Lindsay, A. C., Lofink, H. E., Hoffman, V. A., Turrell, S., . . . Blumenthal, S. J. (2013). A qualitative study of diverse experts' views about barriers and strategies to improve the diets and health of supplemental nutrition assistance program (snap)beneficiaries. *Journal of the Academy of Nutrition and Dietetics, 113*(1), 70-76.
- Leung, C. W., Musicus, A. A., Willett, W. C., & Rimm, E. B. (2017). Improving the nutritional impact of the supplemental nutrition assistance program: Perspectives from the participants. *American Journal of Preventive Medicine, 52*(2S2), 193-198.

- Loehmer, E., Smith, S., McCaffrey, J., & Davis, J. (2018). Examining internet access and social media application use for online nutrition education in SNAP-Ed participants in rural illinois. *Journal of Nutrition Education Behavior*, 45(1), 75-82.
- Lohse, B. (2013). Facebook is an effective strategy to recruit low-income women to online nutrition education. *J Nutr Educ Behav*, 45(1), 69-76.
- Long, V., Cates, S., Blitstein, J., Deehy, K., Morgan, R., Fantacone, J., . . . Hersey, J. (2013). Supplemental nutrition assistance program education and evaluation study wave II. Retrieved from https://fns-prod.azureedge.us/sites/default/files/SNAPedWaveII_Summary.pdf
- Lu, I., Hanson, K. L., Pitts, S. B. J., Kolodinsky, J., Ammerman, A. S., Sitaker, M., . . . Garner, J. (2021). Perceptions of nutrition education classes offered in conjunction with a community-supported agriculture intervention among low-income families. *Public Health Nutrition*, 24(10), 3028-3036.
- Mahawar, M. S., & Nandedkar, T. (2019). Student's perception towards effectiveness of e-learning. *International Bulletin of Management and Economics*, 189-194.
- Manfuso, L. (2020). How the remote learning pivot could shape higher ed IT. *EdTech magazine*. Retrieved from <https://edtechmagazine.com/higher/article/2020/04/how-remote-learning-pivot-could-shape-higher-ed-it>
- McFerren, M. M. (2007). *Incentives & barriers to participation in community nutrition education programs for recipients of food stamps and temporary assistance for needy families*. Virginia Polytechnic Institute and State University, Retrieved from http://www.researchgate.net/publication/228585855_Incentives_Barriers_to_Participation_in_Community_Nutrition_Education_Programs_for_Recipients_of_Food_Stamps_and_Temporary_Assistance_For_Needy_Families?enrichId=rgreq-fb6c8f6f-6b3d-462b-97aa-4e4a47de4177&enrichSource=Y292ZXJQYWdlOzIyODU4NTg1NTtBUzoyMjI5NzExODk4Mjk2MzJAMTQzMDE3MTg4MjM1OQ%3D%3D&el=1_x_2
- Middaugh, A. L., Fisk, P. S., Brunt, A., & Rhee, Y. S. (2012). Few associations between income and fruit and vegetable consumption. *J Nutr Educ Behav*, 44(3), 196-203.
- Morgan, H. (2020). Best practices for implementing remote learning during a pandemic. *The clearing house: A journal of educational strategies, issues and ideas*, 93(3), 135-141.
- Neuenschwander, L. M., Abbott, A., & Mobley, A. R. (2012). Assessment of low-income adults' access to technology implications for nutrition education. *J Nutr Educ Behav*, 44(1), 60-65.
- Neuenschwander, L. M., Abbott, A., & Mobley, A. R. (2013). Comparison of a web-based vs in-person nutrition education program for low-income adults. *Journal of the Academy of Nutrition and Dietetics*, 113(1), 120-126.

- Ogden, C. L., Carroll, M. D., Frayer, C. D., & Flegal, K. M. (2015). *Prevalence of obesity among adults and youth: United states, 2011-2014*. Retrieved from Hyattsville, MD:
- Ogden, C. L., Lamb, M. M., Carroll, M. D., & Flegal, K. M. (2010). *Obesity and socioeconomic status in adults: United states 1988-1994 and 2005-2008*. Hyattsville, MD: National Center for Health Statistics
- Pan, L., Freedman, D. S., Sharma, A. J., Castellanos-Brown, K., Park, S., Smith, R. B., & Blanck, H. M. (2016). Trends in obesity among participants aged 2-4 years in the special supplemental nutrition program for women, infants, and children-united states, 2000-2014. *Morbidity and Mortality Weekly Report*, 65(45), 1256-1260. Retrieved from <http://dx.doi.org/10.15585/mmwr.mm6545a2>
- Quang, H. N., & Tri, H. M. (2021). The challenges and opportunities of online learning during Covid-19 pandemic. *HO CHI MINH CITY OPEN UNIVERSITY JOURNAL OF SCIENCE-SOCIAL SCIENCES*, 11(1), 3-14.
- Reyes, N. R., Klotz, A. A., & Herring, S. J. (2013). A qualitative study of motivators and barriers to healthy eating in pregnancy for low-income, overweight, african-american mothers. *Journal of the Academy of Nutrition and Dietetics*, 113(9), 1175-1181.
- Rustad, C., & Smith, C. (2013). Nutrition knowledge and associated behavior changes in a holistic, short-term nutrition education intervention with low-income women. *J Nutr Educ Behav*, 45(6), 490-498.
- Sanders, D., & Morrison-Shetlar, A. (2002). Students attitudes toward web-enhanced instruction in an introductory biology course. *Journal of Research on Computing in Education*, 33(3), 251-262.
- Schunk, D. H. (2012). *Learning theories: An educational perspective*. Boston, MA: Allyn & Bacon.
- Schuster, E. (2012). Mobile learning and the visual web, oh my! Nutrition education in the 21st century. *Journal of Extension*, 50(6).
- Seguin-Fowler, R. A., Hanson, K. L., Jilcott Pitts, S. B., Kolodinsky, J., Sitaker, M., Ammerman, A. S., . . . Wang, W. (2021). Community supported agriculture plus nutrition education improves skills, self-efficacy, and eating behaviors among low-income caregivers but not their children: a randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity*, 18(1), 1-19.
- Shlenskaya, N., Karnaukhova, A., Son, L., & Lapteva, E. (2020). *Teachers' burnout in online university courses in the time of pandemic*. Paper presented at the 2020 The 4th International Conference on Education and Multimedia Technology.

- Sibrian, J., Hutapea, K., Dunbar, G. B., & Kawar, L. N. (2022). A virtual world: New graduated education in the era of covid-19. *The Journal of Continuing Education in Nursing*, 53(7), 307-311.
- Sinclair, M. (2007). A guide to understanding theoretical and conceptual frameworks. *Evidence Based Midwifery*, 5(2), 39.
- Smith, T. M., Colón-Ramos, U., Pinard, C. A., & Yaroch, A. L. (2016). Household food insecurity as a determinant of overweight and obesity among low-income Hispanic subgroups: data from the 2011–2012 California Health Interview Survey. *Appetite*, 97, 37-42.
- Sneed, C., Franck, K., & Vineyard, M. (2017). Are we listening? How to engage low-income caregivers with nutrition messaging. *Journal Nutrition Education and Behavior*, 49(7S1), S19.
- Stotz, S., Lee, J. S., & Hall, J. (2018). A mixed-methods evaluation using low-income adult Georgians' experience with a smartphone-based elearning nutrition education programme. *Public Health Nutrition*, 21(17), 3271-3280.
- Stotz, S., Lee, J. S., Rong, H., & Murray, D. (2017). The feasibility of an eLearning nutrition education program for low-income individuals. *Health promotion practice*, 18(1), 150-157.
- Swindle, T. M., Ward, W. L., Whiteside-Mansell, L., Bokony, P., & Pettit, D. (2014). Technology use and interest among low-income parents of young children: Differences by age group and ethnicity. *Journal of Nutrition Education Behavior*, 46(6), 484-490.
- Tennessee Department of Human Services. (2022). Tennessee monthly snap participation. Retrieved from <https://www.tn.gov/content/dam/tn/human-services/documents/2022%20-08%20SNAP%20Participation%20Report.pdf>
- Thurmond, V. A., Wambach, K., Connors, H. R., & Frey, B. B. (2002). Evaluation of student satisfaction: Determining the impact of web-based environment by controlling for student characteristics. *The American Journal of Distance Education*, 16(3), 169-189.
- Trivedi, T., Liu, J., Probst, J., Merchant, A., Jones, S., & Martin, A. B. (2015). Obesity and obesity-related behaviors among rural and urban adults in the USA. *Rural and remote health*, 15(4), [217]-[227].
- U.S. Census Bureau. (2020). 2019 Census data on income and poverty in Tennessee. Retrieved from <https://www.sycamoreinstitutetn.org/wp-content/uploads/2020/10/2020.10.01-FINAL-2019-Census-Data-on-Income-and-Poverty-in-TN.pdf>
- U.S. Census Bureau. (2021). United states census bureau quick facts: Tennessee. Retrieved from <https://www.census.gov/quickfacts/TN>

- University of Tennessee Extension. (2015). UT extension tncep/efnep adult participant survey. Retrieved from <https://www.fcs.tennessee.edu>
- US Department of Health and Human Services. (2018). Poverty thresholds and poverty guidelines. Retrieved from <https://aspe.hhs.gov/frequently-asked-questions-related-poverty-guidelines-and-poverty#differences>
- USDA. (2010). *Dietary Guidelines for Americans, 2010* (7th ed.). Washington, DC: US Government.
- USDA. (2014). Supplemental Nutrition Assistance Program, . Retrieved from <https://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program>
- van Rensburg, E. S. J. (2018). Effective online teaching and learning practices for undergraduate health sciences students: An integrative review. *International Journal of Africa Nursing Sciences*, 9, 73-80.
- Vedovato, G. M., Surkan, P. J., Steeves, E. A., Han, E., Trude, A. C., Kharmats, A. Y., & Gittelsohn, J. (2015). Food insecurity, overweight and obesity among low-income african-american families in baltimore city: Associations with food-related perceptions. *Public Health Nutrition*, 19(8), 1405-1416. doi:10.1017/S1368980015002888
- Welser, H. T., Khan, M. L., & Dickard, M. (2019). Digital remediation: Social support and online learning communities can help offset rural digital inequality. *Information, Communication & Society*, 22(5), 717-723.
- Whatnall, M. C., Patterson, A. J., Ashton, L. M., & Hutchesson, M. J. (2017). Effectiveness of brief nutrition interventions on dietary behaviours in adults: A systematic review. *Appetite*, 120, 335-347.
- Whisner, C. M., Bruening, M., & O'Brien, K. O. (2016). A brief survey of dietary beliefs and behaviors of pregnant adolescents. *Journal of Pediatric and Adolescent Gynecology*, 29(5), 476-481.
- WHO. (2020). WHO director-general's opening remarks at the media briefing on COVID-19 Retrieved from <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
- Wilson, K. R., Wallin, J. S., & Reiser, C. (2003). Social stratification and the digital divide. *Social Science Computer Review*, 21(2), 133-143. Retrieved from <https://journals-sagepub-com.proxy.lib.utc.edu/doi/abs/10.1177/0894439303021002001>
- Zimmerman, B. J., & Schunk, D. H. (2001). *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

APPENDIX A
IRB APPROVAL LETTER

Reliance Agreement

Reviewing Institution:

Name: University of Tennessee, Knoxville (UT)
FWA#: 00006629 IRB Registration#: 00000103 IORG#: 0000071
Contact: Jennifer Engle, PhD. Director HRPP
Phone: 865-974-7687 Email: jengle@utk.edu

Relying Institution:

Name¹: University of Tennessee, Chattanooga (UTC)
FWA#: FWA00004149
Contact Name: David Deardorff Phone: 423-425-4443 Email: david-deardorff@utc.edu

Special Instructions: Please provide copy of IRB findings consequent to review.

The Officials signing below agree that Relying Institution may rely on the UT IRB for review and continuing oversight of its human subjects research study described below. This agreement is limited to the following specific study:

Study Information:

Title: The Perception of Hybrid Nutrition Education Among Limited Resource Families in Tennessee
UT IRB#: 20-06022-XP
UT Investigator: Rita R. Jackson UT Investigator Email: rjacks15@utk.edu
Relying Investigator(s): Dr. Elizabeth Crawford Relying Investigator Email: Beth-Crawford@utc.edu
Relying Investigator(s) Activities:
Sponsor: Award Number:

The review performed by UT IRB will meet the human subject protection requirements of Relying Institution's OHRP-approved FWA. The UT IRB will follow written procedures for reporting its findings and actions to appropriate officials at Relying Institution. The UT IRB will provide relevant minutes of IRB meetings to Relying Institution upon request. Relying Institution remains responsible for ensuring compliance with UT IRB's determinations and with the Terms of its OHRP-approved FWA. This document must be kept on file by both parties and provided to OHRP upon request.

UT Signatory Official: Sarah Pruett Digitally signed by Sarah Pruett
Date: 2020.12.16 09:37:19 -05'00' Date: _____
Sarah Pruett, Ph.D., Assistant Vice Chancellor for the Responsible Conduct of Research, Institutional Research Integrity Officer
865-974-9918 spruett1@utk.edu

Relying Institution Signatory Official: Joanne G Romagni Digitally signed by Joanne G Romagni
Date: 2020.11.09 14:08:40'00' Date: _____
Name: Joanne Romagni, PhD Title: Vice Chancellor for Research and Dean of the Graduate School
Phone: 423-425-4478 Email: joanne-romagni@utc.edu

¹ Relying Institution may be required to designate UT's IRB on their OHRP-approved FWA. For more information, please see the [OHRP FAQs](#).



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

December 29, 2020

Rita Rowe Jackson

UTIA - UTIA - EXT-Family and Consumer Science

Re: UTK IRB-20-06022-XM

Study Title: The Perception of a Hybrid Nutrition Education Program Among Limited Resource Families in Tennessee

Dear Rita Rowe Jackson:

The Human Research Protections Program (HRPP) reviewed your application for the above referenced project and determined that your application is eligible for exempt review under 45 CFR 46.101, Category 2: Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by .111(a)(7).

You may use a Consent Cover Statement in lieu of an informed consent interview. The requirement to secure a signed consent form is waived; willingness of the subject to participate will constitute adequate documentation of consent.

Your application has been determined to comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects. This letter constitutes full approval of your application (Version 1.3), and the following study documents:

- Jackson Online nutrition education consent form v. 1.1
- Jackson hybrid education survey v. 1.1
- Nutrition education recruitment script v. 1.1

In the event that volunteers are to be recruited using solicitation materials, such as brochures, posters, web-based advertisements, etc., these materials must receive prior approval of the IRB.

Please note that restrictions are in place due to the COVID-19 pandemic, and all in-person contact with research participants is on hold until further notice.

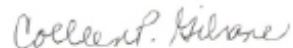
- Newly-approved studies with in-person interactions may not begin enrollment until further notice from the IRB/HRPP.
- Newly-approved studies with no in-person participant interaction may begin after receiving IRB approval.

Please monitor the COVID-19 Updates at <https://www.utk.edu/coronavirus/faq/> for the latest information. Human Subjects Research updates are being filed under Information for Instructors/Research.

Any alterations (revisions) in the protocol or study documents must be promptly submitted to and approved by the UTK Institutional Review Board prior to implementation of these revisions.

You have individual responsibility for reporting to the Board in the event of unanticipated or serious adverse events.

Sincerely,



Colleen P. Gilrane, Ph.D.

Chair

Institutional Review Board | Office of Research & Engagement
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Flagship Campus of the University of Tennessee System

APPENDIX B
VARIABLE ANALYSIS

Variable analysis

RQ1: Is the perception of hybrid nutrition education for limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?

	Variable Labels	Levels of the Variable	Scale of Measurement
Dependent Variable(s)	Perception of hybrid nutrition education Q: 21,22,23,24,25, 26	1= strongly disagree 2= disagree 3= undecided 4=agree 5=strongly agree	Scale
Independent Variables	Residence Q:27	1=urban 2=rural	Nominal
	Access to technology Q: 2,3,4,5,6,7,8,9,10	1= mobile device 2=home computer 3=computer at library/community center 4=work computer 5=other	Nominal
	Receiving nutrition information Q: 11,12,13,14,15,16,18,19,21	1=Facebook 2=TV 3=doctor 4=friends 5=nutritionist/dietician 6=reading 7=other online methods	Nominal

RQ2: Is a preferred method of nutrition education delivery among limited income families in Tennessee associated with their access to technology, where they live, and how they currently receive nutrition information?

	Variable Labels	Levels of the Variable	Scale of Measurement
Dependent Variable(s)	Preferred delivery method Q: 20	1= face to face only 2=face to face and online 3= online only	Ordinal
Independent Variables	Residence Q:27	1=urban 2=rural	Nominal
	Access to technology Q:2,3,4,5,6,7,8,9,10	1= mobile device 2=home computer	Nominal

		3=computer at library/community center 4=work computer 5= other	
	Receiving nutrition information Q: 11,12,13,14,15,16,18,19,21	1=Facebook 2=TV 3=doctor 4=friends 5=nutritionist/dietician 6=reading 7=other online methods	Nominal

RQ3: What are the expectations of a hybrid nutrition education class among limited income families in Tennessee?

This research question would be a qualitative piece of the research identifying the participants' expectations of a hybrid nutrition education class. Data collected would provide the researcher information on what the participant would expect from a hybrid nutrition education class in regards to content, design, and ease of use.

Attribute Variables:

	Variable Labels	Levels of the Variable	Scale of Measurement
	Past online experience Q: 6,10,11,12,13,17	1=yes 2=no	Nominal
	Level of education Q 29	1=high school graduate/GED 2=some college 3=college graduate 4=other	Ordinal
	Gender Q28	1=male 2=female 3=prefer not to answer	Nominal
	Age Q 26	Number	Scale
	Past nutrition education Q 17	1=yes 2=no	Nominal

APPENDIX C

RESEARCH PARTICIPANT TECHNOLOGY USE SURVEY

Research Participant Technology Use Survey

This survey will ask about your experience with nutrition education in an online and face-to-face setting. We will use the results of this survey to help plan future nutrition education programs through the University of Tennessee. This survey is voluntary and your answers will be confidential. Responses will not be identified by individuals. All responses will be compiled and analyzed as a group.

1. I have read the Consent for Research Participation and been given the chance to ask questions and have my questions answered. If I have more questions, I have been told who to contact. By clicking the "I Agree" button below, I am agreeing to be in this study. I can print or save a copy of this consent information for future reference. If I do not want to be in this study, I will click "I do not Agree" and the survey will end.
 - a. I Agree
 - b. I do not Agree

2. How often do you use a computer (Desktop or Laptop)?
 - a. Never
 - b. A few times per month
 - c. At least once a week
 - d. A few days per week
 - e. Every day

3. Where do you most often use a computer? (Choose only one answer)
 - a. Home
 - b. Other family member's or friend's home
 - c. Work
 - d. Library
 - e. School
 - f. Store or restaurant
 - g. Other (Please explain): _____

4. Do you have a mobile phone with active service?
 - a. Yes
 - b. No

5. Do you send and receive text messages from a mobile phone
 - a. Yes

- b. No
6. Do you have a Smart phone that can download and use applications (“apps”)?
- a. Yes
 - b. No
7. How often do you use the Internet? (Choose only one answer)
- a. Never
 - b. A few times per month
 - c. At least once a week
 - d. A few days per week
 - e. Every day
8. What device do you most use to access the Internet? (Choose only one answer.)
- a. Computer (desktop or laptop)
 - b. Mobile Phone
 - c. Tablet (such as iPad, iPad Mini, Kindle Fire or Samsung Galaxy)
9. Do you use high-speed Internet where you live?
- a. Yes
 - b. No
10. Where do you most often use the Internet? (Choose only one answer)
- a. Home
 - b. Other family member’s or friend’s home
 - c. Work
 - d. Library
 - e. School
 - f. Other (Please explain): _____
11. Do you use the Internet currently to look up or read about nutrition or health information?
- a. Yes
 - b. No
12. If you answered “yes” to question 11, please select what you have used the Internet to learn more about in the past month (Choose only one answer)
- a. Recipes
 - b. Healthy eating information
 - c. Exercise tips
 - d. Food safety information

- e. Food budgeting information
 - f. Other (Please explain): _____
13. Have you changed your eating or health habits as a result of the information you found on the Internet?
- a. Yes
 - b. No
14. Do you use any social media sites currently to look up or read about nutrition or health information, such as ideas for healthy eating, exercise, or recipes?
- a. Yes
 - b. No
15. If you answered “yes” to question 14, select which social media sites you use the most to look up or read about nutrition or food information (Choose only one answer).
- a. Facebook
 - b. Twitter
 - c. Pinterest
 - d. Instagram
 - e. YouTube
 - f. Google Plus
 - g. Other (Please explain): _____
16. If you answered “yes” to question 14, please select the items that you have used social media to learn about the most in the past month: (Choose only one answer)
- a. Recipes.
 - b. Healthy eating information.
 - c. Exercise tips
 - d. Food safety information
 - e. Food budgeting information
 - f. Other (Please explain): _____
17. Has the information on social media helped you to change any health or eating habits?
- a. Yes.
 - b. No
18. Have you ever taken a nutrition class online?
- a. Yes
 - b. No

19. How would you prefer to receive nutrition education? (Choose only one answer)
- Face to face setting only (classroom or individual teaching)
 - Online only
 - Hybrid (face to face and online combined)
20. How do you receive most of your nutrition information now? (Choose only one answer)
- Social media (Facebook, twitter, Pinterest, Instagram, YouTube)
 - TV
 - Doctor
 - Friend
 - Nutritionist/dietician
 - Reading
 - Other online methods
21. It would be difficult for me to complete a nutrition education class delivered through hybrid method (face to face and online combined).
- Strongly disagree
 - Disagree
 - Undecided
 - Agree
 - Strongly agree
22. If you were to receive nutrition education in a method other than a classroom setting (using a form of technology), in what format would you like to receive this? (Choose only one answer).
- Visiting a website
 - Facebook posts
 - Emails
 - Videos, such as YouTube or Vimeo
 - Online games
 - Twitter posts
 - Text messaging
 - Phone calls
 - Group support, such as online group chats or message boards
 - Online interactive group classes, such as lessons that include video chats
 - Mobile application (“app”) on phone
23. I believe hybrid (face to face and online combined) learning is as good as face to face only learning. (Choose only one answer)
- Strongly disagree

- b. Disagree
 - c. Undecided
 - d. Agree
 - e. Strongly agree
24. I believe hybrid (face to face and online combined) learning is as effective as online only learning. (Choose only one answer)
- a. Strongly disagree
 - b. Disagree
 - c. Undecided
 - d. Agree
 - e. Strongly agree
25. I feel confident that I would learn well in a nutrition education class delivered through a hybrid method. (Choose only one answer)
- a. Strongly disagree
 - b. Disagree
 - c. Undecided
 - d. Agree
 - e. Strongly agree
26. I do not believe a hybrid method is an effective delivery method for nutrition education. (Choose only one answer)
- a. Strongly disagree
 - b. Disagree
 - c. Undecided
 - d. Agree
 - e. Strongly agree
27. In what area do you live? (Choose only one answer)
- a. Farm
 - b. Towns under 10,000 and rural non-farm
 - c. Towns and cities 10,000- 50,000
 - d. Suburbs of cities over 50,000
 - e. Central cities over 50,000
28. What is your age range?
- a. 18-25
 - b. 26-35
 - c. 36-45
 - d. 46-55

- e. 56 or older
29. What is your gender?
- a. Male
 - b. Female
 - c. _____
30. What is your race/ethnicity category you identify with?
- a. American Indian or Alaskan Native
 - b. Asian
 - c. Black or African American
 - d. Hispanic/Latino
 - e. Native Hawaiian or Other Pacific Islander
 - f. White
 - g. Other _____
31. What is your highest level of education?
- a. 12th grade or less
 - b. High school graduate/ GED
 - c. Some college
 - d. College graduate
32. Please explain what you would like to see included in a nutrition education class where you met face to face, but could also participate online.

APPENDIX D
RESEARCH PARTICIPANT QUALITATIVE ANSWERS

Research Question 3- What are the expectations of a hybrid nutrition education class among limited income families in Tennessee?

I think fact-to-face learning is a great idea as well as online. I'm better with more hands on lessons and online so I can see what I'm learning about.

Recipe videos and things I can cook for my kids that healthy that they will like

Meal planning

Include a step by step guide on how to prepare the food with the correct proportions

I would prefer online classes it would be easier and more convenient for most ppl. I think

Exercise

Exercise positions for belly and glutes, keto diet information

Cooking-classes

Recipes Healthy eating Exercise

Some ways to eat

Everything

The truth. There is so much crazy information on the internet you don't know what to believe. I would want to get truthful information from the class.

Online virtual learning only

Affordable, healthy snacks for picky children. High-calorie, smaller volume ideas for weight gain in children and toddlers.

I'm not sure as I have never done one

Maybe more in depth learning than just reading

More help with ways to budget friendly cook. Resources in my area to get food and information mailed to me. Gardening what works and canning preserving our own food.

Healthy eating tips, and plenty of recipes

Group challenges

Kid nutrition suggests and kid friendly veggies recipes

Face-to-face classes should have games and food preparation. Online classes should also have interactive games and chatrooms

I don't know

The basic covering the balances of carbs, protein, & fats that the body needs in each meal.

Cooking demonstrations

More vegetable stir-fry recipes Kid exercises Smoothies/Detox smoothies

Less junk-food more healthy foods

There is so much junk food out there. That nutrition class needs to happen every were to live life and be healthy.

MS Teams/Zoom with a month lab (face-to-face activity)

Fun recipes using fruit and smoothies.

I would really love to see talk about low carb diets. They seem to be the trend lately and would like to educate myself on the matter.

How to cut bad carbs and how to substitute healthier options for common meals.

In the face-to-face lessons, we could do the lesson or topic with some hands-on activities. And on the online classes, we could have a discussion about the class and what changes we did or planning to incorporate in our lives.

Food Demonstrations

I would prefer face-to-face, right now my kids are on virtual classes and I see how it takes a toll on them, and right now due to me not having a personal laptop, it's hard, but I use my phone a

This is new to me so I think in person face-to-face is better for my age group

Recipes

What is best for a type one diabetic to eat and still get full?

VITA

Rita Rowe Jackson was born in Prairie, MS to James Robert and Betty Rowe. She is the youngest of six siblings. She is a 1992 graduate of Aberdeen High School in Aberdeen, MS. Rita received her BS in Family and Consumer Sciences, and MS in Ag and Extension Education from Mississippi State University and is currently pursuing her EdD in Learning and Leadership from the University of Tennessee at Chattanooga. She has worked with the Cooperative Extension Service for 25 years starting with Mississippi State University Extension Service in 1997, then with the University of Tennessee Extension Service in 2002. She is an Extension Specialist- State Coordinator for the Expanded Food and Nutrition Education Program through UT Extension. She and her husband Malcolm also own a Smoothie King franchise in Memphis, TN and are the proud parents of 2 boys, Malcolm age 15 and Benjamin age 13. They attend The Life Church of Memphis where she serves on the Usher and Outreach Teams. Rita is also an active member of Delta Sigma Theta Sorority, Inc. and volunteers with the Shelby County 4-H Club, Arlington Middle School Band Booster, and Arlington Lacrosse Club.