

DISSERTATION

**USING COMPUTER TECHNOLOGY
TO DELIVER NUTRITION EDUCATION
TO LOW INCOME POPULATIONS**

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED
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ABSTRACT OF DISSERTATION

USING COMPUTER TECHNOLOGY TO DELIVER NUTRITION EDUCATION TO LOW INCOME POPULATIONS

Nutrition education has been found to be effective in improving knowledge, attitudes, and behavior, particularly when programs are behavioral oriented and based on theoretical frameworks such as Prochaska's Stages of Change Model, the Social-Cognitive Learning Theory, and the Communication Theory/Model. Increased nutrition risk has been found to be associated with income level, some minority groups, and education level. A nutrition education program, *La Cocina Saludable* ("The Healthy Kitchen"), has been developed utilizing abuelas (Hispanic grandmothers) to address some of the nutrition education needs of low-income Hispanic women and children, especially among migrant farm working families. Computer technology provides the opportunity to explore new and creative methods to deliver nutrition education to participants receiving food assistance. If this delivery method is effective, more people can be reached with accurate and consistent messages with less of the recruiting and training challenges found with peer educators.

A pictorial version of the *Colorado WIC Program Allowable Foods List* was created using scanning and desk-top publishing techniques to add pictures and increase

the readability of the text. Formative evaluation provided feedback regarding content and design. A final evaluation was completed to determine the preference between the text and pictorial versions. Potential WIC clients preferred the pictorial version (both Spanish and English) by more than 80%. Twelve of 14 grocery store checkers preferred using the pictorial version at their registers. Over 80% of 42 WIC staff surveyed indicated they would use the pictorial version more often with clients and that clients would like them.

Building upon these scanning techniques, two units of *La Cocina Saludable*, "Make It Healthy" and "Make A Change," were adapted to a bilingual interactive multimedia (IMM) program and evaluated. The program was designed to be delivered via touch screen computers to participants of food and other assistance programs. Repeated measures analysis of variance (ANOVA) was used to assess the knowledge gains and reported behavior changes among participants who completed *La Cocina Saludable* with a computer and those who completed it with an abuela. Significant knowledge gains ($p < 0.05$) were observed with both methods of delivery. Those who received "Make It Healthy" with the abuela, however, had significantly more gains ($p < 0.05$) for that outcome than those who used the computer. No significant differences were seen between the abuela and IMM when comparing within the "Make A Change" unit. A few differences were reported for fat and salt behaviors. IMM provides an opportunity to expose more participants to accurate and consistent nutrition education messages and learning activities. Use of a combination of IMM and nutrition

educator methods may be an important consideration to increase contacts and optimize gains.

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INTRODUCTION

Nutrition education overall has been found to be effective in improving knowledge, attitudes, and behavior (JNE, 1985a; JNE, 1985b). Behavior oriented nutrition education has been determined to be more effective than strictly informational programs. The development and evaluation of nutrition education interventions should be based on constructs of theories and the frameworks of models such as the Social Learning Theory, Communication Theory (model), and Prochaska's Transtheoretical model, also referred to as the Stages of Change model. Use of theory and models allows for the connection of past research discoveries with current projects and those yet to be created. *La Cocina Saludable*, a nutrition education program developed to be presented via abuelas (Hispanic grandmothers) to low income Hispanic migrant women with small children, is an example (Taylor, 1997). This program was developed based on the Stage's of Change Theory/model and incorporates information and hands-on activities intended to increase healthy behaviors.

People at increased nutrition risk and at greatest need for nutrition education include those in lower socio-economic groups, those with less education, and those of ethnic minority groups. Lower socio-economic status has been associated with lower vitamin C intakes (Cronin, Krebs-Smith, Wyse, and Light, 1982), iron intakes below the

Recommended Dietary Allowances (RDA) among children (Rose, Smallwood, and Blaylock, 1995), trend to less dietary diversity (Kant, Block, Schatzkin, Ziegler, and Nestle, 1991), and a higher prevalence for being overweight among females regardless of race (Federation of American Societies for Experimental Biology, 1995). Less education has been associated with decreased intake of vitamin C (Cronin, Krebs-Smith, Wyse, and Light, 1982), less iron consumption (Rose, Smallwood, and Blaylock, 1995), and a trend to less dietary diversity (Kant, Block, Schatzkin, Ziegler, and Nestle, 1991). Hispanics and African-Americans have significantly lower calcium intakes than whites (Windham, Wyse, and Hansen, 1983a) and the former group may be at greater risk for vitamin A intakes below recommended amounts (Windham, Wyse, Hansen, and Hurst, 1983b). Hispanic children do not eat recommended amounts of fruits and vegetable (Murphy, Castillo, Martorell, and Mendoza, 1990) and a higher percentage of preschool aged children had iron intake at half the RDA than whites or African Americans (Rose, Smallwood, and Blaylock, 1995). Hispanics also are at increased risk for chronic diseases such as obesity, heart disease, and diabetes (American Diabetes Association, 1997; American Heart Association, 1997; Department of Health and Human Services, 1997). These risk factors usually are not exclusive. For example, Hispanics tend to earn less and have less formal education than whites (Bureau of Census, 1996).

Although several assistance programs are available for many persons at high nutritional risk, especially women and children, funds are being cut and/or placed into block grants and distributed to individual states to be redistributed at the discretion of each state (Bauer and Braun, 1996; DHHS, 1997). Currently, more than 31,591,000

persons are being served through five such programs: the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Expanded Food and Nutrition Education Program (EFNEP), the Food Stamp Program, the Food Stamp Nutrition Education Program (FSNEP), and Head Start. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (P.L. 104-193) provides for a single capped entitlement to states for which the latter is responsible for setting policy and implementing distribution of funds. Three basic elements of this "welfare reform" act could affect nutrition educators and their ability to reach people at high nutritional risk (Rose and Nestle, 1996): (1) work requirements, (2) federal spending limits, and (3) delegation of program responsibility to the states. These elements may result in the limited ability to reach high risk persons with finite competitive funding. In Colorado, these block grants are being dispersed to 63 counties to be distributed at county discretion.

Nutrition education has been a component of some of these programs, but is threatened due its "non-direct feeding" appearance. Based on the more current history, spending on nutrition education will not fall quickly, but will be eroded away (Rose and Nestle, 1996). Thus, new, potentially less costly methods for sustainable and consistent delivery of nutrition education must be considered and evaluated. In 1985, the computer was cited as a future factor in education and the recommendation was made that the field of nutrition should incorporate state-of-the-art technology (JNE, 1985a). Computer technology provides opportunities to develop and deliver consistent and objective nutrition education messages at a variety of convenient times with less

sustained costs than staff intensive individual counseling. Although primarily qualitative evaluations of the use of computer technology for different types of nutrition education have been completed, the quantitative effectiveness of using a computer to that of a peer educator has not been formally compared with a sample of low-income individuals.

Scope of the Research

This dissertation includes the descriptions of the development and evaluation of two projects in which the computer was used to create materials and/or deliver nutrition education information. The goal of Project I was to use computer technology to simplify the Colorado WIC Food List for non-readers. The goal of Project II was to develop, implement, and evaluate two modules of an interactive multimedia (IMM) program. The IMM program was based on two units of the tested *La Cocina Saludable* nutrition education program, a program originally intended to be delivered by an abuela or Hispanic grandmother. In Figure 1, the projects are displayed to show their interrelationship and common link of using digitized images within printed material and incorporating digitized images within an interactive multimedia nutrition education program. Figure 2 displays how the two projects fit into the overall *La Cocina Saludable* nutrition education program.

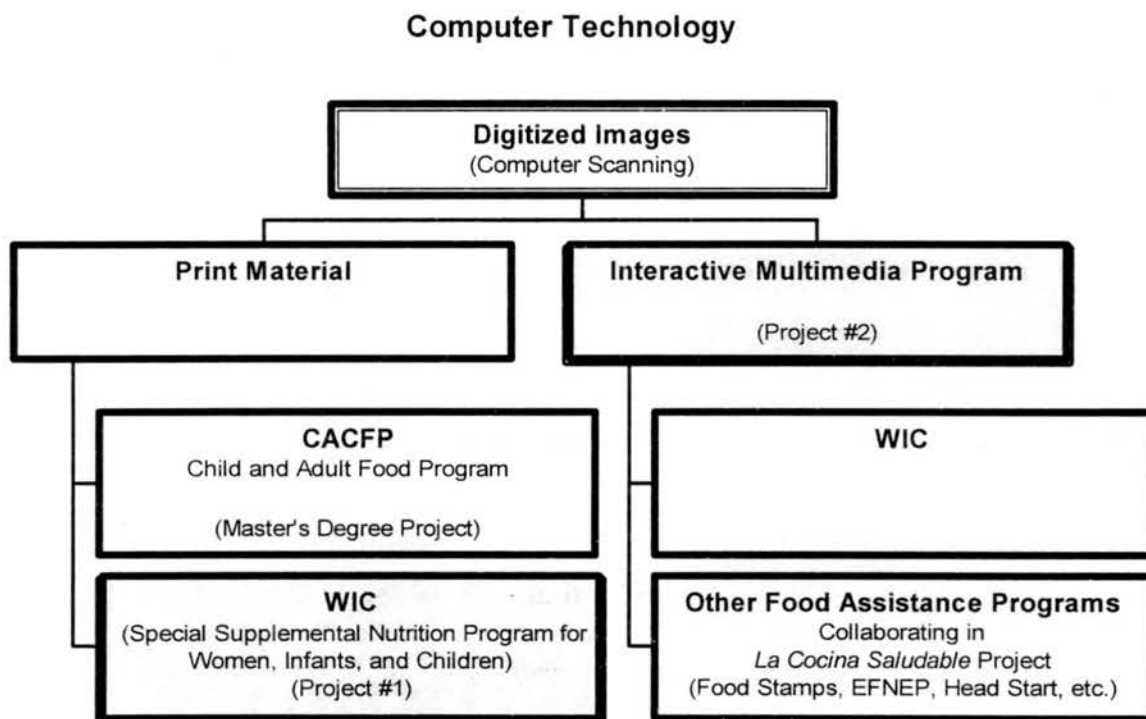


Figure 1: Flowchart of research projects

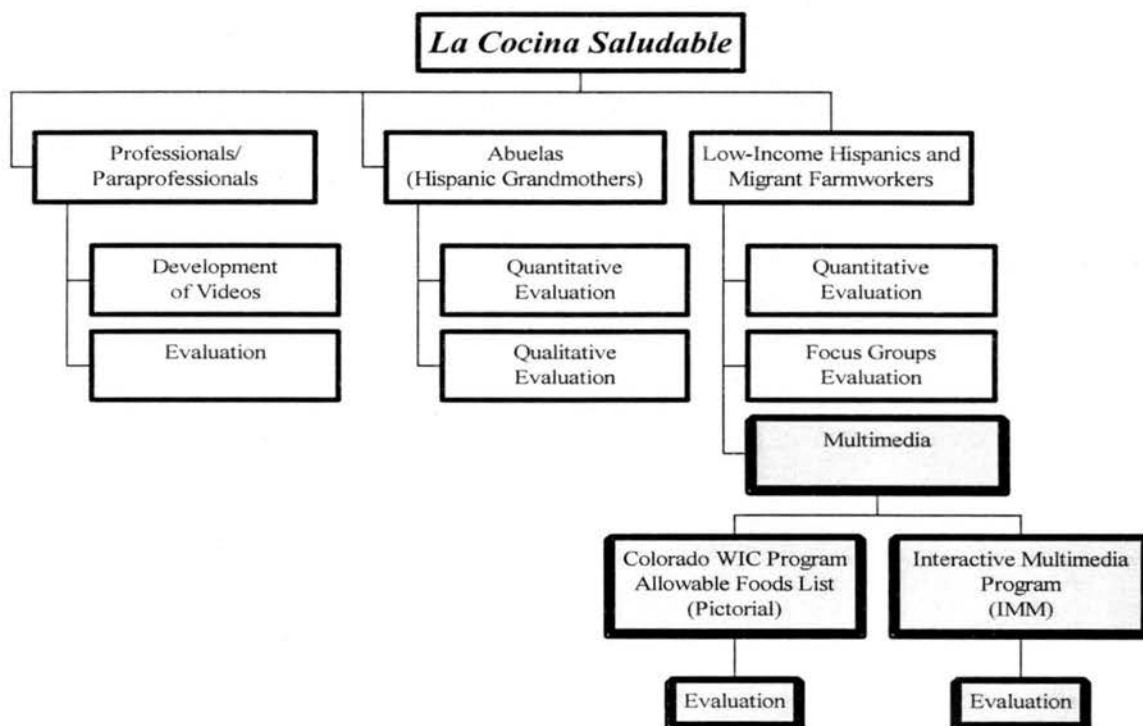


Figure 2: Flowchart of section of *La Cocina Saludable* incorporating multimedia.

In the first project, the *Colorado WIC Program Allowable Foods List* was simplified through minimizing the text and maximizing the delivery of content via pictures, while maintaining the size and organization. The original intent of this project was to provide a pictorial guide that could be used by the abuela nutrition educators who taught *La Cocina Saludable* to WIC-eligible mothers of preschool children in order to optimize their acquisition of WIC foods at the grocery store. Specific objectives were to:

- add pictures to the current list of WIC foods and modify text to assist participants with food selection at the grocery store;
- apply formative evaluation to obtain, analyze, and use quantitative descriptive data and specific recommendations from several user groups to modify a prototype list;
- evaluate the visual preference for the pictorial *Colorado WIC Program Allowable Foods List* among low income women;
- evaluate the usability of the pictorial *Colorado WIC Program Allowable Foods List*;
- evaluate the preference among grocery store clerks for the *Colorado WIC Program Allowable Foods List*; and
- evaluate the perceived usefulness of the modified list by WIC staff as a nutrition education tool.

The imaging technology of Project I was utilized as part of a solution to address several challenges that have been encountered with the nutrition education program, *La Cocina Saludable*. Recruitment and retention of sufficient numbers of abuelas needed to maintain the program has been difficult. In addition, the consistency of the delivered messages has been a concern (Anderson and Kendall, 1995).

The second goal of this research was to develop and evaluate two modules of an interactive multimedia program (IMM) incorporating the educational materials from *La Cocina Saludable* being used with the low-income Hispanic clientele. To do this, digitized images (graphics), audio clips, and video clips were combined to capture both the abuela and the educational messages in a format for delivery at selected community assistance program waiting areas.

The objectives of this project were to:

- develop two modules of an interactive multimedia computer program based on the content of *La Cocina Saludable*;
- incorporate formal alpha (formative) testing to track and describe development parameters of time, tasks, and cost;
- evaluate the effectiveness of the program in regards to gains in knowledge and reported behavior;
- compare outcomes for groups taught by an abuela and the IMM methods;
- complete a cost-benefit analysis to determine a break-even point when compared to an abuela/peer educator; and

- explore the "Stages of Change" model and see if their responses are modified based on learning from the interactive multimedia compared with those who receive nutrition education from an abuela.

The organization of this document after this introduction is as follows: an overview of the pertinent literature is followed by methodology, results, conclusions, limitations, and discussion for each project. A final discussion about the use of computer technology in nutrition education interventions is presented to summarize the two projects.

Definition of Terms

- Alpha testing – formative evaluation: evaluation conducted by product knowledgeable people to identify problems and content errors
- Beta testing – testing completed by customer-based participants in actual use situations to detect and eliminate performance errors prior to releasing the application to the market
- CD-ROM – Compact Disk – Read Only Memory; a compact disk on which a large amount of digitized read-only data can be stored (Random House, 1994)
- Digitizing (Imaging, Scanning) – using a device to read text, data, or graphics for use by a computer or a computerized device
- Graphic – a product of the graphic arts, as a drawing or print; a computer-generated image (Random House, 1994)

Interactive multimedia (IMM)

Interactive – allowing immediate two-way communication between a source or sources of information and a user who can initiate or respond to queries (Random House, 1994).

Multi-media – means involving the use of several media simultaneously such as graphics, scanned images, video clips, and audio clips

Limitation

Participants involved in the evaluations of these research projects were convenient and self-selected. Thus, results may only be applicable to those with similar characteristics as the sample.

Assumption

The assumption has been made throughout both projects that answers to interviews and surveys have been open and honest reflecting the true nature of the subjects.

REVIEW OF LITERATURE

Introduction

This review of literature provides the background about areas of nutrition education and theory, populations at high nutritional risk, a sampling of assistance programs available to relieve hunger and malnutrition, and recent legislation that could impact nutrition education interventions. *La Cocina Saludable*, a nutrition education program targeting low-income Hispanic migrants is reviewed because it serves as the basis for the research projects of this dissertation. A brief summary of computer technology along with some examples of interactive computer applications and the more commonly used "alpha" and "beta" evaluation techniques also have been described.

Nutrition Education and Theory

Although there are many definitions of *nutrition education*, a useful one is "any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well-being" (Contento et al., 1995). Nutrition education has been determined to be a valid and constructive practice, especially in regard to the design of curriculum materials and teaching practices (JNE,

1985b). It has been found to be a significant factor for improving dietary practices when the program is designed for behavior change and action strategies are incorporated (Contento et al., 1995). Three basic findings were drawn from a meta-analytical survey of nutrition education studies regarding the effectiveness of nutrition education overall (JNE, 1985a; JNE, 1985b):

- "Nutrition education results in a marked increase in knowledge about nutrition;"
- "Nutrition education results in some increase in positiveness of attitudes toward eating nutritiously; and"
- "Nutrition education results in constructive changes in participants' patterns of food consumption."

The third was found valid across all age levels, gender, socio-economic levels, and instructional procedures (JNE, 1985a; JNE, 1985b). The focus in nutrition and health education should be more behavioral than the traditional emphasis on information (Contento et al., 1995; JNE, 1985a). The computer was cited in 1985 as an "up and coming" factor in education and the recommendation was made that the field of nutrition should incorporate state-of-the-art technology (JNE, 1985a).

The development and evaluation of nutrition education interventions should be based on constructs of theories and the frameworks of models. Theories explain the "ways, processes, and mechanisms by which behavior is affected" (Glanz, Lewis, and Rimer, 1990). They tell the what, how, when, and why of behavior. Theory also can be

described as a "set of principles that tells us how and why concepts are related to each other" (Achterberg and Clark, 1992). A combination of theories/models results in more effective programs (Contento et al., 1995). Two theories/models used in nutrition education with relevance to the incorporation of computer technology are the Social Learning Theory and the Communication Theory / Model. Prochaska's Transtheoretical Model of Behavior (Stages of Change) focuses on the processes found to be important for behavioral changes to occur. The Stages of Change model provides the additional constructs in the framework to guide development, implementation, and evaluation of nutrition education programs so the focus is on behavioral rather than informational outcomes (Prochaska, Norcross, and DiClemente, 1994).

Social – Cognitive Learning Theory

Psychological functioning is the interaction among environmental, behavioral, and personal determinants and forms the basis for the Social-Cognitive Learning Theory (Bandura 1977a). Influencing environmental stimuli or *antecedent* determinants in nutrition education could be such situations as professionals providing verbal or written materials, the media, peer groups, and interactive multi-media. The outcome of behavioral or *consequent* determinant(s) could include health implications, social ramifications, and self-esteem. The benefits of consequent determinants may be very individually determined, but play a critical role in the successful change in behavior. Personal determinants or *cognitively based motivations* are the self-activated

intermediary processes such as the goal specifying, creative, and response processes that determine the route taken to achieve the consequence.

Nutrition education could utilize immediate benefits, even non-health related, to promote healthy nutritional habits (Hochbaum, 1981). He further states that the psychological motivations of food habits may be much stronger than the physiological. Commercial food advertising has been very successful with this contention and has been the exception to the challenge of applying social psychological theories to eating behaviors (Glanz, 1981). Food marketing success has been attributed to satisfying immediate needs of consumers, perhaps through such perceived assets as price, packaging, convenience, and value (Hochbaum, 1981).

Another facet of the Social Learning Theory is self-efficacy which "is based on the principal assumption that psychological procedures, whatever their form, serve as means of creating and strengthening expectations of personal efficacy. . . . An efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977b). "Judgements of self-efficacy also determine how much effort people will expend and how long they will persist in the face of obstacles or aversive experiences." (Bandura, 1982) People should be encouraged to attempt activities at which they feel they can succeed. If the appropriate skills and incentives are present, efficacy expectations could be of influence to the way people approach and manage stressful situations.

Four major sources of information influence personal efficacy expectations (Bandura, 1977b). *Performance accomplishments* are based on successful or failed

personal mastery experiences. If the successes outweigh the failures, mastery expectations will increase and occasional failures will have less and less influence. *Vicarious experience* involves modeling which is seeing others accomplish challenging activities successfully with persistence and self-persuasion. Symbolic modeling is seeing how a task is accomplished, such as on paper. *Verbal persuasion*, through verbal or visual suggestion(s) and/or self-instruction, can be a powerful influence in letting others believe that their self-worth is valid. Self-instruction requires sufficient tools to assist the person in the desired behavior. *Emotional arousal* can occur in stressful and taxing situations and can influence behavior tremendously. If means are given to deal with or reduce the stress, emotional influence of the situation can be decreased.

Communication Theory / Model

Communication occurs "when the message sent is the message received" (Yarbrough, 1981). Research has established many assimilative and influencing processes between sender and receiver. Yarbrough (1981) summarized major conclusions of Klapper (1960) and Berelson and Steiner (1964) regarding communication effects. Interpersonal channels of communication are more influential than mass media. Predispositions may influence current communication to have a reinforcing effect on current behavior rather than a creating effect for new behavior. The smaller the predispositions, the less likely they are to influence behavior. Any change that might occur probably will be in small increments. Factors the sender

controls, such as the medium, "influence the effectiveness of communication messages" (Yarbrough, 1981).

Three major components form the communication model (Gillespie and Yarbrough, 1984): inputs; intervening process(es); and outcomes.

Inputs

Inputs include those of the sender and the receiver. As a type of sender, the nutrition educator needs to consider many facets in education delivery. *Channels* are the methods used to deliver the messages such as interpersonal or mass media. Interactive multimedia may incorporate some aspects of both types of channels. The user may direct the learning as presented by the narrator (somewhat interpersonal), but the messages are consistent from one user to the next (a characteristic of mass media). The *source* of the information is the perceived sender. This sender may be one person such as an abuela (Hispanic grandmother) or an organization such as Cooperative Extension. It is important to select *message content* carefully to provide enough information to make the message meaningful but not overwhelm the receiver. The *treatment* involves how the messages/ideas are presented, such as the words selected for a narrative script. The time and place for receiving messages and the extent of the interactivity are included in the *system design*. The final channel, *metacommunication*, includes the aspects of presentation that influence interpretation such as layout and order.

The receiver also has predispositions. He/she brings *attitudes, beliefs, and skills* to a learning situation that may influence how the messages are received, what the messages mean to him/her, and how he/she is able to deal with the messages. *Habits* that have evolved over a lifetime may direct interpretation of messages. *Social status roles* include the expectations associated with gender, age, economic position, and ethnicity. People who are around the learner on a regular basis make up his/her *reference group* and can have tremendous influence on the way the learner interprets and subsequently responds to messages.

Intervening Processess

The intervening process is what happens between the inputs and the outcomes. It requires the learner's active participation. It is important that the presentation is in a manner to inspire that participation. The process requires gaining and maintaining attention through interaction. Sensory stimuli, especially oral and/or visual, must be transferred into meaning for comprehension. Interaction, either between the learner and the communicator or between the learner and peers, allows for active involvement of the learner.

Outcomes

The outcome of communication is the acceptance or rejection of messages of which there are three types. Cognitive acceptance is internalizing the message and believing it to be true. Affective acceptance is accepting the message, such as a

proposed change, to be good or bad for one's self. Behavioral acceptance is manifested in behavior change. This type of acceptance is difficult to measure, especially since it may not be immediate.

In the application of the communication model, Gillespie and colleagues (1984) stressed the need to emphasize the process of nutrition education as much as the outcome; thus, individual learning and communication differences could be assessed. In addition, the challenge of ingrained food habits and feelings should be addressed, and the time needed for change must be considered. Measures of outcome should consider the unintentional as well as the intentional messages that can occur in nutrition education.

Another pragmatic perspective of communication theory is with the illustration of the differences between digital and analogic communications (Watzlawick, Beavin, and Jackson, 1967). Digital communication, spoken or written language, allows people to use words and syntax to be able to explain complex and abstract topics. Analogic communication includes the semantics and non-verbal or metacommunication cues (such as layout, color, or pace) to express relationships. These types of communication are complementary and can enhance delivery of information. The transition from one to the other, however, can result in loss of information. Thus, the influence of communication is within the context in which it is presented.

Prochaska's Transtheoretical Model of Behavior Change

The Transtheoretical Model of Behavior Change is behavior based and, as the name transtheoretical implies, incorporates several health belief theories such as the Health Belief Model and the Social-Cognitive Learning Theory as well as other educational and psychological theories. Theories such as these provide insight into cognitive processes of change likely to move a learner to the next stage (Prochaska, Norcross, and DiClemente, 1994). There are five "Stages of Change," thus, this is an alternative name for the model. The first, *precontemplation*, is the stage when the individual has no intention of changing behavior either because he/she cannot see the negative behavior, or he/she does not want to think about the behavior. *Contemplation* is the stage when the behavior has been acknowledged and the individual is thinking seriously about solving the problem with indefinite action plans in the next six months. In the *preparation* stage, awareness is high and the individual is planning actively to take action within the next month. During the *action* stage, the most overtly modified behavior can be seen by others. Action, however, is not equivalent with change. *Maintenance* is the time when gains of the previous stages are consolidated and the individual struggles to maintain the new or changed behavior and minimize relapses.

People move through each stage until the desired behavior has been incorporated. Many return to earlier stages, so it has been advised to plan for relapse. Some individuals reach a controversial sixth stage, *termination*, in which the former behavior is no longer a desire for him/her. Smoking is one example in which, for some, an aversion is developed during the behavior change process, and the person no longer

is tempted to relapse into former behavior. Thus, the old behavior has been terminated and the new behavior becomes the norm. Some negative behaviors, such as alcoholism in which a person is never recovered, may only be in long term maintenance and may never reach the termination stage.

The Stages of Change Model has been applied in smoking cessation (Prochaska, 1991; Prochaska, DiClemente, and Norcross, 1992; Prochaska, Velicer, DeClemente, and Fava, 1988) alcohol abuse (Prochaska, Norcross, and DiClemente, 1994), dietary and nutrition intervention (Prochaska, Norcross, and DiClemente, 1994; Sandoval, Heller, Weise, and Childs, 1994), and exercise (Marcus and Simkin, 1994). This theory was the basis for the development, implementation, and evaluation of *La Cocina Saludable*, a behavior-based nutrition education program (Anderson and Kendall, 1997; Taylor, 1997).

Populations at Nutrition Risk

Nutrition risk includes obesity and related complications as well as nutrient deficiencies. Nutrition risk has been found to be higher among populations with lower incomes, ethnic minorities, and those with less education and literacy ability. To complicate the issue, "demographic characteristics are seldom statistically independent of one another" (Cronin, Krebs-Smith, Wyse, and Light, 1982).

Income

Socio-economic status has been associated with nutrition risk. There is evidence from data of the USDA's 1977-1978 Nationwide Food Consumption Survey (NFCS) to indicate that mean frequency of reported fruit and vegetable intake was higher for those with incomes greater than \$20,000 (Cronin, Krebs-Smith, Wyse, and Light, 1982).

Kant and colleagues (1991) analyzed data from the National Health Nutrition Examination Survey (NHANES) II using a dietary diversity score. This method was used to quantify the extent of variety in the diet based on the number of food groups represented on a 24 hour dietary recall and the number of servings from each group. A trend toward positive association was observed between level of income and dietary diversity when viewing frequency histograms, although not statistically significant at the $p < 0.05$ level. Preschool children from lower income households were at greater risk for consuming less than half the RDA for iron based on data from the 1989 Continuing Survey of Food Intake by Individuals (CSFII) (Rose Smallwood, and Blaylock, 1995).

Analyzed data from NHANES III and the 1989 CSFII indicate that a higher percentage of people with lower incomes consumed whole milk and less vegetables (Federation of American Societies for Experimental Biology, 1995). In addition, females with incomes below the 130% poverty level across all racial/ethnic groups were more prevalently overweight. Yet, nine to 13 percent of people in the low-income households and thirteen percent of families at the less than 100% poverty level from this

sample marked some degree of food insufficiency compared to about four percent in the overall U.S. population.

Ethnicity

Calcium consumption has been found to be lower than the nutrient density standard, (as defined by the amount of nutrient in 1,000 kcals of food /human allowance of nutrient per 1,000 kcals), for all ethnic groups (Windham, Wyse, and Hansen, 1983a). Furthermore, calcium intakes were significantly lower for Hispanics (.80 nutrient standard) and African Americans (.82 nutrient standard) than whites where a .90 was recorded based on USDA Nationwide Food Consumption Survey data. Hispanics had vitamin A intakes below recommended amounts (Windham, Wyse, Hansen, and Hurst, 1983b). Data from the Hispanic HANES (HHANES) survey collaborate this data for Hispanic children ages one through five (Murphy, Castillo, Martorell, and Mendoza, 1990). This group was found to eat less than the recommended servings of fruits and vegetables. Data from CSFII show that iron intake was half the RDA in 19% of Hispanic preschool children compared with 7% for whites and 11% for African American preschoolers (Rose, Smallwood, and Blaylock, 1995).

Based on NHANES III data, fifty two percent of non-Hispanic Black women and 50 percent of Mexican-American women were overweight contrasted to about 33 percent non-Hispanic white women (Department of Health and Human Services, 1997). Mexican-American children-adolescents, ages sixteen through 19 years old, were found to have relatively high prevalence of obesity and relatively low prevalence of thinness

when compared with this age group as a whole (Federation of American Societies for Experimental Biology, 1995). Yet, another finding from the Federation research was that Mexican-Americans and non-Hispanic Blacks were more likely than non-Hispanic whites to report that they "sometimes or often did not have enough food to eat". Hispanics also are at greater risk than the general population for heart disease and diabetes (American Diabetes Association, 1997, American Heart Association, 1997).

Education and Literacy

A third nutrition risk characteristic is education level. The education level of mothers has been associated positively with increased intake of vitamin C (Windham, Wyse, and Hansen, 1983a). Kant and colleagues (1991) observed a strong trend for increased dietary diversity based on plotted frequencies. Children from less educated households were more likely to consume less than half of the RDA for iron for their age (Rose, Smallwood, and Blaylock, 1995).

Functional literacy is the ability to read at a level of proficiency considered necessary to function in a given society or culture (Nitzke, 1989). Twenty three million (19.8%) adults are estimated to be functionally illiterate (Doak, Doak, and Root, 1985). Many nutrition and health materials distributed from the United States Department of Health and Human Services (USDHHS) are at the 10th grade reading level. This may result in as many as 50 to 60 million people not be able to read food labels (Nitzke, 1989).

Risk Factor Interrelationships

Positive relationships were found among education level and income and nutrition knowledge in a summary by the authors of a supplement of a 1978 National Association of Educational Progress (NAEP) study (Kirsch and Jungeblut, 1986). Characteristics that tend to be more common among adults with low literacy skills include "poverty, recent immigration, racial and ethnic minority status, limited schooling, poor health, unemployment, of large families, isolation, immobility, inadequate housing, and low self-esteem" (Nitzke, 1989). In the Northcutt national study, minorities were represented more in lower level performance groups than whites (Doak, Doak, and Root, 1985). In the United States in 1995, 18.3% of persons 25 years and older had not finished high school (Bureau of Census, 1996). The percent is higher for blacks (26.2%) and Hispanics (46.6%) and less for whites (17.0%) (Bureau of Census, 1996). Hispanics are twice as likely to drop out of high school (34.7%) than blacks (15.5%), and three times more likely than whites (12.7%). High school dropouts tend to be unemployed (20.4%) nearly twice as much as high school graduates (12.1%) (Bureau of Census, 1996). In addition, personal health practices tend to be less healthy for those who are less educated and/or have less yearly income. They are twice as likely to snack and half as likely to exercise. A greater percentage are 20% or more overweight (above desirable weight based on 1983 Metropolitan Life Insurance Company standards; self-reported height and weight data). "Awareness of diet and health relationships among female main meal planners and preparers [were found to be] lower for those who were black, less educated, and from lower incomes." (Bureau of

Census, 1996) Thus, an inter-relationship of factors has been observed that place certain populations at increased nutritional risk.

Assistance Programs

Several community assistance programs have been established to reach populations at high nutritional risk. Nutrition education may or may not be a component. In Table 1, the number of participants in five such programs have been displayed for the United States, Colorado, and Southern Colorado target areas.

Special Supplemental Food Program for Women, Infants, and Children (WIC)

WIC was established to reach high risk pregnant or lactating women, infants, and children and is administered through State, Tribal and Territorial Health Agencies. The major services include access to health care, quality nutrition education and services, breast feeding promotion and education, and food prescriptions which are specific foods listed on vouchers based on qualifications and risk factors (U.S.D.A., 1996). This intervention is meant to be short term to influence lifetime nutrition and health behaviors. During April of 1994, 1.6 million women, 1.9 million infants, and 3.5 million children were served (U.S.D.A., 1996).

The mothers participating in WIC during the summer of 1993 were younger, less educated, less employed, and more often in a poverty status when compared with non-participating mothers (Bureau of Census, 1995b; Gordon and Nelson, 1995). These

Table 1: Number of Persons Reached by Selected Food Assistance Programs
Nationwide and in Colorado

Assistance Program	Nationwide	Colorado	Southern Colorado Areas
WIC ^a	7,440,000	75,951	11,000
EFNEP (Families) ^b	198,931	1,608	N/A [*]
Food Stamp Program ^c	23,200,000	205,316	36,200
FSNEP / FNP ^d	N/A	768	N/A
Head Start ^e	752,077	8,647	N/A
TOTAL	31,591,008	291,570	47,200

^{*}N/A = not available

^aNationwide figure is preliminary for March 1997 (U.S.D.A., 1997b) and the Colorado figure is for May 1997 from Colorado WIC report provided by Colorado Department of Public Health and Environment.

^bThis represents the number of direct contacts; an additional 737,800 family members were reached indirectly through adult participation. Nationwide figures are from U.S.D.A. 1995 and Colorado figures are from Colorado EFNEP Report (1995).

^cNationwide figure is for March 1997 (U.S.D.A., 1997a) and Colorado figures are from the Colorado State Food Stamp Office for May 1997 and reflects those persons who were authorized and picked up food stamps.

^dWilken and Bray (1997)

^e1996 (DHHS, 1997b).

general characteristics occurred even when compared to income-eligible non-participants (Gordon and Nelson, 1995). Overall, the average number of children per mother were the same for both groups. WIC mothers, however, began having children earlier and had more children later in age than non-WIC mothers (Bureau of Census, 1995b). WIC mothers were more likely to be less educated than non-WIC mothers. In 1993, 34% did not have high school diplomas, nearly twice that of non-WIC mothers (16%) (Bureau of Census, 1995b). Forty six percent more non-WIC mothers had

finished high school than WIC mothers. When compared with non-WIC mothers, forty percent more WIC mothers had not worked within the month of the study. In addition, 30% more WIC mothers than non-WIC mothers made less than \$1,000 per month; and 38 percent more WIC mothers were at the poverty level than non-WIC mothers. One of every 10 black and one of eight Hispanic mothers of child bearing age received WIC benefits in contrast to one in 16 white mothers (Bureau of Census, 1995b).

In the Study of WIC Participants and Program Characteristics (Williams, Lessler, Wheelless, and Wildfire, 1990), pregnant women had a mean of three nutritional risk factors while lactating women had a mean of 2.5 and postpartum women had a mean of two. Infants and children had an average of two nutritional risk factors. Although the most common nutritional risk factor among children was dietary (68%), 47% had at least one anthropometric risk factor, and 40% had at least one medical risk factor. Seven percent of participating primary caretakers of infants and children had less than eight years of education.

A summary of studies regarding WIC participant outcomes was completed by Gordon and Nelson (1995). There was an increase in infant birth weight in five of the eight studies that measured that variable. Two studies found an association for better outcomes with longer participation. In one study, associations for WIC participation and decreased infant mortality and improvement in prenatal care were found. In two studies, the cost-benefit was analyzed. An estimated Medicaid savings during the first 60 days postpartum of about two to four dollars for every dollar spent in WIC per newborn and mother was realized. This was calculated to be a health expenditure

savings of 8.5 million dollars during one year; and over 18 years, a savings of one billion dollars could be attained (Gordon and Nelson, 1995; NAWD, 1995). Other outcomes have included improved dietary intake of women (NAWD, 1995), reduction of anemia among children (Rush et al., 1988; Yip, Binkin, Fleshood, and Trowbridge, 1987), and better dietary intake for iron (Rose, Smallwood, and Blaylock, 1995; Rush, et al., 1988) and vitamins A and C in preschool children (Rush et al., 1988). In regards to nutrition education, required once every six months, the goal is to increase the intake of specific nutrients, particularly calcium, iron, and vitamins A and C.

Expanded Food and Nutrition Program (EFNEP)

The Expanded Food and Nutrition Program (EFNEP) is administered by the Cooperative State Research Education and Extension Service of the USDA (CREES – USDA) with land grant universities. The goals of EFNEP have included teaching nutrition, food safety, and food resource management to low income families and the accrual of practical skills necessary to make positive behavior changes. An additional goal in many states, including Colorado, has been to offer programs targeting pregnant teens and adults at risk for having low birth weight babies. In 1994, over 80% of EFNEP participants were enrolled in other public assistance programs. According to data presented by the USDA in 1995 (U.S.D.A., 1995) 87% of participants improved in one or more food resource management practices such as planning meals and not running out of food. Improvement was observed in one or more nutrition practices, such as making healthy food choices and reading labels; and 69% of participants

showed improvement in one or more food safety practices, such as thawing and storing foods properly. Improvement from 17% to 42.5% was seen among participants who had a diet that provided even half the number of servings of breads and cereals and at least one serving from each of the other food groups. A conservative estimate of 20 to 30 dollars per month savings can be translated to about 300 dollars per year savings per family participating. Since the average cost of delivering the EFNEP to a family is about 300 dollars, there could be a potential savings for other food assistance programs (U.S.D.A., 1995).

Food Stamp Program

The Food Stamp Program, administered at the federal level through the Food and Consumer Service (FCS) of the USDA, was initiated in 1961 as a pilot project; and, in 1964, with the Food Stamp Act, it became law. At the state and local levels, this program is administered by state welfare agencies. This is a coupon-based national program in which recipients use coupons to purchase relatively unrestricted food items. Eligibility is based only on financial status targeting the most needy. The level is dependent on household assets, size, and gross income less than or equal to 130% of Federal poverty guidelines (Levedahl, Ballenger, and Harold 1994). Changes in benefit levels are made yearly to compensate for inflation (Bureau of Census, 1995a). In March of 1997, 23.2 million people were assisted at a cost of 2.1 billion dollars (1.7 billion dollars in benefits plus four hundred million dollars in program costs) (U.S.D.A., 1997a; U.S.D.A., 1997b). The average benefit per person was calculated to be \$71.74.

During the summer of 1993, 15% of all child bearing-aged mothers received food stamps to help purchase food for over 13 million children (Bureau of Census, 1995a). Participating mothers were younger, began having children at earlier ages, and had more children than non-participating mothers. During this time period, a rate of one in three Black mothers and one in four Hispanic mothers received food stamps compared to one in nine white mothers. About 30% of the Hispanic mothers were born outside the United States. Forty percent of all the recipient mothers did not have a high school diploma and another forty percent had completed only high school. Seventy eight percent did not have a job during the month before they were surveyed. Incomes of 66% of the recipients were less than \$1,000 per month. Seventy five percent lived below the poverty level and supported over 10 million children.

According to Fraker (1990), efficacy has been difficult to measure. Although initial information from a review of the literature indicated improved nutrient availability, the evidence for actual nutrient intake was inconclusive. More recently, a study sponsored by the FCS (Bradbard, Michaels, Fleming, and Campbell, 1997) was conducted to investigate food-choice behavior among low-income families through the use of two methodologies: (1) analysis of data from a combination of three national and three regional surveys and (2) 28 focus groups of primarily women with children who received food stamps held in six cities of the United States. From the analysis of survey responses, 36% to 50% spent less than the Thrifty Food Plan (TFP) amount on at-home foods; ten percent or less used foods at home that meet Dietary Guidelines; four to ten percent spent less than the TFP amount to have foods with sufficient amounts of key

nutrients; and only three to eight percent met TFP spending goals and dietary goals. Those that did meet spending and dietary goals spent more on grains, fruits, vegetables, and milk and a smaller portion on meat and "other" (extras) foods such as soft drinks and alcoholic beverages. Although more than 75% of those surveyed were aware of some of the major links between diet and health, no evidence was found to support a relationship between knowledge and attitudes and spending less than the TFP amount. Women with higher incomes were found to be better informed of the links than women with lower incomes. From the focus group analyses, these food stamp recipients were found to be strategic shoppers who looked for bargains and had shopping routines. Food price was the most important factor for choosing foods. Other important considerations included convenience and children's and family preferences. African Americans and Hispanics often considered ethnic and cultural traditions when shopping. Participants in the focus groups were "aware of current guidelines for healthy eating, uncertain about the healthfulness of their own diet, and open to trying new ways to feed their families healthier meals." Many said, however, that "they believe the changes are difficult" because of lack of family support, difficulty with understanding the food label information, and convenience (Bradbard, Michaels, Fleming, and Campbell, 1997).

Food Stamp Nutrition Education Program (FSNEP) / Family Nutrition Program (FNP)

Food and nutrition education assistance has been provided to food stamp recipients in Wisconsin through the Food Stamp Nutrition Education Program (FSNEP) since 1986. Since that time, more than 20 additional states offer such programs and

some use the name of the Family Nutrition Program (FNP) (Joy and Doisy, 1996).

Administration of the FSNEP / FNP is through interagency cooperation of a sponsoring organization, usually the Cooperative Extension Service, the state Food Stamp Agency, and the USDA. Funding may be provided from the federal budget in the form of reimbursements for up to 50% of allowable administrative and program costs subject to the availability of federal funds (U.S.D.A, 1997). Staff in this program provide group education in nutrition, food safety, and food resource management to people who receive or are eligible for Food Stamps. The target groups include individuals, families, youth, and migrants eligible for or who are receiving food stamp coupon or cash benefits.

In Colorado, 758 participants completed 12 hours of instructional lessons from October 1995 through September 1996 (Wilken and Bray, 1997). Depending on the particular FSNEP program, 12% to 20% were Hispanic, 76 to 78% reported household income at or below poverty level. Many (36 to 100%) were receiving some type of public assistance. In addition, 83 to 100% reported they were very satisfied with classes, 69 to 100% improved their shopping skills, and 83 to 92% improved their eating habits (based on a "usual" day of eating). Ninety four percent improved at least one food resource management behavior, 71 to 92% improved at least one nutrition practice, and 89% improved at least one food safety practice. The average monthly savings on the grocery bill was about \$100.00. Food stamp participants were able to extend their food stamps by an average of six to eight days.

Head Start

The Administration for Children and Families division of the United States Department of Health and Human Services (USDHHS) oversees the Head Start program. Goals of this program include offering a broad range of services to children of low-income, preschool children and enhancing services to parents and promoting parental involvement so that poor children "can begin schooling on an equal footing with their more advantaged peers" (Currie and Thomas, 1995). Children are offered services intended to enhance education, develop a greater degree of social competence, optimize physical and mental health, and encourage sound nutrition in order that they will have greater everyday effectiveness at the present time and in later school and life activities (DHHS, 1996; Head Start, 1984). Dietary adequacy is one of the facets of social competence.

Enrollment in Head Start during fiscal year 1996 was 752,077 at a cost of 3.6 billion dollars (DHHS, 1997b). Local public agencies, private non-profit organizations, and school systems receive funding through grant awards made by DHHS regional offices and Head Start Bureau of American Indian and Migrant Program Branches. During the 1995 – 1996 operating year, annual incomes of 61.9% of Head Start families were less than \$9,000 and incomes of 77.7% were less than \$12,000 (DHHS, 1997b). The average permanent income in 1990 was nearly \$10,000 less for white (non-African Americans) Head Start households when compared to all white households and \$2,000 less for participating African-Americans when compared to all African-American households (Currie and Thomas, 1995), both statistically significant differences.

Among white households, education attainment was found to be significantly less for mothers and grandmothers of Head Start Participants than non-participants.

Concerns have been raised recently regarding Head Start's impact. According to a recent Government Accounting Office Report (General Accounting Office, 1997), "most of the limited number of impact studies deal with cognitive outcomes, and do not address nutrition or health-related outcomes." Two basic conclusions were drawn from a meta-analysis completed by a contracted research group in Washington, DC (McKey, Condelli, Ganson, Barrett, McConkey, and Plantz, 1985). Immediate achievements in cognitive and socio-emotional test scores and in health status have been observed. Over time, however, these do not track; the scores and health status are similar to disadvantaged children who did not participate with Head Start. Currie and Thomas (1995) observed similar results in their study looking at outcomes of sibling pairs, one a Head Start participant and one a non-participant. For both African-Americans and whites (non-African Americans) there were large significant gains initially, but these gains lessened quickly, especially among the former group. A significant positive association ($p \leq 0.01$) was found for participation in Head Start and the probability of not repeating a grade for the white children, but not the African-American children. Children in both races who attended preschool, including Head Start, had increased access to preventive health services.

There is evidence, however, that some of the nutrition education interventions with Head Start children and families have been effective. A program that lasted the school year and that incorporated a variety of nutrition education materials such as an

introductory lecture, training workshops, newsletters, cassette players with tapes, and a food and fitness fair resulted in a significant increase in reported exercise, varied food intake, and decreased fat intake (Gunn and Stevenson, 1985). Meal planning, food preparation, and eating habits improved when trained volunteers worked with families (Koblinsky and Phillips, 1987). An intervention with mothers, incorporating workshops and newsletters, resulted in offering diets to their children that were more diverse and higher quality with more servings of nutritious foods than was noted for children in a control group (Koblinsky, Guthrie, and Lynch, 1992).

Welfare Reform: Block Grants

In all of the previously described programs, funding is limited and constantly at risk for reduction. This translates into limited resources and personnel for administration and for implementation of the nutrition education components. In addition, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (P.L. 104-193), more commonly known as "welfare reform" ended 61 years of entitlement to all eligible mothers and children (Bauer and Braun, 1996; DHHS, 1997a).

Within the new program, Temporary Assistance to Needy Families (TANF), the guaranteed Aid to Families with Dependent Children (AFDC), Job Opportunities and Basic Skills (JOBS), and Emergency Assistance (EA) have been restructured into one entity. States are given a single, capped entitlement and are required to implement block grant programs, effective no later than the first of July, 1997. A review of state plans by DHHS was required prior to that date. Within state plans, "objective criteria

for delivery of benefits and determining eligibility" and the appeal process for adversely affected recipients must be delineated (DHHS, 1997a).

Many assistance programs have been affected including Food Stamps and child nutrition (Bauer and Braun, 1996). Although some food programs remain with federal eligibility guidelines, benefits may be tied to specific qualifying factors such as work requirements, child support payments, and citizenship status as stipulated by the state; and these stipulations may be standardized across assistance programs (DHHS, 1997a). Maximum benefit levels for the Food Stamp Program have been reduced to the cost of the Thrifty Food Plan (from 103%) while maintaining annual indexing. Some states have chosen to establish family benefit caps (National Governor's Association, 1997). Federal subsidies for meals and snacks in day care homes not operated by low-income providers have been reduced; and school breakfast and summer feeding programs will not be able to expand due to the termination of special funding (Bauer and Braun, 1996).

According to Rose and Nestle (1996), three elements of welfare reform that could effect nutrition education are work requirements, federal spending limits, and state responsibility for designating funds. They believe these elements could influence the direction of nutrition education in four different ways. *Erosion of funding* over a longer period may occur rather than major cutbacks in the short term; programs that may be hardest hit are the newer ones recently receiving increased spending. *Restructuring of services* could occur if more responsibility for services is shifted to states since block grants are in consideration for other social service programs such as

housing and education. It has been required previously under the federal WIC program that approximately 17% of state WIC administrative funds be used for nutrition education. Variations under state regulations will occur from strong commitment to very little provisions. Rose and Nestle (1996) write that "local factors, such as institutional cultures and individual personalities will play a greater role in determining whether the response to problems of limited resources is competitive or cooperative." *Changes in economic status* are likely to occur when fewer people can be supported by programs and/or reduced benefits are received. Basic needs will become increasingly more important with the emphasis in nutrition education shifting more towards resource management strategies. Finally, *reaching high-risk* disadvantaged clients, particularly legal immigrants and pregnant teenagers, will become more difficult due to limitations on their eligibility for assistance.

La Cocina Saludable

La Cocina Saludable (The Healthy Kitchen) is a collaborative nutrition intervention project originally funded through a U.S.D.A. grant and sustained through other funding sources. Results of focus group interviews with professionals, paraprofessionals, and potential persons in need, indicated that the nutrition education should be convenient, interactive, family oriented, include hints for dealing with children's eating, and emphasize healthful eating (Palmeri, 1995). The overall goal of the resulting project, *La Cocina Saludable*, has been the development, implementation, and evaluation of a multi-faceted nutrition education program targeted to low-income

Hispanic women and children with emphasis on migrant farm worker families in specified areas of southern Colorado (Anderson and Kendall, 1995; Anderson and Kendall, 1997). The first of three objectives was to establish local area advisory committees in the three targeted areas, namely the San Luis Valley (Alamosa) area, the Pueblo/Trinidad area, and the Arkansas Valley (La Junta/Rocky Ford) area and one state advisory committee to function collaboratively on the project. The areas have been displayed in the map of Colorado in Appendix A. These committees include representatives from many of the collaborating assistance programs reviewed previously.

The second objective was the development of the multi-faceted, four level nutrition education program to reach under-served areas of southern Colorado. During the first level more than 95 professionals and paraprofessionals in rural areas of southern Colorado were reached via a series of workshops. A combination of one-way videotape, two-way audio, correspondence study and hands-on workshop formats incorporating the Colorado State University distance learning course "Nutrition and the Pre-school Child" were employed. Four of six groups had significant knowledge gains ($p < 0.05$) (Anderson and Kendall, 1997). In the communities farthest from the campus, 92 – 100% of the participants felt this type of learning was similar or more desirable to live classroom instruction; but in the area closest to campus, only 54% concurred.

The second level incorporated the training of Abuelas in all three geographic areas. These trained grandmothers returned to their communities and delivered nutrition education information to Hispanic mothers and care providers of preschool children.

Teaching materials included a 11 x 17 inch flip chart of color photography including Hispanic, WIC, and Commodity Supplemental Foods Program (CSFP) foods, simple phrases, and a color key to the food guide pyramid. The corresponding *La Cocina Saludable* Resource Guide is a nutrition teaching guide that serves as the script for the non-educator / grandmother. Concepts of the U.S.D.A. Food Guide Pyramid are reinforced with a four page color brochure and a coordinated color table-top Food Guide Pyramid. The materials for the five unit program were developed based on the incorporation of the processes of the Stages of Behavior Change Theory (Prochaska's Transtheoretical Model of Behavior) which completed the third objective of the project. That objective was to use a theory based approach in the development and evaluation of nutrition education. The evaluation component included a survey with questions to explore the measurement of movement from one stage to the next in regard to healthy food behaviors.

Both quantitative and qualitative methods were employed for the evaluation of the abuela component (Anderson and Kendall, 1997; Serrano, 1997). The demographics of the abuelas have been presented in Table 2. Pre-, post-, and six month follow-up surveys were administered to evaluate knowledge and skill gain. Least squares means indicated a significant increase between pre- and post-surveys ($p < 0.05$). Although a slight, insignificant decrease was seen between post- and follow up, these means remained significantly higher than pre-training scores. Seventy eight percent reported they had made positive behavior changes due to the program. Twenty five abuelas responded to the qualitative portion of the telephone interview. More than 80%

Table 2: Demographic Characteristics of Abuelas and Participants in the *La Cocina Saludable* Peer Education Project

Demographic Characteristic	Abuelas n (%)	Participants n (%)
Number	36 (100)	337 (100)
Female	35 (97.2)	329 (98)
Hispanic	35 (97.2)	N/A
Age: under 20 year	0	20 (6)
20-30 years	2 (6.0)	131 (39)
31-40 years	10 (27.8)	108 (32)
41-50 years	10 (27.8)	51 (15)
51-60 years	8 (22.2)	
over 60 years	5 (13.9)	27 (8)
Education: Elementary	2 (6.0)	88 (26)
High School Diploma	9 (25.0)	118 (35)
"Some College Credit"	10 (27.8)	94 (28)
Bachelor's Degree or above	11 (30.6)	13 (4)
Other	5 (13.9)	24 (7)
Income: < \$10,000/year	12 (6.0)	202 (60)
\$10,000-\$20,000/year	11 (30.6)	71 (21)
\$20,000-\$30,000/year	2 (6.0)	47 (14)
>\$30,000/year	8 (22.2)	17 (5)
Use of Specified Community Services	30 (83.3)	N/A
Teaching Experience	27 (75.0)	N/A
Spanish Fluency	25 (69.4)	155 (46)

believed the training gave them enough knowledge, skills, and confidence to teach subsequent classes. All of the materials were rated four or above on a five point scale with five representing "extremely beneficial". The two most challenging parts of the program were "overwhelmingly" recruiting participants and coordinating/arranging classes. The abuelas liked the sharing and interaction the most. Abuelas identified the Food Guide Pyramid as the major nutritional message that participants learnt.

The results from the participant evaluation (third level of program) were similar to the abuelas (Anderson and Kendall, 1997). The knowledge and skills scores of

participants increased significantly from entry to post ($p < 0.05$), but not for control subjects (no treatment). Self-reported behavior changes showed similar changes. The scores for the Make It Healthy and Make A Change units were significantly higher from entry to post ($p < 0.01$). The knowledge and skills scores remained significantly higher than entry scores for the six month follow-up ($p < 0.01$). Education level and occupation had a slightly significant effect on knowledge and skill, but not on behavior. The researcher concluded that this is a viable nutrition education program due to the bilinguism, transferability, emphasis on pictorial materials, learning activities, group interaction, and useful cooking incentives. "Due to the program's overall success in increasing knowledge and skills, and improving behavior, it is anticipated that such a program could be expanded to other population groups" (Taylor, 1997).

The fourth level of *La Cocina Saludable* has been the development and evaluation of an interactive multi-media component in which the essence of the Abuela is "captured" via video and audio clips and developed materials from the current program content are incorporated. The rationale for this level stemmed from the difficulty in recruiting and retaining qualified and committed abuelas and the barriers that occurred to recruiting and arranging classes for participants (Anderson and Kendall, 1995).

Computer Technology

The use of computers has become second nature to many people during an exponential growth of applications over the past two decades. In nutrition and dietetics,

computers have been used commonly for general applications of word processing and accounting and specific applications of food service management systems and diet analysis.

Although graphics, computer-generated images, have been used in various applications in science, medicine, and education, early uses in food and nutrition applications were mainly for aesthetics in nutrition education material. Only within the past few years, have substantial data bases such as Corel Draw™ (1994) of graphically depicted clip art food items been developed and become available. Recent applications have begun to include multi-media.

Scanning / Digitizing / Imaging

Scanning, also termed digitizing and imaging, is used to read text, data, or graphics for use by a computer or a computerized device. Again, a wide variety of uses have been found in science fields (Gopalakrishnakone, 1990; Hiruma and Hirakow, 1989; Robinson, Kimsey, and Kimsey, 1991), art related fields (Greh, 1992; Martin and Rempsel, 1988; Strum, 1989), and police work (Philip, Crookes, and Juhasz, 1992). Food and nutrition applications of graphics and scanning reported in the literature are minimal.

In work completed in 1993, a pool of 134 scanned photographs was developed from which an illustrated version of the Colorado Child and Adult Care Food Program (CACFP) Creditable and Non-creditable Foods booklet was created for a large state sponsor (Gould, 1993). Although no significant differences ($p > 0.05$) were found for

compliance to guidelines over time, positive responses were relayed on the subjective evaluation. Users felt the illustrated booklet was easy to use, other providers would enjoy using the booklet, and the pictures were clear and the symbols were understandable. When segmenting those with less than 100 percent compliance, a weak trend ($p < 0.11$) was noted for differences between groups over time favoring the pictorial version. This segmented analysis was done to look at the potential ceiling effect of the initially high reimbursement rates for all groups. The major conclusions from this study were (1) it is possible to develop a pool of imaged (scanned) photographs to be used in nutrition education materials, (2) CACFP providers liked the illustrated booklet, (3) different variables for measuring effectiveness should be tested, (4) and using this technology with other groups at high nutritional risk and who may have minimal reading skills should be investigated.

Interactive Multimedia

Interactive is characterized by allowing immediate two-way communication between a source or sources of information and a user who can initiate or respond to queries (Random House, 1994). *Multi-media* means involving the use of several media simultaneously such as graphics, scanned images, video clips, and audio clips (Random House, 1994). General formal research regarding multimedia is scant and involves small sample sizes on which inferential analyses are difficult. In two projects, however, audio was found to be a positive component (Roark and Parrish, 1993; Talbot, Pepin, and Loranger, 1992).

Descriptions and/or evaluations of food and nutrition related interactive and/or multimedia applications in the literature include the following. *Ship to Shore* (Matheson, 1994) is a computer assisted instruction (CAI) program employing nutrition issues to teach skills from subject areas such as science, math, social studies, language arts, and health. Pre-test and post-test interview data were converted to concept maps, scored, and analyzed using repeated measures analysis of variance (ANOVA) for a sample of 49 middle school children (22 treatment, 27 control). Post-test knowledge scores were higher than pre-test for the vitamin deficiency section ($p < 0.0001$), the starvation section ($p < 0.05$), and the dehydration section ($p < 0.01$). Significant effects for interactions was interpreted to indicate that the treatment group learned more about vitamins and dehydration, but not starvation. In the latter section, treatment students had significantly less ($p < 0.05$) misconceptions than the control group. Observational data was used to determine the type of interaction that occurred among students and with the computer program. Girls were found to be primarily "Dominant Directors" and "Passive Actors" while the boys fit more often into the "Action-Oriented Learners" and "Content-Oriented Learners".

In the Dole® *5-A-Day Adventures*, children have the opportunity to travel through a town filled with fruit and vegetable graphic characters who communicate information about themselves including the many nutritional benefits. Data from this study (Miller, 1996) was qualitative in nature and included the identification of program objectives, instructional design strategies, formative evaluation, and implementation.

College students using an interactive automated programmed instruction were found to have significantly ($p < 0.001$) greater knowledge gains and a 41.8% lower fat intake ($p < 0.003$) than subjects in a non-interactive computer group using passive prose text (Kumar, Bostow, Schapira, and Kritch, 1993). The students in the interactive group took longer to review the provided information.

Formative and summative evaluations were completed for a project to develop a computer-based instruction (CBI) courseware to teach research methods to nutrition students (McEwen, 1995). A combination of questionnaire, personal interview, and focus group evaluation techniques were used. Results of the formative evaluation led to final development of 10 – 14 hours of user interaction and the inclusion of multicolored text, high-resolution colored graphics, more audio, and real time video segments in a more linear, student-controlled progression. An independent student t-test ($n = 31$) resulted in significantly higher mean post-test scores for the group using the CBI courseware (Castelli, 1997). The 29 students who evaluated the final courseware agreed/strongly agreed that features enhanced comprehension.

A computer-based system for Type I diabetic patient monitoring of diet and exercise practices was compared with a paper and pencil monitoring system to determine effectiveness for compliance to a recommended regimen (Sheldon, 1996). Compliance was measured through physiological and self-reported measures. Within the computer-intervention group, significant improvements ($p \leq 0.05$) were observed for blood cholesterol, body mass index (BMI), hip, and waist measures. When compared to the paper and pencil group, the computer group showed improved clinical scores. The

intervention group entered more days into the self-monitoring log than the traditional group, a result interpreted as greater behavioral adherence. At the end of the study, the computer group rated the intervention credibility higher than the paper and pencil group.

Results from a pilot evaluation of a computerized interactive menu selector system for hospital foodservice indicated significant ($p < 0.01$) patient-subject ($n = 47$) satisfaction, motivation, convenience, availability, interest, and curiosity when compared with those using a printed manual system based on a Chi-square "goodness of fit" analysis for each variable (Jamison, 1994). More than 75% preferred using the computerized menu selector system over the paper method. Although no subjects indicated that the system was not useful to them, 72% of the 43 subjects who responded felt that the system could be improved and 28% felt the system was excellent. Suggestions for improvement included providing opportunities for special orders, need for an interactive rate (system gave set amount of time to make choice – sometimes too slow, sometimes too fast), better synchronization with the audio, and the ability to see the full day's menu at once. From results of a cost analysis, labor costs were decreased by 14.3% and a payback period would be estimated to occur in 6.7 months. A potentially higher cost savings was estimated for hospitals in which more than 44% of the patient diets were non-calculated as the menu selector system also tallies and keeps records. According to the researcher, future enhancements could include a link to the mainframe to eliminate duplication of record keeping, incorporate direct accounting capabilities, and provide immediate nutrient analysis feedback.

A computer-based simulation system presented three clinical dietetic situations for use during orientation with entering dietetic interns (Turner, 1995). The group using the computer simulation system tended to be rated higher than non-users for nutrition care planning during the first three weeks, but not during the next five weeks. The only other differences observed between groups regarding nutrition care delivery were behaviors related to communicating and managing nutrition care delivery were better during the first two weeks among the group completing the computer-based simulation.

Completion of CAI tutorial programs to teach dietetic students clinical reasoning skills resulted in a 10% higher score on a simulation test while no computer intervention yielded only a 2.7% higher score (Raidl, 1993). Lower-level clinical reasoning skills improved by 20.3 to 31.7% and of higher-level decision making skills by 28.3%. Results from student affective evaluations indicated enjoyment and usefulness for the programs.

An expert system-based, computer-assisted training program (ES-CAT) for the diagnosis and treatment of eating disorders was found to be a more effective training means than three other methods: (1) an expert system-based, (2) without computer-assisted training, or (3) a traditional self-study method (Todd, 1992). More significant gains of learning from pre to post were observed for the ES-CAT than the other groups.

Dietary intake was obtained using interactive software that prompts and guides users through recording food weights and descriptions (Fong and Kretsch, 1990). A savings in time and labor of 80% was observed when a cost comparison of using a computer to a personal interview for dietary intake was completed. A direct savings

(after the initial computer purchase) of \$7,400 was seen over an equivalent of 5.5 months. If the cost of the computer was considered (\$1,200 -\$6,700), a potential net savings over two years could be \$15,000.

A prototype interactive program was developed at Virginia Polytechnic University to be used in point of purchase situations to alter shoppers' supermarket purchases to fit nutritional guidelines (Winnett et al., 1991). Supermarket receipts were used to measure actual purchases. When compared to a control group, there were more decreased high fat purchases of meat ($p < 0.001$) and dairy ($p < 0.05$) and increased high fiber purchases from the grains/cereal categories ($p < 0.001$) during the intervention period. During a follow-up phase, (five weeks after the intervention phase), purchases of low-fat dairy items and high-fiber grains/cereals remained significantly higher ($p < 0.05$) than the control group purchases.

Computer-aided feedback before an intervention was not found to be more helpful than the intervention alone for low income EFNEP homemakers (Bowens, 1993). Bowens concluded that using a simpler dietary analysis printout should be tested.

The change in preference for interactive computer use was evaluated among low-income pregnant women (Suitor and Gardner, 1992). Before using an interactive, self-administered computerized food frequency questionnaire, 58% expressed preference for this method over a paper questionnaire. After using the program, 87% preferred the computerized version. Likewise, the percent increase in preference for

computers over personal interviews was from 45.4% to 73.5%. It was hypothesized that the computer is a less threatening situation than personal contact.

An interactive multi-media nutrition education computer application was developed targeting the WIC population in Maine (Carroll, Stein, Byron, and Dutram, 1996). Pre- to post-viewing assessment responses improved. Client acceptance was favorable and 93% of those interviewed were positive about using the system for learning. "Nutritionists and aides, in this evaluation, reported that using this technology had an overall positive impact" even though some lack of acceptance by staff may have limited its use.

Evaluation of Computer Applications

Development of effective computer programs incorporates a great deal of alpha testing (formative evaluation) and Beta testing (similar to a pilot study). Alpha testing is conducted as the modules are developed. It is completed by product-knowledgeable people to identify glitches and content errors. As much as possible, customer/client use should be simulated.

Beta testing has been used primarily in the commercial sector to validate the product concept, eliminate performance error(s) before releasing to the market, and to serve as an effective sales promotion device (Dolan and Matthews, 1993). This testing is completed by customer based participants in realistic use situations to detect problems not identified during alpha testing. Most of the time this testing has been qualitative with a few descriptive statistics being applied.

Beta testing has been completed in a variety of situations. In hopes of speeding up requests and subsequent deliveries, a computerized interlibrary loan request system at Massachusetts General Hospital in Boston was evaluated through beta testing (Borsman, 1994). Subjective feedback was solicited and the results indicated that although the beta testing was time consuming and sometimes frustrating due to the trial and error nature of this type of evaluation, overall, the new computerized system was more effective than the previous system.

At a New Jersey Hospital, a computerized system for collecting performance indicator data was Beta tested (Finlan and Zibrat, 1993). Data were analyzed and then used to improve clinical outcomes, such as the higher than average cesarean section rate.

Another example of the utilization of Beta testing was with the evaluation of an interactive multi-media program promoting facets of New Mexico, *The Natural Resource Extravaganza* (Gleason, 1991). The evaluation was primarily qualitative and observational from which conclusions for future implementation were drawn.

Summary

Nutrition education is a valid and constructive practice. The most effective interventions are those that are developed and evaluated based on theories and models and that are behavior based. The Social Learning Theory and the Communication Theory / Model provide the framework for utilizing computer technology in this

nutrition education program while Prochaska's Transtheoretical Model guides the identification of behavior change.

Potential increased nutrition risk has been established for the low-income non-reader, especially ethnic minorities. Although food assistance programs are available for many, "welfare reform" could result in reaching less of those in need.

Scanning (digitizing) and interactive multi-media are two aspects of computer technology that can be used in designing and delivering nutrition education materials and interventions. Interactive multi-media has been employed successfully in nutrition education programs for children, college students, shoppers, and low-income persons. Evaluation of interactive multi-media involves alpha testing (formative evaluation) and beta testing (pilot evaluation). Comparison of interventions with live peer educators, however, was not found in the literature.

PROJECT I:
DEVELOPMENT AND EVALUATION OF
A PICTORIAL VERSION OF
THE "COLORADO WIC PROGRAM ALLOWABLE FOODS" LIST

Introduction

A challenge prior to 1997 for the Colorado Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) recipients with less than an eighth grade education, potentially more than 4,900 (Williams, Lessler, Wheelless, and Wildfire, 1990), was that the list of WIC allowable foods was printed in a format that could be difficult to read (Appendix C). The print was small, words were placed close together, and concepts of allowed and not allowed were integrated. Although the list also was offered in Spanish, this would be of little help if the client could not read.

The first project was designed to simplify the list of *Allowable Foods for Colorado WIC* (1996). Computer generated graphics were used to add pictorial cues for non-readers. This also was intended to provide WIC nutrition educators with an additional counseling tool. One of the basic tenets of the Communication Theory (Model) is to make sure the message sent (the input) is the message received (the output) (Gillespie, 1984). Pictures should assist with clarification of the content (the

intervening process). The problem solving element of this theory was addressed with a tool to assist with identification of foods for maximum benefit from the WIC vouchers. Four factors of the Social-Cognitive Learning Theory provide basis for the development and use of a pictorial list, also (Bandura, 1977a; Bandura, 1977b). (1) *Reciprocal determinism*, provides that if the client's environment can be influenced to make it easier to select appropriate foods, optimal nutritional intake might be promoted. (2) *Behavioral capabilities* for food selection at the grocery store might be made easier with use of a pictorial food list. If a client has an easier time with food acquisition, the powerful motivating factor of (3) *self-efficacy* should improve. The list provides some means of persuasion while WIC provides social support for success. The expected outcomes (4) (*expectations*) of the desired behavior are both short term, foods received, and long term, healthier self and/or children. The value each client places on those expectations (*expectancies*) is very individually determined.

The overall goal of this project encompassed the development, dissemination, and evaluation of a pictorial list of WIC allowed foods with the intent of improving selection of foods available with vouchers among Colorado WIC clients with low reading skills. The evaluation encompassed two phases: (1) formative and process evaluation, and (2) target population preference evaluation.

Objectives and Hypotheses

The objectives for the formative/process evaluation were:

- to assess the content validity of a simple attitudinal questionnaire regarding the pictorial list for allowable foods;
- to acquire recommendations from WIC staff in four areas of Colorado, Abuelas who work with a section of the target population, and from WIC clients to assist with revision of the pictorial list based on responses from these groups; and
- to combine at least one recommendation from each group in revising/using the pictorial list for allowable foods.

The objectives for the preference evaluation were:

- to determine potential WIC clients' text or pictorial version preference;
- to determine WIC clients usability preference;
- to determine grocery store checker usability preference; and
- to determine target area WIC staff usability preference.

The hypotheses for the preference evaluation were:

- #1 a: Potential WIC clients will prefer the pictorial version over the text version of the Colorado WIC allowed foods list.
- b: The primary reason potential WIC clients will have for preference of the pictorial version will be related to the descriptive aspects of the pictures.

- #2 a: Grocery store checkers will prefer the pictorial version over the text version of the Colorado WIC allowed foods list.
- b: The primary reason Grocery store checkers will have for preference of the pictorial version will be related to the descriptive aspects of the pictures.
- #3 WIC staff will anticipate that the pictorial version of the WIC allowed foods will be more usable with clients than the text version of the Colorado WIC allowed foods list.

Methods

Formative Phase (Phase I)

The information for allowed foods of the Colorado WIC program was revised from the current list of *Allowable Foods for [Colorado WIC] as of January 1996* (Appendix C). Pictures were added to provide specific information for the foods that can be purchased using the WIC vouchers. To avoid overwhelming the reader, the text in the revised four-fold leaflet was not intended to be inclusive of the original but to contain the most critical information regarding valid foods. The font used was a 14 point Universal compared to a six to eight point font of the original. The "not allowed foods" were separated; quantities were not included. This was intended to allow the WIC professional to be able to individualize the information by highlighting allowable item(s) and writing in appropriate amounts.

Women currently eligible or newly enrolled in WIC of Colorado were the ultimate target population for the food list. They were characterized further as potentially having difficulty with selecting a maximum percent of their allowable foods due to limited understanding of the written English language.

Material Development:

Corel Draw™ Clip Art and graphic pictures developed in the Public Relations department of Colorado State University for *La Cocina Saludable* were used to illustrate the pictorial version. Microsoft Word for Windows was used to “type set” text. Through the formative evaluation described next, the appropriateness of utilizing these computer applications was determined.

Evaluation

A simple questionnaire (Appendix D) was administered to federal interagency nutrition professionals during a regularly scheduled meeting to establish content validity. After viewing one of the two versions of the Colorado WIC Allowable Food List, the questionnaire was administered to abuelas (Hispanic grandmothers) in southern Colorado who were being trained as nutrition educators in a related project. On one of the two days of training, they received either the text version or a pictorial version to view; on the following day, they received the other version.

WIC staff administered the questionnaire to WIC clients in a local county after the clients had an opportunity to view the pictorial version of the list. WIC staff in the

local county and three areas of southern Colorado were asked to provide their opinions of the pictorial version by answering a slightly more discerning questionnaire (Appendix D). Administration of this questionnaire was by the contact person in the respective WIC offices.

Preference Phase (PhaseII)

Material Modification

Based on data from the formative evaluation of 1995, the following modifications were made. Computer scanned images were used in place of the clip art. Adobe Photoshop™ was used for scanning 10 black and white photos previously used in the Child and Adult Care Food Program (CACFP) booklet, 24 cereal boxes, and seven brands of frozen juice concentrates from other state WIC guidelines. Photos taken of WIC items not in the “picture library” were developed in scanned format on Kodak® CD ROM. These items included two bagged cereals, one brand of frozen juice concentrate, three brands of canned juice, and three other food items (infant juice, eggs, carrots).

Adobe Photoshop™ also was used for modification of the following graphics. The gray backgrounds of the black and white images used in the CACFP project were removed and necessary modifications of the same images were made to meet WIC requirements (e.g. remove string cheese and sliced cheese from cheese image). Special offers on the labels of cereal boxes were removed to decrease potential confusion. Where appropriate, specific brand names of some juices were replaced with “any brand”

and "generic" where appropriate. Obvious flaws were removed. All images were saved in tagged image file (.tif) format. Pictures were incorporated with text using Microsoft Word for Windows (6.0). A Spanish version of the pictorial list was also made by substituting Spanish text for English text. The final versions were sent over the internet to be printed directly with a high quality laser printer.

Evaluation

For the initial preference evaluation of this phase, 100 consenting women were recruited at the Sunrise Community Health Center in Weld County and asked to answer two questions regarding a nutrition education tool in order to help with improving them. This was done in conjunction with the administration of a questionnaire of the larger *La Cocina Saludable* project. The questions (Appendix E) were asked orally and brief notes were taken to record responses. A Spanish speaking person was available to translate as needed.

Twenty six new WIC clients in Larimer County were invited to help with testing two nutrition education tools. They were asked if they would be able to commit to a time when they could meet the researcher at the grocery store of their choice when they would use their WIC vouchers or if they would be able to complete the survey after using the lists at their convenience. At the grocery store, they were to be given a copy of each version of the WIC Allowable Food List, encouraged to find all the items on their voucher and, when finished, return to answer a few questions regarding usefulness and preference of the two versions (Appendix E).

Twenty four grocery store checkers were solicited to take part in a study to determine which of the versions of the list would be most useful and preferred among checkers. Each checker had one copy of each version of the list (text and pictorial) available for use while working at his/her cash register. After two weeks of exposure to both versions of the list, the clerks were asked to complete a questionnaire (Appendix E) about their use of the lists and preference.

Forty two WIC staff from Larimer county and from the three areas of *La Cocina Saludable* were asked to review the pictorial version. They were asked to complete a questionnaire, (Appendix E) to determine preferences and to gather information regarding the pictorial version's potential usefulness as a nutrition counseling/education tool.

All survey questions for the preference phase were based on the surveys validated for content during the formative phase. Permissions from every food company represented within the list were received and are on file with the Colorado State University's Department of Food Science and Human Nutrition Cooperative Extension. The Human Subjects Committee at Colorado State University approved this project and informed consent was received from all participants.

Data Analysis

Microsoft Excel[®] and Statistical Analysis Systems (SAS[®]) software (Version 6.09) were employed to perform primarily descriptive quantitative analyses of the data.

Frequencies of preference for four versions (English pictorial, English text, Spanish pictorial, Spanish text) were calculated for the interview data gathered from the women (potential WIC clients) in the low income health clinic. Frequencies also were calculated for those WIC clients who used the lists, grocery store checkers, and WIC staff.

Results

One hundred women in a low income health clinic were interviewed and asked about their preference for the text of pictorial version of which ninety eight were usable. Eighty six percent preferred the pictorial versions (English and Spanish) (Figure 1) while 14% preferred the English text version. No one preferred the Spanish text version. The reason most often cited for preferring the pictorial list was the pictures.

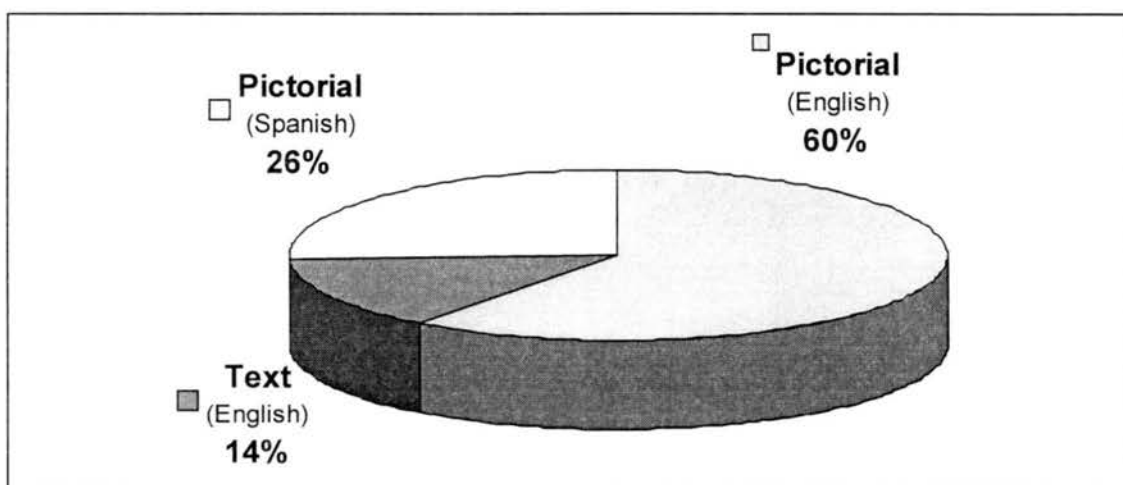


Figure 1: Preference for four versions of the *Colorado WIC Program Allowable Foods* list from potential WIC clients (n=98); no one preferred the Spanish text version.

In the WIC client usability evaluation, only twelve of the 26 women recruited returned at least the questionnaire. Six of those women had used and evaluated the text version and the other six had used and evaluated the pictorial version. All participants responded that the foods lists helped them very much at the grocery store with finding items listed on their WIC check regardless of whether they had the pictorial or text list. The reasons most often cited for the pictorial list included the pictures, ease of use, and the convenience of information on one sheet. The only negative comment by one participant regarded the bulkiness of the pictorial list.

Fourteen of the 24 grocery store checkers recruited used the pictorial list for two weeks and completed the questionnaire. Twelve (86%) preferred using the pictorial version while 1 person (7%) preferred the text version and 1 person (7%) had no preference (Figure 2). The major reasons for preference of the pictorial version were that it was easier to clarify allowable foods when serving WIC clients and it was a clearer, quicker, and easier reference. All responded that the text was very readable; and all, but one, responded that the pictures were very clear.

The sample size for the WIC staff who completed the questionnaire was 42. Sixty four percent marked that they would use the pictorial version more with clients than the text version while eighty percent marked that they would use the pictorial version more with client education than the text version (Table 3).

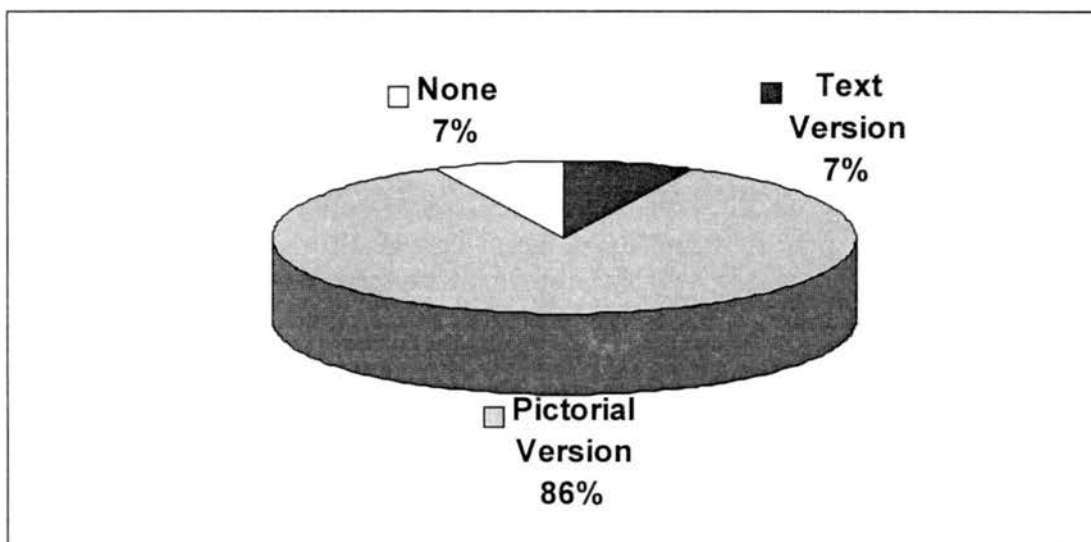


Figure 2: Preference of grocery store checkers after using two versions of the *Colorado WIC Program Allowable Foods* list (n = 14).

Table 3: Responses of WIC Staff Regarding Potential use Pictorial Version of Colorado WIC Foods List with clients(n = 42^a)

Q ^b #	More than Text Version	Same as Text Version	Less than Text Version
Q1	64%	29%	7%
Q2	80%	18%	3%

^a For Q2 n=40

^b Q = Question:

Q1: When working with mothers would you use this list more, same, or less than current (text) guide?

Q2: Would this guide help with client education more, same, or less than current (text) guide?

Eighty eight percent perceived that the pictorial version would be easy for clients to use and that mothers would like to use it (Table 4). Eighty three percent felt the pictures were clear. Seventy one percent marked that the amount of information in the pictorial version was okay while 85% marked that the size of the words were okay (Table 5).

Table 4: Client Potential Use and Liking, and Clarity of Pictorial List (n = 42)

	Most Positive	More Positive	Neutral	Less Positive	Least Positive
Q3	64%	24%	7%	2%	2%
Q4	62%	22%	10%	0%	2%
Q5	64%	19%	4%	2%	0%

Q3: How easy would this guide be for WIC clients? Very Easy >>>>> Difficult
Q4: How much would mothers like using it? Like >>>>> Dislike
Q5: Are the pictures clear? Very Clear >>>>> Very Unclear

Table 5: WIC Staff Views about Information and Text (n = 42)

Q6	Too Little	5%	12%	71%	7%	5%	Too Much
Q7	Too Small	2%	7%	85%	2%	2%	Too Large

Q6: The information is Too little >>>>> Too much
Q7: The words are Too small >>>>> Too large

Conclusions and Discussion

The use of digitized photos to create a pictorial list for the Colorado WIC program was successful. The pictorial versions (Spanish and English) were preferred by a sample of low income women, grocery store checkers, and WIC staff in four areas of Colorado. The pictures were mentioned most often among potential WIC clients as being the reason they preferred that version. Even though these subjects did not have the opportunity to use the pictorial list, it might be speculated based on the Communication Model (Gillespie, 1981; Gillespie and Yarbrough, 1984) and the Social-Cognitive Theory (Bandura, 1977a) that the graphics may have provided a clear input from which the viewer could envision their self-efficacy for selecting the appropriate foods. Although not a model in the form of a person, the graphics provide a

type of symbolic modeling to the viewer. This was supported by several of the grocery store checkers who commented that the list made it easier to communicate the allowed foods to the WIC participant. An additional comment was that it was less frustrating, not only for the checkers, but also for their WIC customers. The list contributed to self-efficacy in this instance.

One limitation of this research was that the sample size of clients who used lists and returned the evaluations was too small to complete inferential statistics and draw related conclusions. Recruitment of WIC clients for this part of the evaluation was difficult and no one agreed to meet at the grocery store. Subsequently, mail response was only 50% with very few of these women returning all the items requested along with the survey: the list and a copy of the grocery store receipt.

Another limitation was that the grocery store checkers did not have the pictorial version of the list in the “usual” place. At their registers, checkers had all the produce prices, WIC list (text), and other pertinent information they might need to reference quickly in a spiral type bound packet. The pictorial list had to be placed on a magnetic board next to the register which a few checkers considered as inconvenient. A solution would have been to put a revised format of the pictorial version into the booklet itself, but, this was not possible for the study period because the formatting would have needed to be completely changed to accommodate the size and format of the books. The only checker who chose the text version noted the inconvenience of the location of the pictorial list compared with the other list.

It would have been helpful to have had the WIC staff evaluate actual use of the pictorial list with the clients; however, this was not possible at the time of the study. One staff member in southern Colorado did take the time to review it with a client and noted that it was very useful. The responses overall reflect inferences based on many years of WIC client education experience.

Beginning in January 1997, the pictorial lists described above were distributed in place of the text versions for use with all WIC clients in the state of Colorado. This translates to reaching approximately 76,000 WIC clients statewide*. They were printed on an orange colored paper which was designated for that edition. The colored paper allows for quick distinction by clients, grocery store checkers, and WIC staff, and the color is changed with each modification.

This is one example of how computer technology can be used to enhance nutrition education materials for clients. The skills of scanning / digitizing graphics from this project were incorporated into the interactive multimedia computer program described next in Project II.

* Figure provided by Colorado Department of Public Health and Environment, Nutrition Services, July 1997

PROJECT II:

***DEVELOPMENT AND PROCESS EVALUATION OF AN
INTERACTIVE MULTI-MEDIA NUTRITION EDUCATION
COMPUTER PROGRAM***

Introduction

A major challenge in the Abuela Educator (Hispanic grandmother peer educators, hereafter referred to as “abuela”), level of training of the *La Cocina Saludable* project has been the recruitment and retention of qualified peer educators to be the abuela educators. Although the local advisory committees have been enthusiastic and helpful with this challenge, and a number of abuelas have been recruited, trained, and are educating the low-income Hispanics, the use of an interactive multi-media program (IMM) could be complementary in areas in which qualified abuela educators may be unavailable. In addition, the recruitment and coordination of classes for the target audience has been challenging due to such barriers as lack of transportation and child care and the irregular hours migrants work (Taylor, 1997). IMM provides a means to deliver accurate and consistent nutrition education information at a convenient location and time such as a community assistance office waiting area during open hours or a migrant clinic that is open in the evening hours. Since the interactive multi-media

program would be available to any person who participates in an assistance program and visits the local office to receive benefits, the target audience could be expanded. The IMM format for nutrition education is easily sustained, replicated, and transferred to other locations.

Potential advantages of IMM are the use of creative graphics and delivery to reach and maintain the attention of non-readers, accuracy and consistency of information through the control of research-based content (Anderson and Kendall, 1995), and minimal cost for maintaining the education effort after initial equipment purchases (Fong and Kretsch, 1990). Transferability of the information and content across assistance programs could be attained and the two way learner-controlled interactivity could be sustained. The challenges of recruiting, training, and retaining abuelas could be minimized with the use of IMM, especially in areas where qualified abuelas are unavailable to enhance nutrition education efforts in food and other assistance programs.

Maintaining the behavior based constructs of Prochaska's Stages of Change model upon which *La Cocina Saludable* was developed and evaluated was critical in adaptation to IMM format (Prochaska, Norcross, and DiClemente, 1994). In addition, based on tenets of the Social Learning Theory, IMM has the potential to incorporate creative, realistic experiences for mastery (Bandura, 1977a). With the use of photographs, high quality graphics, animation, and video, behaviors such as using the Food Guide Pyramid and making healthful choices can be simulated and allow the user to practice these skills. An abuela figure provides modeling, positive feedback and

encouragement for persuading, and means to deal with stressful situations. The user can be guided and shown the skills for determining serving sizes or choosing low fat foods as many times as he/she chooses without a negative consequence such as eating too much of a high fat food or selecting a food high in fat and having subsequent problems with obesity. By utilizing a tested, consistent format of IMM, the message could be controlled (Communication theory); yet, the interactive features would allow for individual choices (Gillespie, 1981).

Alpha testing (formative evaluation) in the literature is primarily descriptive. Neither quantitative nor qualitative data has been reported formally. This project provided an opportunity to begin the process of exploring formal evaluation of this phase of developing the interactive multi-media program using quantitative and qualitative methods.

A further testing method termed, "Beta testing" could be used to analyze qualitatively and quantitatively the effectiveness of the computer program and the equipment functions at the user level. There was potential that quantitative data acquired through the computer tracking system during the beta phase could be analyzed to determine preliminary effectiveness of the program and to perform a cost benefit analysis. According to Kolasa (1996), new methods of evaluation are needed to determine the cost/benefit of using new technologies in nutrition education.

A rigorous research design was applied to determine the effectiveness of the IMM method. Concurrently, the effectiveness of a computer application and the usual

treatment of group nutrition education facilitated by an abuela was assessed and compared.

Research Questions and Hypotheses

Four research questions were posed:

1. Can formal alpha testing be quantified in regard to time and to the number of obstacles encountered and overcome? Since this is a qualitative type assessment, corresponding hypotheses will be formed after the results are analyzed (Thomas & Nelson, 1990).
2. Can a nutrition education program, developed and delivered through interactive multimedia (IMM), increase knowledge, skills, and behavior and be comparable to the program taught by an abuela (Hispanic grandmother). Three hypotheses have been included:
 - a. The interactive multimedia method will not affect knowledge and reported behaviors at entry (μ_1), post (μ_2), or follow-up (μ_3);
 $(H_0: \mu_1 = \mu_2 = \mu_3; H_a: \mu_1 \neq \mu_2, \mu_1 \neq \mu_3, \mu_2 \neq \mu_3)$
 - b. There will be no differences in mean scores of knowledge and reported behaviors among the participants receiving the nutrition via the IMM (μ_1) and those receiving it with an abuela (μ_2); $(H_0: \mu_1 = \mu_2; H_a: \mu_1 \neq \mu_2)$.

3. Is the cost/benefit for using IMM similar to the personal contact approach with an abuela? The hypothesis is that if the number reached is similar, the mean costs will be similar, also;

($H_0: \mu_1 = \mu_2$, where μ_1 = average cost per client reached via computer and μ_2 = average cost per client reached by the Abuela educators; $H_a: \mu_1 \neq \mu_2$).

This research project was approved by the Human Subjects Committee at Colorado State University. Informed consent was obtained from participants.

Methods

Materials Development

Two modules of *La Cocina Saludable* interactive multimedia (IMM) program were developed based on the two corresponding units, "Make It Healthy" (MIH) and "Make A Change" (MAC), of the tested peer education program. The program attempted to "capture" the essence of the Abuela educator via audio and video clips and graphics. Content consisted of the current materials being utilized within the *La Cocina Saludable* nutrition education program. These included messages from the teaching Resource Guide, graphics from the colorful flip chart, and clips from documentary videos developed for education of the professionals, paraprofessionals, and abuelas. A team of seven persons within the Department of Food Science and

Human Nutrition at Colorado State University, the graphic artist, and the programmer provided advice and agreed on the components to use and the presentation format.

The general steps for development were as follows.

- (1) A half-day brainstorm session with the team members was held to gather a wide variety of ideas and to begin pairing down the ideas, establishing goals and objectives, and determining general content.
- (2) Goals and objectives of the program were established including (a) paralleling the peer education program as closely as possible, (b) maintaining the theoretical framework (Prochaska), and (c) including behavior based information reinforced by behavior-based activities.
- (3) The general content was determined based on the goals and objectives. Five modules of the program would be developed eventually. Two of the most similar, "Make It Healthy" and "Make A Change," were selected for this evaluation;
- (4) Macro-flowchart(s) were developed to display visually how the general content (five modules) would fit and flow together.
- (5) Macro-flowcharts were expanded to a micro-flowchart by adding more specific content description with potential options and "links" for each unit.
- (6) Storyboards were completed to provide a sketch of the page and to coordinate the media components (audio, video, graphics, and animation).
- (7) Programming on the computer was completed to integrate the media components.

The audio script was adapted directly from the main messages of the Resource Guide. The scripts for the two modules and proposed scripts for three remaining modules to be developed ("Make It Fun", "Make It Safe", and "Make A Plan") have been included in Appendix G and Appendix H, respectively. A choice of Spanish or English audio was an option at the beginning of the program. The order for the messages and the delivery approaches were consistent with the peer education program. When adaptations were made to accommodate the IMM format, the Stages of Change model was considered to determine how those adaptations were completed. For example, introductory messages were abbreviated to include enough to raise consciousness, but not overwhelm the user. This usually was done in the form of a probing question regarding a behavior the user might or might not do in regard to his/her family as well as his/herself. Three to four concise supporting messages were followed options to explore more in-depth content.

Many of the graphics were based on the colorful photographs of the flip chart. The original slides were digitized professionally onto Compact Disc – Read Only Memory (CD-ROM) for modification to use within the program. The colorful pyramid used consistently throughout the materials also was used often throughout the IMM program. Animation was employed to provide variety and retain attention.

Abuelas currently teaching group sessions in southern Colorado were included in pictures and short video clips within the program. An abuela in a video at the end of the "Make It Healthy" claps to congratulate and reinforce the user for finishing the module.

Activities for use within the IMM program were adapted from those used within the peer education program. In "Make It Healthy", the user has the opportunity to touch and drag a plate of similar foods, such as vegetables, to the appropriate place on the Food Guide Pyramid. For every correct answer, the narrator responds with a positive reinforcement and a brief statement about the importance about that group of foods. In addition, the foods stay within the pyramid, eventually to complete it as in a puzzle. For incorrect answers, the narrator encourages the user to try again or to touch her picture for help. This activity is offered at the beginning of the module to raise consciousness and at the end to provide, self re-evaluation and self efficacy and to reinforce learning.

The activities for "Make A Change" included choosing more healthful foods (by touch) within each change, (decreasing fat, decreasing sugar, decreasing salt, or increasing fiber). This was offered at the beginning of each section for raising consciousness. At the end of the module, users had the opportunity to touch foods within a group of foods that could help the user make a healthful change.

The authoring software used was Asymetrix Multimedia Toolbook™, a software package in which video, audio, and graphics could be captured, modified, and integrated to form an interactive multi-media program. In addition, a component was incorporated within the program to track usage and facilitate data collection.

Four touch screen computers were purchased and one was placed in each of the three areas in southern Colorado for the evaluation and for subsequent use in assistance program waiting areas. Kiosks (small structures encasing a computer system open at one section to allow access to a touch screen monitor) were semi-custom made at a mid-

size height of about four and a half feet. This provided a comfortable height for most adults who were seated and for children who were standing.

Target Audience

The target audience for the project was primarily participants of food assistance programs (such as WIC and EFNEP). These included some the low-income Hispanic persons and migrant farm worker families who participate in food assistance programs in the three target areas of southern Colorado (Appendix A): Area 1 – the San Luis Valley (Alamosa area); Area 2 – the Pueblo/Trinidad/Walsenburg area, and Area 3 – the Arkansas Valley (Rocky Ford/La Junta/Lamar area). Characteristics as related to national and Colorado statistics have been displayed in Table 6. Residents of these areas tend to be poorer, are more likely to be Hispanic, are less educated, have higher rates of chronic diseases, and have a higher participation rate in community assistance programs.

Evaluation

Alpha Testing

During the first phase of alpha testing in the development stage, specific activities and the corresponding amount of time involved were recorded in a research log (lab style) book. In addition, a computer log book was posted at the computer

designated for development. The number and type of problems encountered during alpha testing were to be documented in order to draw conclusions about potentially difficult areas of the development process.

Table 6: Selected Characteristics of Southern Colorado Population^a

	National	Colorado	12 Counties of S. CO Areas ^b
Population (1993,1994)	262,755,000	3,746,607	239,431 (6.4% of CO population)
Hispanic (1994)	26,072,853	492,087	23 – 77% (1996)
< 100% poverty level (1993)	6.8%	5.2%	17 – 30%
Unemployment			4.2 – 11.0%
< High School Diploma (Age 25+ for 1990)	22.4%	15.6%	22 – 39%
			(Lower percents in larger towns)
Mortality rate (per 100,000)			
Heart Disease		171.4	205.9 – 417.7 (20–240% higher than CO rate)
Cerebro-vascular Disease		42.7	42.7-58.8-118.0 (0-37-280% higher than CO rate ^c)
Diabetes		14.2	20.1-85.3 (43-600% higher than CO rate)
Participation in selected food and other community assistance programs	31,591,000 (12%)	291,600 (7.8%)	47,200 (19.7%)

^aSources: Colorado Department of Public Health and the Environment: County Health Reports, 1996 and Colorado Vital Statistics, 1997.

^bRanges represent the ranges for the 12 counties within the three target areas of southern Colorado.

^cOne county within the areas had a mortality rate for cerebro-vascular disease similar to the state rate of 42.7; the other 11 counties had a rate 37 to 280% higher than the state rate.

A second level of alpha testing incorporated the evaluation of the product by over 40 professionals and paraprofessionals who were in the nutrition education field. During and after use, comments (guided by a draft survey) were recorded and analyzed

to determine necessary changes and to assess face and content validity of the qualitative evaluation questions in the computer program.

Participant Evaluation

The summative evaluation was completed in conjunction with Beta testing. The survey included selected questions from the previously validated survey (face and content validity determined by nutrition professionals). This modified survey was used to assess the effects on knowledge and behavior of the original *La Cocina Saludable* education program delivered in a group setting to low-income Hispanics by abuelas (Anderson and Kendall, 1995; Taylor, 1997). The reliability coefficient for the entire survey was 0.83 and was established by a test/retest method with 28 individuals in Denver (Anderson and Kendall, 1997; Taylor, 1997).

Participants completed the survey three times. The Entry survey was completed before starting the nutrition education. The Post survey was completed after finishing both units/modules. Additionally, those who finished at least one module of the IMM program were asked to complete a simple hedonic type survey to give opinions on how they liked the program and how they liked using the touch screen computer. The questions in this survey were validated for content during alpha testing. Follow-up surveys were sent by the researcher anytime between two to four weeks after the Post evaluation was completed.

Areas and abuelas. A map with the three areas described previously can be found in Appendix A. The abuelas for each area were selected based on their success during the peer education evaluation of Taylor (1997). They were among the most dependable, successful with recruiting and organizing, and presented the nutrition education information most accurately and consistently. Areas 1 and 2 each had one abuela throughout the evaluation while Area 3 had three abuelas. Logistical support for the abuelas was administered through the coordinator and the local county Colorado State University Cooperative Extension office.

Recruitment. Recruitment for most of the participants who had the Abuela for the first units ("Make It Healthy") was accomplished through a networking method by the abuela as established through the original peer education program (Taylor, 1997; Serrano, 1997). "The abuela [was] responsible for recruiting and organizing the time, location, supplies, equipment, childcare, transportation, and other necessary details for the group" (Anderson and Kendall, 1995). Abuelas were compensated, but that compensation was determined by the area coordinator and Cooperative Extension Agent. Recruitment for most of the participants who completed the first unit ("Make It Healthy") using the IMM program in Areas 1 and 3 was accomplished on site at a food or other community assistance program such as WIC, a local food bank, and a low income health clinic. A coordinator was present to recruit participants, obtain written consent, track the times the subjects began, and administer the surveys. The recruitment of participants in Area 2 also was completed through assistance programs such as Head

Start and WIC, but, often the sessions were prearranged by the coordinator and in a similar manner as for the abuela sessions.

Although the incentives for participation were the same incentives used in Taylor's (1997) original peer education evaluation (Appendix B), the manner of rewarding was dependent upon area. For Areas 1 and 2, the incentives were awarded after finishing the other three remaining modules with the abuela. After returning the Follow-up survey, however, these participants received a five dollar certificate and the invitation to complete the program with the abuela. In Area 3, the participants received the incentives corresponding with the unit/module upon completion of the Post survey. The two quart measuring bowl was awarded for "Make It Healthy" and a set of measuring spoons was awarded for "Make A Change". The cloth grocery tote bag was sent to participants in Area 3 from whom the Follow-up survey was received.

Demographic evaluation. A demographics section was included in the Entry survey administered before the nutrition education intervention. Questions were based on demographic instruments used by EFNEP and WIC. Age, place of birth, Spanish-speaking ability, education level, income range, occupation, participation in food and other community assistance programs, and number of children were queried.

Knowledge and skills evaluation. The survey used included questions designed to assess knowledge and skill gains regarding the main points within each of the two units, "Make It Healthy" (MIH) and "Make A Change" (MAC). These questions were

constructed by Taylor (1997) who also validated and assessed reliability (as described previously). In addition, she developed the *La Cocina Saludable* content and materials.

The MIH indicators (questions) consisted of identifying the sections of the pyramid and the recommended number of servings for each (Appendix I, questions 6.1 and 6.2). Correct identification of each section was worth two points with partial credit (one point) given for partial identification (eg. "fats" of the Fats, Oils, and Sweets section) or for placing the Cheese, Milk, and Calcium foods into the Meats, Beans, and Eggs sections or vice versa. An additional two points were assigned for each food group for knowing the range of servings for that group. One point was given for noting only one number within the range. Zero points were given for incorrect answers or blanks. A total of 24 points were possible for the MIH indicator. The number correct was divided by the total possible to obtain a percent correct. Percents were used in subsequent analyses to standardize scores across units.

For the MAC indicator, 14 food items were listed of which the participant was asked to mark those with fiber (Appendix I, question 5). Each item marked correctly – fiber foods marked and non-fiber foods not marked – was assigned two points for a total of 28 possible points. Again, a percent was calculated for subsequent analyses.

Two additional questions were asked to assess the participant's ability to choose foods which were good sources of vitamin A and vitamin C (Appendix I, questions 3 and 4). Answers to these were scored separately either "correct" (2 points) or "incorrect" (0 points). These scores were assessed separately and within the combined knowledge total. The latter was worth 56 points and included the MIH

indicator (24 points), the MAC indicator (28 points) and the two vitamin indicators (two (2) points each). This score also was converted to a percent.

Reported behavior indicators. Two behavior indicators (Appendix I, questions 1 and 2) were used from the survey of the peer education evaluation (Taylor, 1995). The first regarded how often foods designated as "low fat" versus regular foods were used. The second asked the participant how often he/she added salt to foods. The five potential responses ranged from "Do not do" to "Almost always". For analysis, the least healthful answer was coded as "1" and the most healthful answer was coded as "5".

On-line Tracking.

Every interactive choice for each user was registered within an on-line record for use in exploring the amount of time spent with the IMM and to begin exploring the selected paths. From the data gathered on the computer for each participant in the research, the average times taken to complete the introduction, the "Make It Healthy" module and the "Make A Change" module were calculated. In addition, the amount of exploration was determined by how far into the options the participant progressed.

Cost-analysis

The cost analysis was completed by determining total costs for both the Abuela and IMM instruction methods. From these values, cost per participant could be calculated for each instruction method and plotted to determine break-even points.

The baseline for the abuela total cost was based on costs incurred during Taylor's research (unpublished). These costs included training costs (36 abuelas), project implementation costs, and incentives.

$$\textit{Abuela Total Cost}_1 (ATC_1) = \textit{Training costs} + \textit{Implementation costs} + \textit{Incentives}.$$

Training costs were comprised of the trainer's salary (six months) and a set of training materials and a set of incentives (Appendix B). Implementation costs included wages and travel for the abuelas and the coordinators and activity supplies associated with actual trainings (eg. food). A full set of incentives was given to each participant who completed all five units of *La Cocina Saludable* with an abuela (657 participants).

For subsequent analysis, the total cost for the abuela instructional method for participants after the first 657 was based only on implementation costs and incentives.

$$\textit{Abuela Total Cost}_2 (ATC_2) = \textit{Implementation costs} + \textit{Incentives}.$$

The development costs of the original materials for *La Cocina Saludable* were not included in the Abuela Total Cost. The script (Spanish and English) in the resource guide, many of the graphics from the flip chart, the Hispanic Food Guide Pyramid, and selected video clips were used extensively within the IMM program. Thus, these costs were not determined since they would contribute the same amount to the abuela costs and the IMM costs.

Total cost for the IMM instruction method included development costs, implementation costs, and evaluation costs.

$$\text{IMM Total Cost (ITC)} = \text{Development costs} + \text{Implementation costs} + \text{Evaluation costs}.$$

Development costs were comprised of staff salaries, a development computer system, software, media components, and office expenses. Implementation costs included four computer systems and kiosk enclosures used for delivery of the nutrition education program. Evaluation costs included travel to southern Colorado, coordinator and abuela wages, copies, and incentives.

After the total costs per instruction method were determined, a cost per participant per unit was calculated. Per unit was used since participants completed five units presented in the original peer education *La Cocina Saludable* study (Taylor, 1997) and only two units in the present IMM study.

For participants up through 657 (Number reached in the Taylor study):

$$\text{Abuela Cost per Participant per Unit}_1 (\text{ACPU}_1) = \text{ATC}_1 / \# \text{ Participants} / \# \text{ Units}.$$

For analysis of future participants totaling more than 657, training costs were spread across all participants, while implementation and incentive costs were continued to be assessed per person:

$$\text{Abuela Cost per Participant per Unit}_2 (\text{ACPU}_2) = (\# \text{ Participants} / \text{Training cost} / \# \text{ Units}) + (\text{ACPU}_1 - \text{Training cost within ACPU}_2).$$

Since the development, implementation, and evaluation costs for the IMM method were one time expenses, costs per participant could be determined by the equation:

$$\text{IMM Cost per Participant per Unit} = \text{ITC} / \# \text{ Participants} / \# \text{ Units}.$$

IMM costs per participant per unit then were plotted on a graph to show where the break-even points occurred for one to four systems when compared to the abuela costs per participant. Costs per participants per unit were calculated for 600 to 4,000 participants.

When completing this cost analysis, the following assumptions were made.

(1) No new abuelas would be trained beyond the initial 36, (2) abuelas would not receive any increase in stipends, and (3) no new costs would be incurred with the multimedia beyond the initial investment for development, implementation, and evaluation.

Research Design

The two modules "Make It Healthy" (MIH) and "Make A Change" (MAC) were presented in one of four combinations of the two delivery methods (IMM and/or abuela) in order to test effectiveness separately and comparatively. Each group received the same units in the same order (Table 7). The first group received MIH via the usual mode of the live abuela and then they completed MAC through the interactive multi-media (IMM) program. The second group received MIH through IMM and the second unit

(MAC) was presented by the abuela. The third group completed both units on the IMM system while the fourth group received both units from the Abuela.

Table 7: Instruction Methods^a for Each Group by Unit

Group	"Make It Healthy" Instructional Method	"Make A Change" Instructional Method
1	Abuela	IMM
2	IMM	Abuela
3	IMM	IMM
4	Abuela	Abuela

^aThe "Abuela" was the peer education instruction method; the IMM was the interactive multimedia instruction method.

Figure 3 displays how the four groups fit into a two by two by three factorial design. The first factor (independent variable) was the instruction method for the "Make It Healthy" unit with the two levels: Abuela or IMM. The second factor was the instruction method for "Make A Change" unit with two levels: Abuela or IMM.

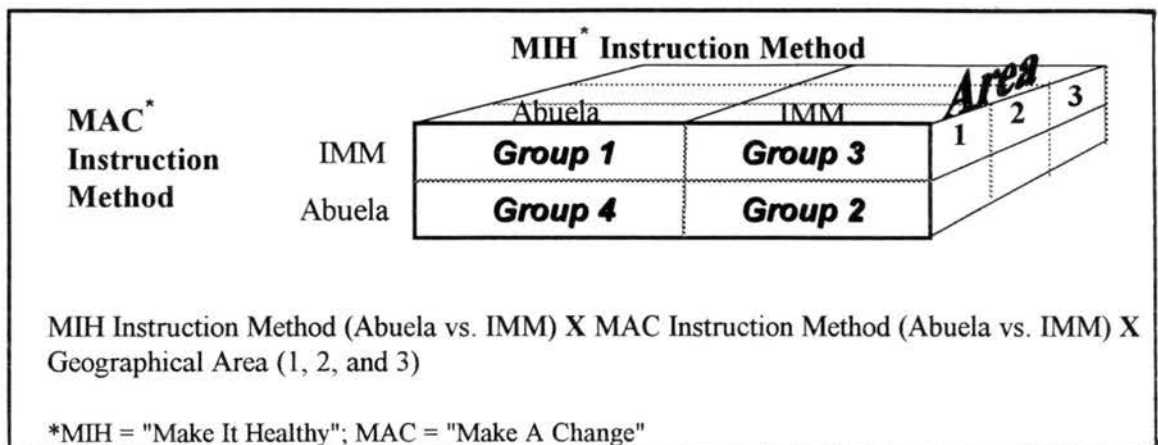


Figure 3: Diagram of experimental design for evaluation of interactive multimedia (IMM) program.

The third factor, geographical area, with three levels (Area 1, Area 2, and Area 3), was included primarily to control for the potential differences among the Abuelas, since they were different for each area. A fourth factor, time, had three levels: Entry, Post, and Follow-up. (This factor was not diagrammed within Figure 3).

Statistical Methods

A combination of Microsoft® Access® 2.0 and Excel 7.0 for Windows 95, Statistical Package for the Social Sciences (SPSS®) (Version 7.5 for Windows) and Statistical Analysis Systems (SAS®) software (Version 6.09) were employed to perform quantitative analyses.

Alpha Testing

Descriptive statistical analyses were used during this phase. Frequencies were calculated for responses during testing conducted early in development to determine potential questions for future qualitative evaluations. For the final two alpha evaluations, means and standard deviations were calculated from the responses to the five point Likert scale used. Frequencies for narrative responses also were calculated and noted in parentheses after the statement.

Participant Evaluation

Frequencies were calculated for demographic characteristics of participants in the participant evaluation and were noted by treatment group. Repeated measures of

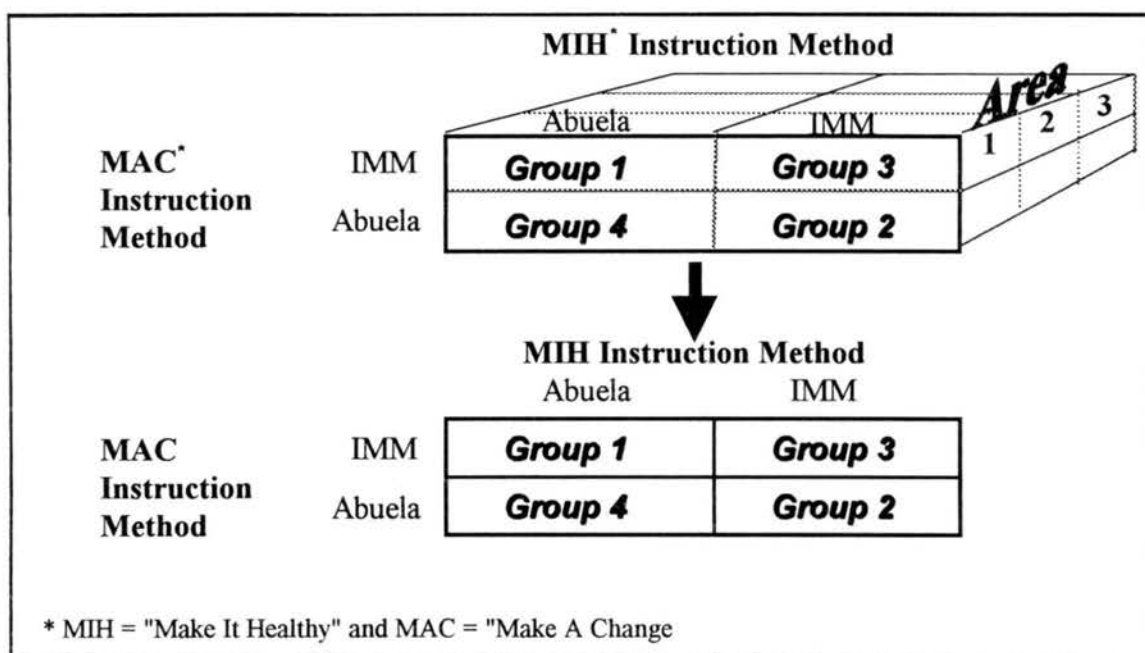


Figure 4: Model modification to reflect the omission of area. (Evaluation at three times is not shown in this model.)

Similarly, there were no differences in least squares means (Figure 5) for groups that had the abuela for MAC, (groups 2 and 4) and groups that completed the IMM module for MAC (groups 1 and 3). To study the effect of the abuela versus the IMM in the MIH unit, the least squares means were averaged over the instructional methods (abuela and IMM) for the MAC unit (Figure 6). Likewise, to study the effect of the abuela versus the IMM instructional methods in the MAC unit, the least squares means were averaged over the instructional methods (abuela and IMM) for the MIH unit (Figure 7). This averaging over the other unit's instruction method allowed for more efficient analyses of the data by doubling the sample size for each instruction method within each unit. Least squares means of the MIH indicators, MAC indicators, and

analysis of variance (ANOVA) was used to analyze the MIH indicators, the MAC indicators, and the behavior indicators from Entry, Post, and Follow-up surveys. Three "between subjects" factors were MIH instruction method, MAC instruction method and area. The "within subjects" factor was time.

Results from a preliminary analysis of the data allowed for reduction of the model to a two (MIH instructional method) by two (MAC instructional method) factorial. The only significant effect involving area was a three way interaction ($p = 0.003$) observed on the "Make A Change" (MAC) indicator with the instructional method (abuela, IMM) and time (Entry, Post, Follow-up). When plotted (Appendix K), Area 1 and Area 2 had similar trends and nearly parallel profiles with no interactions. For Area 3, the plot shows a crossing pattern in which little increase occurred from Entry to Post for the IMM instructional method, but more from Entry to Follow-up to a relatively similar position as the other areas. This effect was not significant for MIH instructional methods or for MIH indicators. Since the primary interest was in the outcomes over the three areas and the interaction occurred in only one area, with one outcome indicator, and only with the IMM instruction method, area was omitted from the model for subsequent analyses (Figure 4).

In the subsequent analysis, no significant interaction between the two factors MIH instruction method and MAC instruction method was observed. In addition, there were no differences in least squares means (Figure 5) for groups who had the abuela for MIH (groups 1 and 4) and no differences for groups that completed the IMM for MIH (groups 2 and 3).

reported behavior indicators were used based on the unbalanced design, due to the different numbers of participants in each group (Ott, 1993).

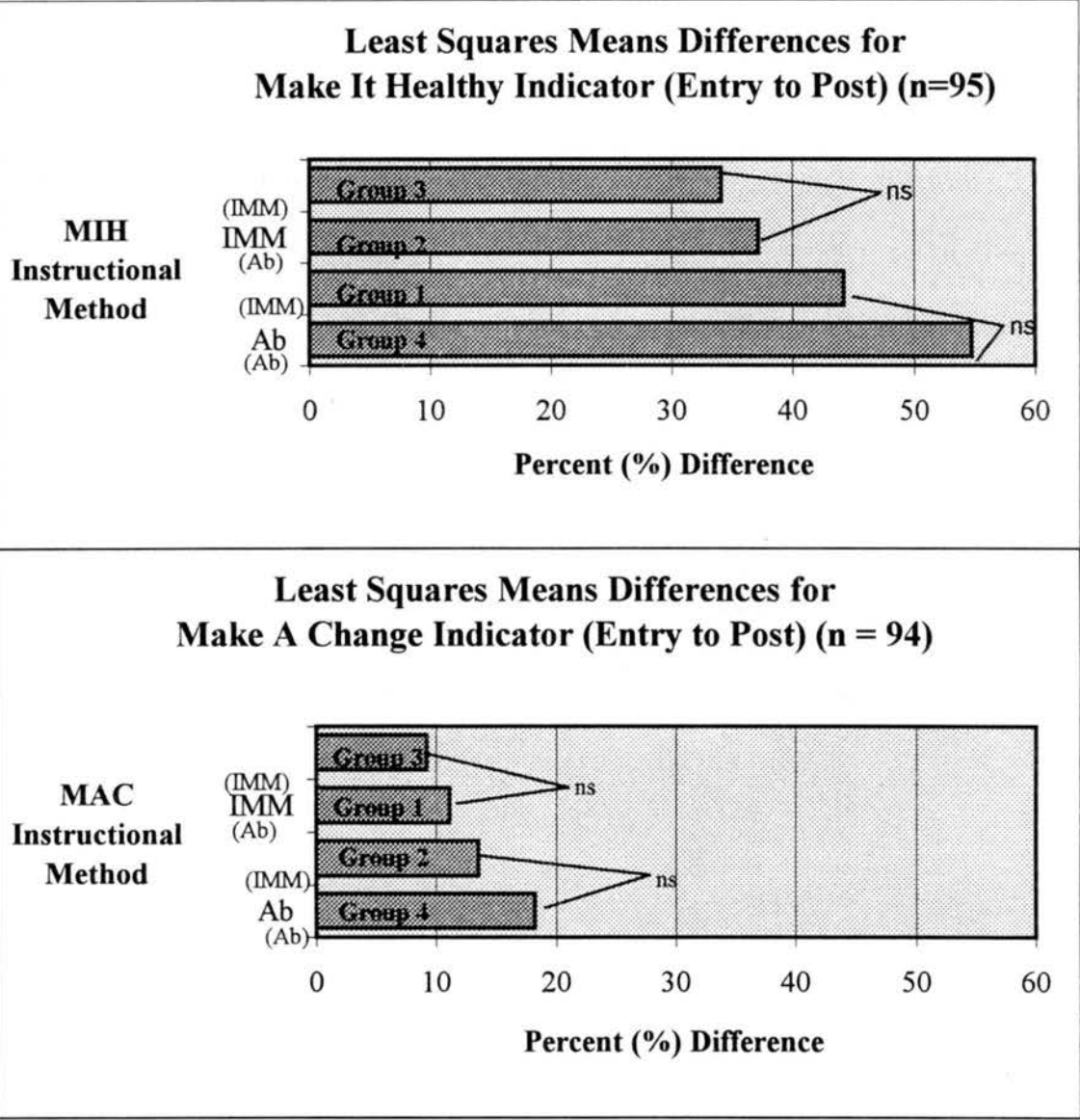


Figure 5: Least squares means for percent differences in Entry and Post for Make It Healthy (MIH) and Make A Change (MAC) by Delivery Method (Method within parentheses denotes instructional method for MAC unit in the upper graph and MIH unit the lower graph.)

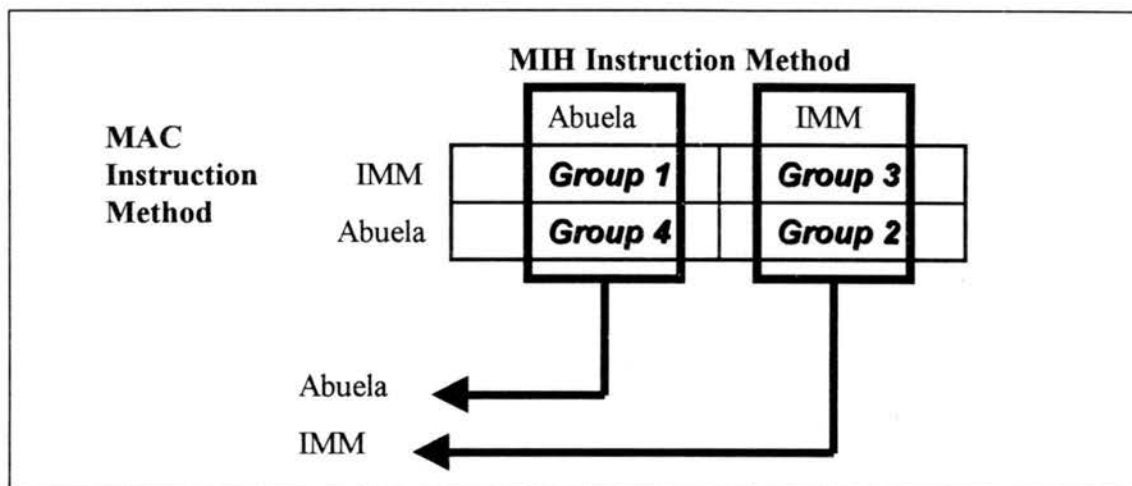


Figure 6: Diagram of averaging least squares means for all participants who had an abuela for "Make It Healthy" (MIH) and for all those who completed the interactive multimedia (IMM) module. (MAC = "Make A Change")

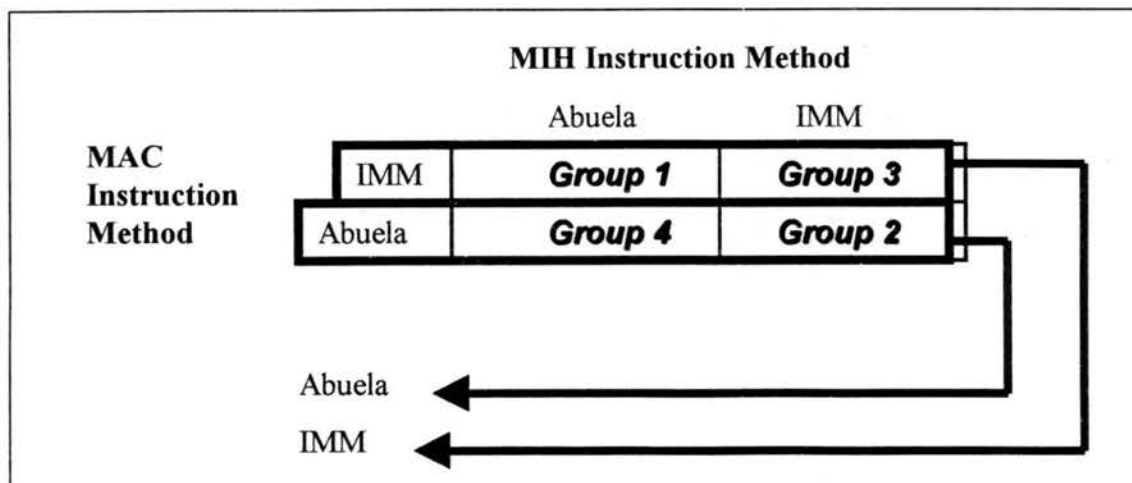


Figure 7: Diagram of averaging the least squares means for all participants who had an abuela for "Make A Change" (MAC) and for all those who completed the interactive (IMM) module. (MIH = "Make It Healthy")

Chi-square analyses were applied in situations of categorical and ordinal data in which the application of least squares means was not appropriate. The vitamin

indicators, for example, only had one correct answer for each of the two questions. The participant either answered the question correctly or incorrectly.

Results

Alpha Testing

"Formal" alpha testing was completed on the interactive multimedia (IMM) program four times before the participant evaluation. The first two were conducted two months apart and consisted primarily of responses to open ended question from collaborating staff in Southern Colorado (n = 4) and graduate nutrition students (n = 4). The IMM program was modified and further developed, and the survey questions were refined.

The next two alpha evaluations incorporated more specific questions, most in the form of a five point Lickert scale (one being the most positive), with a place to write comments. The results from these have been included in summary tables in Appendix L. The mean scores for the first group (n = 6) were between 1.80 and 2.85 with most of the standard deviations around one (Appendix L, Table L1). The format of the question regarding speed differed in that three was the best score while one was too slow and five was too fast. The mean rating for speed was 2.80 (+1.10).

The second evaluation incorporating the Likert scale was completed among six groups of Colorado State University Extension Agents with six to eight in each group. The groups had the opportunity to view the program during a specific time at a spring meeting and the responses for the groups were consolidated on one evaluation sheet. Mean scores from the six groups ranged from 1.75 to 3.00. A trend for improvement (from the most recent previous alpha evaluation) was observed particularly in the

understandability of the messages, graphics, and flow, as well as the ease of moving through the program. The quality of the graphics, however, tended to be rated less favorably.

From these last two alpha evaluations, three of the most informative questions were selected and simplified to a three point hedonic scale (using expressive faces). Two questions regarding the touch screen delivery method were added since this seemed to be an influencing factor on flow, speed, and smoothness during alpha testing. A question regarding the understandability of the graphics was too vague and covered too many graphics to be helpful, so the participant was asked to note the things they remembered most about nutrition.

Participant Evaluation

A total of 95 participants received the information from the two units of *La Cocina Saludable*. Data from the 60 follow-up surveys also were analyzed.

Participant Demographics

Demographic characteristics have been displayed in Table 8. There were between 20 and 27 participants in each treatment group. Some Spanish was spoken in nearly half (46) of the homes. Thirteen persons completed the surveys in Spanish. Eighty nine of the participants were women and 65 were of childbearing age (between the ages of 18-40 years). All but 13 had at least one child. Six of those who did not

Table 8: Demographic Characteristics of Participants Who Completed at Least an Entry and a Post Survey in *La Cocina Saludable* Interactive Multimedia (IMM) Project by Treatment Group (N = 95) (60 participants completed the Follow-up survey)

Demographic Characteristic	Treatment Group ^a :				Total
	Group 1	Group 2	Group 3	Group 4	
Number	22 (23.2)	20 (21.1)	27 (28.4)	26 (27.4)	95 (100)
Female	20 (21.1)	20 (21.1)	24 (25.3)	25 (26.3)	89 (93.7)
Hispanic	5 (5.3)	13 (13.7)	10 (10.5)	18 (18.9)	46 (48.9)
Age: < 18 years	7 (7.4)	3 (3.2)	1 (1.1)	1 (1.1)	12 (12.8)
18-30 years	6 (6.3)	5 (5.3)	14 (14.7)	15 (15.8)	40 (42.6)
31-40 years	4 (4.2)	8 (8.4)	8 (8.4)	5 (5.3)	25 (26.6)
41-50 years	3 (3.2)	3 (3.2)	3 (3.2)	4 (4.2)	13 (13.8)
over 50 years	2 (2.1)	0	1 (1.1)	1 (1.1)	4 (4.2)
Number of children ^b : 0	3 (3.2)	1 (1.1)	3 (3.2)	1 (1.1)	7 (8.0)
1 – 3	6 (6.3)	12 (12.6)	19 (20.0)	19 (20.0)	56 (63.6)
4+	9 (9.5)	6 (6.3)	5 (5.3)	6 (6.3)	25 (28.4)
No response ^c	5 (5.3)	1 (1.1)	0	0	6 (6.3)
Education:					
Elementary (< 6 th grade)	1 (1.1)	3 (3.2)	0	3 (3.2)	7 (7.5)
< High School (7 th – 11 th grade) ^c	7 (7.4)	4 (4.2)	4 (4.2)	1 (1.1)	16 (16.8)
High School Diploma or Equivalency (GED)	6 (6.3)	5 (5.3)	4 (4.2)	13 (13.7)	28 (29.5)
"Some College Credit"	7 (7.4)	7 (7.4)	15 (15.8)	3 (3.2)	32 (33.7)
Bachelor's Degree	1 (1.1)	0	1 (1.1)	1 (1.1)	3 (3.2)
No response	0	1 (1.1)	3 (3.2)	5 (5.3)	9 (10.5)
Income: < \$10,000/year	8 (8.4)	13 (13.7)	18 (18.9)	15 (15.8)	53 (64.6)
\$10,000-\$20,000/year	5 (5.3)	4 (4.2)	6 (6.3)	6 (6.3)	21 (22.1)
\$20,000-\$30,000/year	1 (1.1)	0	1 (1.1)	1 (1.1)	3 (3.7)
>\$30,000/year	1 (1.1)	1 (1.1)	1 (1.1)	2 (2.1)	5 (5.3)
No response ^c	7 (7.4)	2 (2.1)	1 (1.1)	2 (2.1)	12 (12.6)
Occupation:					
Homemaker	4 (4.2)	9 (9.5)	7 (7.4)	12 (12.6)	32 (33.7)
Multiple	1 (1.1)	2 (2.1)	4 (4.2)	0	7 (7.4)
Not employed	2 (2.1)	1 (1.1)	1 (1.1)	0	4 (4.1)
Farm	0	0	3 (3.2)	0	3 (3.2)
Student/Disabled/Retired	3 (3.2)	0	1 (1.1)	3 (3.2)	7 (7.4)
Other	5 (5.3)	6 (6.3)	9 (9.5)	6 (6.3)	26 (27.4)
No response ^c	7 (7.4)	2 (2.1)	2 (2.1)	5 (5.3)	16 (16.8)
Use of Specified Food and Community Assistance Programs ^{c,d}	16 (16.8)	16 (16.8)	22 (23.2)	24 (24.2)	81 (85.3)

Numbers within parenthesis represent percentages of the total (95) participants; percentages in each row add up to the total for the row.

^a Group 1: Make It Healthy (MIH) – Abuela, Make A Change (MAC) – IMM IMM; Group 2: MIH – IMM, MAC – Abuela; Group 3: Both MIH and MAC – IMM; Group 4: Both MIH and MAC – Abuela

^b 240 children of whom 122 were seven years old or younger

^c Includes 6 girls under 18 years who left the section blank

^d Includes one subject with no demographic characteristics available

have children were under 18 years of age. One hundred twenty two of the 240 children were younger than eight years of age.

Twenty-eight of the participants had a high school education or equivalency. Although another 32 participants were categorized as having "Some College Credit," their responses included "some college credit," certificate, Associate Degree, and other unspecified. Only three responded that they had a Bachelor's degree. The majority of the annual incomes (53) were less than \$10,000 per year. A total of 74 participants (86.7%) had less than or equal to \$20,000 income annually. Thirty two reported their occupation as being homemakers. Four indicated they were unemployed, while seven others had multiple jobs. The others were employed at entry level type positions such as food service, teacher's/nurse's aides, child or other caregivers, and custodial. There also were two teachers, a postal employee, a book keeper, and a loan processor. Three wrote in that they were disabled, three were students, and one was retired. These seven did not list any other occupations.

The majority of the participants were born in Colorado (52) or Mexico (17) (Table 9). Most mothers (59%) and fathers (55%) of the participants also were born in Colorado or Mexico. Of the 93 participants who completed the question about how long they had lived in the area, 36 (38.7%) responded with 20 or more years. Another 25 (26.9%) had been in the area for at least 10 years.

Eighty one subjects (85.3%) reported using at least one of eight food or other community assistance programs specified on the survey (Figure 8). Sixty four (67.4%)

Table 9: Birthplace(s) of Participant and Parents (N = 95)

	Participant	Mother	Father
Colorado	52 (54.7)	41 (43.2)	34 (35.8)
Mexico	17 (17.9)	18 (18.9)	21 (22.1)
New Mexico	6 (6.3)	8 (8.4)	12 (12.6)
California	4 (4.2)	1 (1.1)	0
Texas	2 (2.1)	5 (5.3)	3 (3.2)
Other	13 (13.7)	18 (18.9)	20 (21.1)
Unknown or Not reported	1 (1.1)	4 (4.2)	5 (5.3)

Numbers within parenthesis represent percentages within the columns

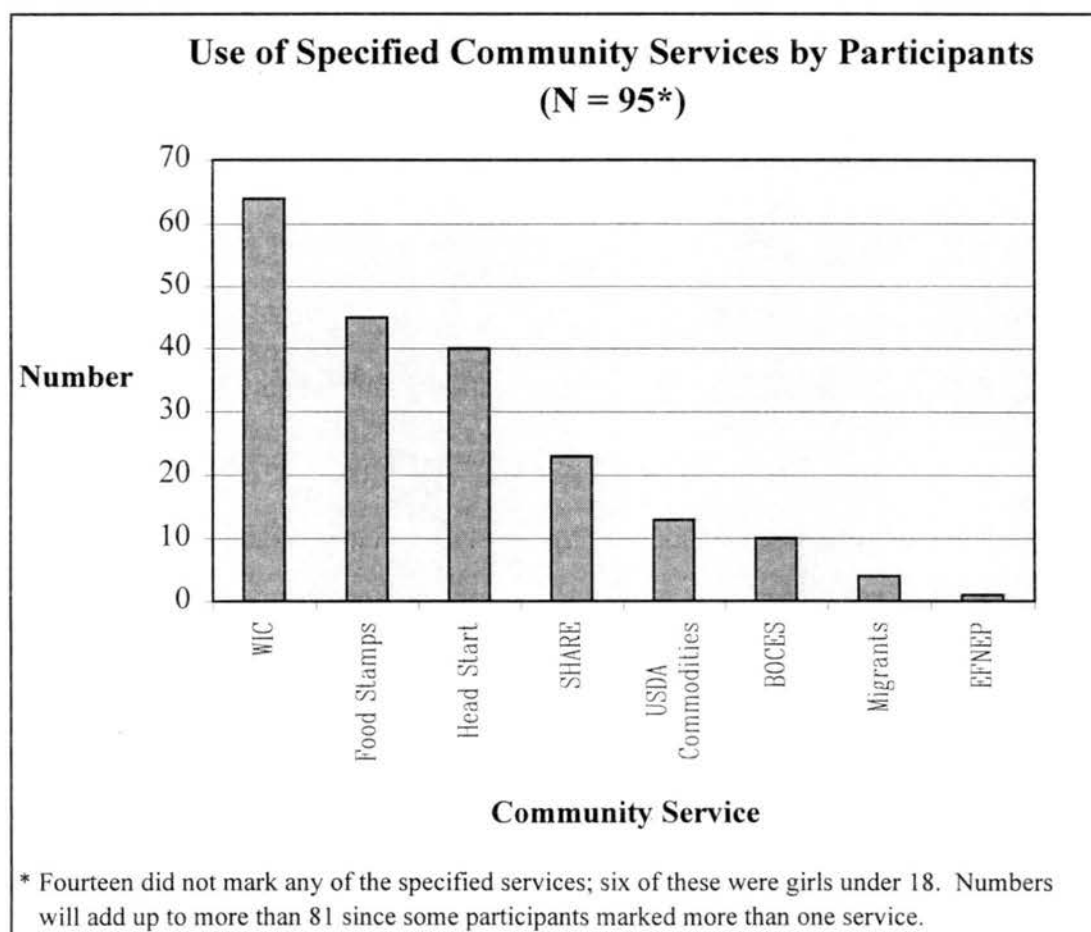


Figure 8: Reported usage of specified community services by participants.

had been WIC recipients, 45 (47.9%) had received food stamps, and 40 (42.6%) had used Head Start.

The distribution of participants in each group by area are displayed in Table 10. As described in the Methods section of this project, area as a factor was removed based on the preliminary analysis.

Table 10: Distribution of Participants by Groups^a and Areas^b

	Group 1	Group 2	Group 3	Group 4	Total
Area: 1	5 (5.3) ^c	1 (1.1)	5 (5.3)	11 (11.6)	22 (23.2)
2	9 (10.5)	10 (10.5)	12 (12.6)	7 (7.4)	38 (40.0)
3	8 (8.4)	9 (9.5)	10 (10.5)	8 (7.4)	35 (36.8)
Total	22 (23.2)	20 (21.1)	27 (28.4)	26 (27.4)	95 (100)

^aGroups: 1 = Make It Healthy (MIH) with the Abuela, Make A Change (MAC) with IMM; 2 = MIH - IMM, MAC - Abuela; 3 = MIH - IMM, MAC - IMM; 4 = MIH - Abuela, MAC - Abuela. For analyses purpose, combined data from all participants that had the Abuela for MIH and data from all participants that had IMM for MIH. Data also was combined the same way for MAC.

^bAreas: 1 = San Luis Valley (Alamosa area); 2 = Pueblo; 3 = Arkansas Valley (La Junta/Rocky Ford Area).

^cValues in parentheses are percents.

"Make It Healthy" (MIH) Indicators and "Make A Change" (MAC) Indicators

Significant improvements ($p \leq 0.05$) from entry to post and from entry to follow-up were observed for both the Abuela instruction method and the IMM instruction methods. The Make It Healthy (MIH) indicator scores (Table 11), the Make A Change (MAC) indicator scores (Table 12), and the combined knowledge total scores (Table 13) all were increased from entry to post and from entry to follow-up. Although

no differences were seen among Abuela and IMM participants' MIH scores at Entry, those who had the Abuela for the MIH unit had greater improvements ($p < 0.03$) than the participants who completed the IMM module ($p \leq 0.05$). No significant differences were found between the Abuela and IMM groups for the improvements for MAC.

Table 11: **"Make It Healthy" (MIH) Knowledge Indicator** Least Squares Means (% Correct) for Abuela and Interactive Multimedia (IMM) Instruction Methods

	Entry	Post	Follow-up
MIH Instruction Method			
Abuela (Groups 1, 4)	22.4 (+3.1) ^{a,A}	71.8 (+3.5) ^{b,B}	73.1 (+4.9) ^{b,B}
IMM (Groups 2, 3)	14.5 (+3.2) ^{a,A}	50.1 (+3.6) ^{b,A}	49.0 (+5.5) ^{b,A}
MAC Instruction Method			
Abuela (Groups 2, 4)	16.5 (+3.2) ^{a,A}	62.3 (+3.6) ^{b,A}	62.1 (+5.3) ^{b,A}
IMM (Groups 1, 3)	20.5 (+3.1) ^{a,A}	59.6 (+3.5) ^{b,A}	60.0 (+5.2) ^{b,A}

LS means within rows with same lower case letter(s) are not significantly different ($p \leq 0.05$).

Adjacent LS means within columns with same upper case letter(s) are not significantly different.

Improvements within groups based on Least Squares Means significant 95% confidence intervals.

Table 12: **"Make A Change" (MAC) Knowledge Indicator** Least Squares Means (% Correct) for Abuela and Interactive Multimedia (IMM) Instruction Methods

	Entry	Post	Follow-up
MIH Instruction Method			
Abuela (Groups 1, 4)	65.7 (+2.9) ^{a,A}	81.6 (+2.2) ^{b,A}	78.9 (+2.5) ^{b,A}
IMM (Groups 2, 3)	71.4 (+3.0) ^{a,A}	81.6 (+2.2) ^{b,A}	80.2 (+2.7) ^{b,A}
MAC Instruction Method			
Abuela (Groups 2, 4)	67.4 (+3.0) ^{a,A}	82.0 (+2.2) ^{b,A}	78.0 (+2.6) ^{b,A}
IMM (Groups 1, 3)	69.7 (+2.9) ^{a,A}	81.2 (+2.1) ^{b,A}	81.2 (+2.6) ^{b,A}

LS means within rows with same lower case letter(s) are not significantly different ($p \leq 0.05$).

Adjacent LS means within columns with same upper case letter(s) are not significantly different.

Improvements within groups based on Least Squares Means significant 95% confidence intervals.

The significantly different results of the MIH unit indicator were reflected in the combined knowledge total score. Additional analyses considering participant

characteristics indicated no significant effects or interactive effects for language, birth place, time in area, income, education, age, or number of children.

Table 13: **Combined Total Knowledge** Least Squares Means (% Correct) for Abuela and Interactive Multimedia (IMM) Instruction Methods*

	Entry	Post	Follow-up
MIH Instruction Method			
Abuela (Groups 1, 4)	46.2 (+2.4) ^{a,A}	76.3 (+2.3) ^{b,B}	76.5 (+2.7) ^{b,B}
IMM (Groups 2, 3)	45.6 (+2.5) ^{a,A}	66.2 (+2.3) ^{b,A}	64.9 (+3.0) ^{b,A}
MAC Instruction Method			
Abuela (Groups 2, 4)	43.9 (+2.5) ^{a,A}	71.1 (+2.4) ^{b,A}	69.4 (+2.9) ^{b,A}
IMM (Groups 1, 3)	47.9 (+2.4) ^{a,A}	71.4 (+2.3) ^{b,A}	71.9 (+2.9) ^{b,A}

* Combined score including "Make It Healthy" (MIH) and "Make A Change" (MAC) indicators and vitamin indicators.

Ls means within rows with same lower case letter(s) are not significantly different ($p \leq 0.05$).

Adjacent ls means within columns with same upper case letter(s) are not significantly different.

Improvements within groups based on Least Squares Means significant 95% confidence intervals.

Vitamin Indicators

Based on chi-square analysis, no distributions of correct answers for abuela and IMM groups were found to be dependent on the MIH instruction method (Table 14). There was evidence, however, that two distributions were dependent on the instruction method within the MAC unit (Table 15). At follow-up, the ability to identify the food source with vitamin A was significantly different ($p < 0.01$), (better based on observation), for the IMM instructional method of the MAC unit. At post, the correct identification of the food source for vitamin C was significantly different ($p < 0.01$) (worse based on observation), for the participants who had an abuela for the MAC unit.

Table 14: Number (Percent) of Participants Who Answered the Vitamin Indicators Correctly by “Make It Healthy” (MIH) Instruction Method

Time	MIH Instruction Method	Vitamin A	Vitamin C
Entry	Abuela (n = 48)	24 (50%)	38 (79%)
	IMM (n = 47)	23 (49%)	37 (79%)
Post	Abuela (n = 47)	27 (57%)	36 (77%)
	IMM (n = 47)	20 (43%)	33 (70%)
Follow-up	Abuela (n = 33)	22 (67%)	27 (82%)
	IMM (n = 27)	13 (48%)	20 (74%)

Table 15: Number (Percent) of Participants Who Answered the Vitamin Indicators Correctly by “Make A Change” (MAC) Instruction Method

Time	MAC Instruction Method	Vitamin A	Vitamin C
Entry	Abuela (n = 46)	19 (41%)	33 (72%)
	IMM (n = 49)	28 (57%)	42 (86%)
Post	Abuela (n = 45)	19 (42%)	27 (60%)
	IMM (n = 49)	28 (57%)	42 (86%) *
Follow-up	Abuela (n = 30)	12 (40%)	21 (70%)
	IMM (n = 30)	23 (77%) *	26 (87%)

*Indicates difference between abuela and interactive multimedia (IMM) instructional methods ($p < 0.01$) at a given time for a given vitamin indicator.

Reported Behavioral Indicators

Based on the repeated measures ANOVA using least squares means, no significant differences for reported low fat food intake between instructional method

groups at each time were seen (Table 16). There were, however, significant within subject differences for this indicator. The participants who had the abuela instruction method for MIH reported a significantly healthier behavior from Entry to Post and from Entry to Follow-up. This result also was seen for Entry to Post for the abuela instruction method of MAC.

Table 16: Least Squares Means ($\pm$ SD) for Reported Behaviors by "Make It Healthy" (MIH) Instruction Method at Entry, Post, and Follow-up

Time	MIH Group	Eat low fat foods	n	Add salt to foods	n
Entry	Abuela	2.8 ($\pm$ 0.1) ^a	48	2.8 ($\pm$ 0.2) ^a	47
	IMM	2.8 ($\pm$ 0.2) ^a	45	2.9 ($\pm$ 0.2) ^a	44
Post	Abuela	3.1 ($\pm$ 0.1) ^b	47	3.4 ($\pm$ 0.1) ^b	43
	IMM	3.1 ($\pm$ 0.1) ^{a,b}	46	2.7 ($\pm$ 0.2) ^a	43
Follow-up	Abuela	3.1 ($\pm$ 0.2) ^b	32	3.2 ($\pm$ 0.2) ^{a,b}	29
	IMM	3.0 ($\pm$ 0.2) ^{a,b}	26	2.9 ($\pm$ 0.2) ^a	26

LS means with same letter are not significantly different; 95% CI for within subjects measures; $p \leq 0.05$ for between subjects measures. (Based on scale of "1" through "5" with "5" being the most healthful behavior.)

The same type of analysis was used to assess the reported behavior of adding salt to food. A significant difference was observed at Post for the participants who had the abuela for MIH when compared to those who completed the MIH IMM module (Table 17). The values were not significantly different at Entry or Follow-up. There were significant ($p \leq 0.05$) within subject differences from Entry to Post for those who had an abuela for MIH and from Entry to Follow-up for the IMM instruction method in MAC.

Table 17: Least Squares Means ($\pm$ SD) for Reported Behaviors by "Make A Change" (MAC) Instruction Method at Entry, Post, and Follow-up

Time	MAC Group	Eat low fat foods	n	Add salt to foods	n
Entry	Abuela	2.8 ($\pm$ 0.2) ^a	45	2.9 ($\pm$ 0.2) ^a	45
	IMM	2.9 ($\pm$ 0.1) ^a	48	2.8 ($\pm$ 0.2) ^a	46
Post	Abuela	3.2 ($\pm$ 0.2) ^b	45	3.2 ($\pm$ 0.2) ^b	43
	IMM	2.9 ($\pm$ 0.1) ^{a,b}	48	2.9 ($\pm$ 0.2) ^{a,b}	43
Follow-up	Abuela	2.9 ($\pm$ 0.2) ^b	28	2.8 ($\pm$ 0.2) ^{a,b}	28
	IMM	3.1 ($\pm$ 0.2) ^{a,b}	30	3.4 ($\pm$ 0.1) ^b	27

LS means with same letter are not significantly different; 95% CI for within subjects measures; $p \leq 0.05$ for between subjects measures. (Based on scale of "1" through "5" with "5" being the most healthful behavior.)

Qualitative

Fifty one of the 69 participants who completed one of the IMM modules, also completed the questionnaire soliciting their opinions about this method for delivering nutrition education. The results are shown in Figure 9. More than 85% marked at the highest level that they thought the touchscreen was easy to use, they liked using the touchscreen, the pictures made sense, and the program was easy to use. Seventy eight percent felt the program speed was fine. Two persons (4%), however, marked the worst rating for speed. The medium answer was marked nine (18%) times.

On-line Tracking

The average time the IMM study participants spent along with the ranges have been displayed in Table 18. Participants spent about three and a half more minutes on

the MIH module yet tended not explore nearly as much of that module as they did the MAC unit (Tables 19 and 20).

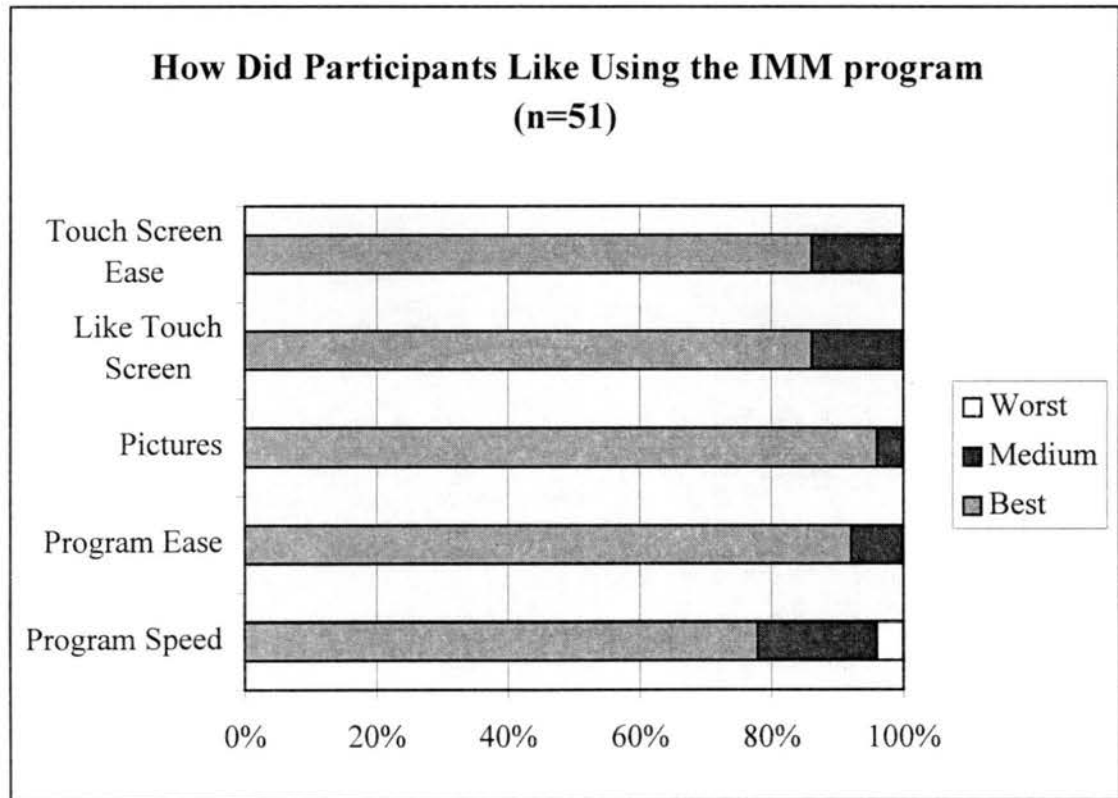


Figure 9: Qualitative feedback regarding interactive multimedia program

Table 18: Time (minutes:seconds) Study Participants Spent on Interactive Multimedia Program

	Introduction (n = 43)	Make It Healthy (n = 39)	Make A Change (n = 22)
Average	3:37	13:27	9:59
Range	1:19 – 14:02	3:51 – 22:42	1:23 – 21:51

Sixty percent of the MIH IMM participants explored the basic information provided for at least one section of the pyramid. Cheese, milk, and calcium foods were observed to be explored more often. In contrast, at least 85% of the MAC IMM participants explored the basic information for at least one potential change among fat, sugar, salt, or fiber. Most were observed to explore fiber. Less than 40% MIH IMM participants chose to explore more options of the food section they chose, whereas the MAC IMM participants chose to explore further 45 to 86% of the time. Only three MIH IMM participants tried the final module activity while all the MAC participants tried the final module activity.

Table 19: Options Chosen for "Make It Healthy" Interactive Multimedia Module
(n = 22)

	Basic Information	More Exploration	
		Serving Sizes	Nutrients
Tortillas, Breads, Cereals	11 (50%)	8 (36%)	8 (36%)
Vegetables	9 (41%)	6 (27%)	6 (27%)
Fruits	10 (45%)	7 (32%)	7 (32%)
Cheese, Milk, Calcium Foods	13 (59%)	8 (36%)	8 (36%)
Meats, Beans, Eggs	12 (55%)	7 (32%)	6 (27%)
Fats, Oils, Sweets	11 (50%)	5 (16%) ^a	
Activity	3 (14%)		
None	2 (9%)		

^aFats, Oils, and Sweets only had one option for more exploration.

Table 20: Options Chosen for "Make A Change" Interactive Multimedia Module
(n = 22)

	Basic Information	More Exploration
Fat	15 (68%)	11 (50%)
Sugar	15 (68%)	10 (45%)
Salt	17 (77%)	17 (77%)
Fiber	19 (86%)	19 (86%)
Activity	22 (100%)	
None	1 (5%)	

Cost Analysis

Total costs for each instruction method are listed in Table 21. Figure 10 displays graphs of costs per participant per unit and break even points for one to four IMM systems at the place where the representative lines cross the abuela cost per participant per unit line. (Numeric costs per participant per unit are displayed in Appendix M.)

Both the abuela and IMM systems cost per participant per unit dropped initially. The cost per participant per unit for the abuela instruction method nearly levels due to the continuous expense of paying for an abuela. The cost per participant per unit for the IMM instruction method continues to drop due to the one time initial expense characteristic of the system. This also can be observed by looking at the IMM instruction method (1 kiosk system) as a fixed, one-time expense (100%) and comparing the actual cost for the abuela as a percent of the IMM instruction (Figure 11).

Table 21: Total Costs for Abuela and Interactive Multimedia (IMM) Instruction Methods

	Abuela	IMM
	(5 units)	(2 modules (units))
Development	*	\$45,560.53
Training	\$9,264.04	(included with evaluation)
Implementation	\$33,000.00	\$20,215.50
Evaluation	(included with implementation)	\$8,965.95
Incentives	\$9,342.75	(included with implementation)
Total Cost	\$48,177.04	\$74,741.98

* Since the IMM program included many of the media components of the evaluated Abuela program, these costs were considered parts of both programs and were not included in the total costs.

Thus, it can be observed that while the IMM cost remains steady regardless of the number of participants, the cost for the abuela increases proportionately with increased numbers of participants.

The cost-effective (break-even) points also have been displayed in Figure 10. For one kiosk system, it appears to be similar at the 600 participant point. It actually was determined to be 633 persons when calculating the abuela cost per participant per unit as a percent of the IMM cost (Figure 11). Although the number of participants needed increases to make two, three, and four systems become cost effective, it does not do so in a linear function: 1,421; 2,210; and 2,999. As the number of systems increase, the more sharing of the total costs occurs.

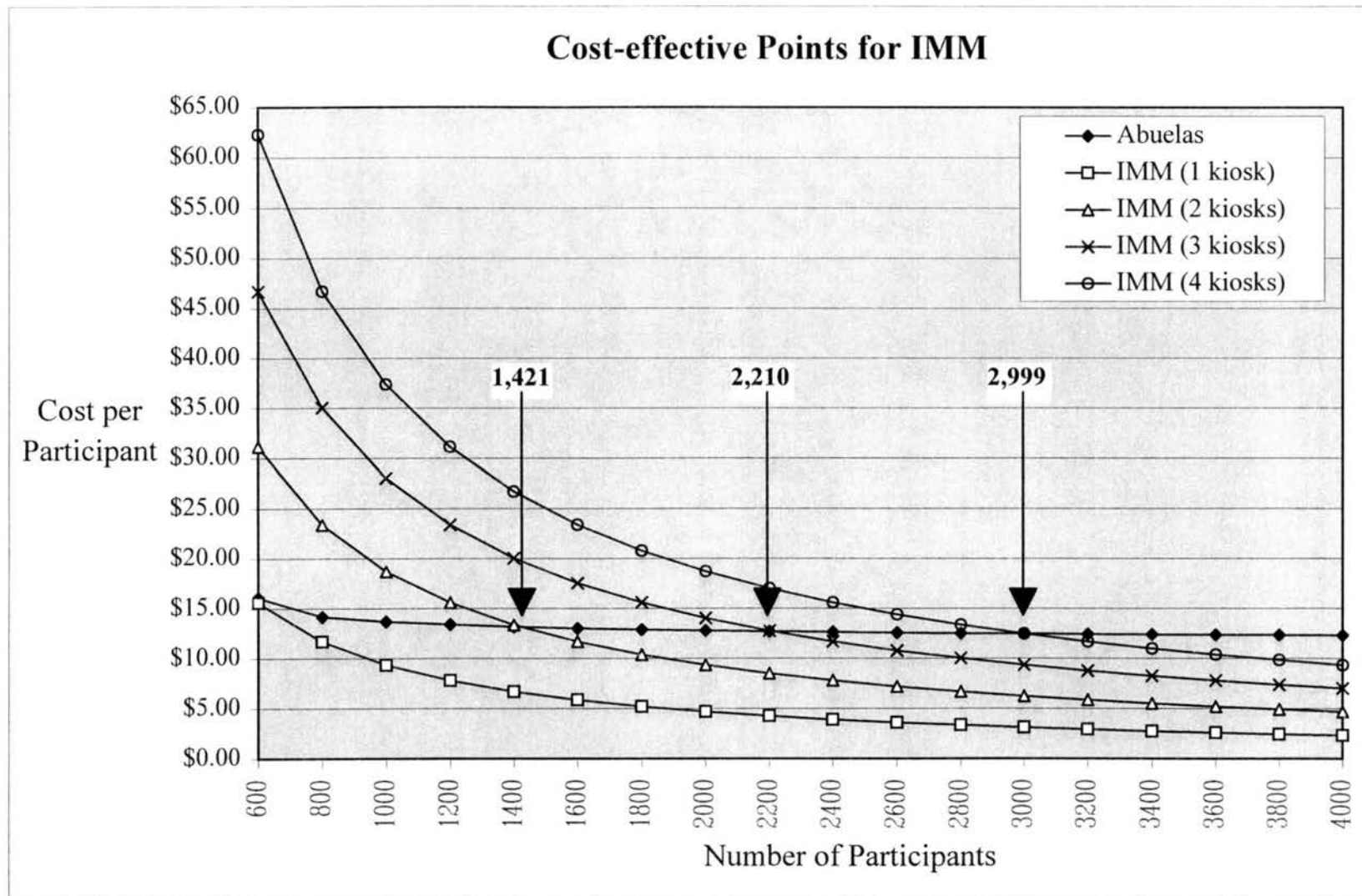


Figure 10: Cost effective points for one to four interactive multimedia (IMM) kiosk systems compared to abuela instruction

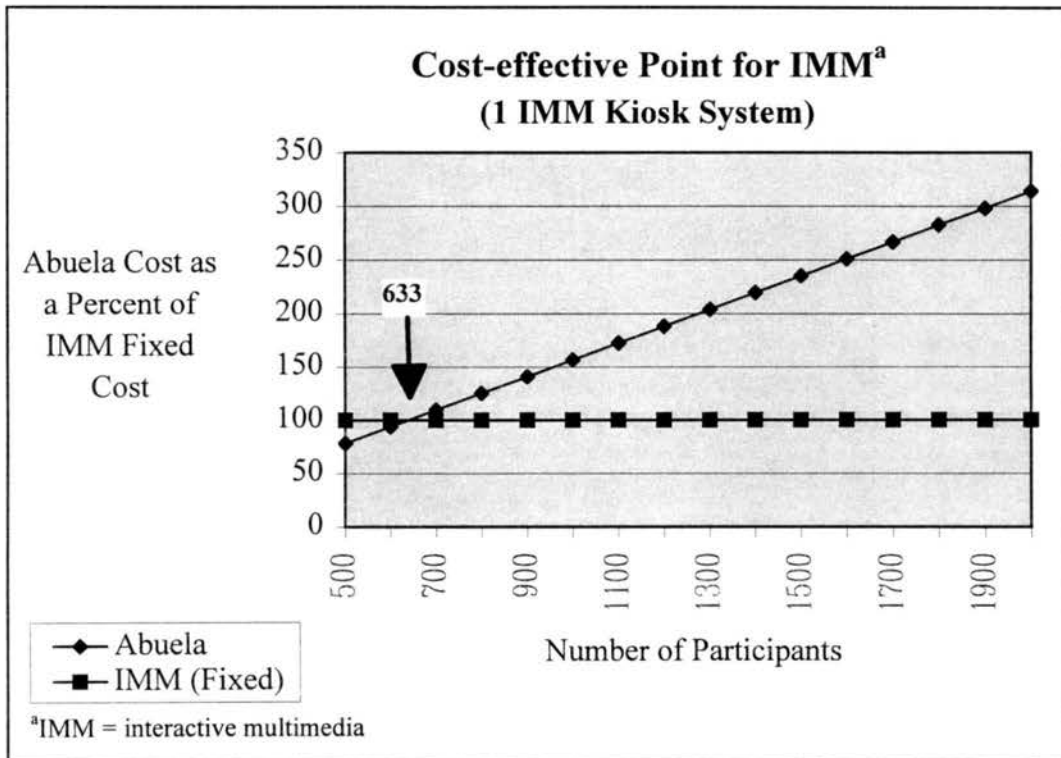


Figure 11: Cost-effective point for one interactive multimedia (IMM) computer kiosk using a percent comparison of Abuela cost (variable cost dependent on number of participants) to fixed IMM cost (one time expense)

Conclusions and Discussion

The measured outcome variables of this interactive multimedia (IMM) project were diverse and provided a great deal of information from which to draw conclusions and make recommendations. Alpha testing (formative evaluation), knowledge and behavior indicator outcomes, qualitative opinions, exploration of on-line tracking, and a cost analysis were helpful in forming an overall conclusion regarding the usefulness of IMM with low income participants. Summarized within this section are individual conclusions along with pertinent discussion points, including comparisons to the Taylor study (1997) in which evaluation was completed on the original peer education portion of *La Cocina Saludable*. In addition, recommendations have been included for further investigation based on the results of the *La Cocina Saludable* IMM research project.

Alpha testing

Level 1

Conclusion 1a: Tracking time and processes using a traditional lab book method was not appropriate in this case of developing and evaluating IMM.

Discussion: Originally, it was planned to document time and processes for developing IMM and, subsequently, determine what were the most common challenges and the circumstances under which they occurred. Because of the project manager's (researcher) numerous responsibilities and time constraints, the log book process was not effective. One recommendation for future IMM projects is to use project

management software. These applications are designed to assist with strategy development, activity coordination, progress tracking, contingency management, and evaluation (formative and process). Others involved in the project could assist with the tracking process using a consistent method. This assistance not only would allow more time for the project manager to organize and coordinate, but would keep others up-to-date about the project. A second recommendation is that the majority of the project manager's time be spent with organization and coordination. Media component development should be delegated to those who can do it more effectively even if the costs are slightly increased. Ultimately, a quality IMM application would more likely be completed on-time and within budget.

Level 2

Conclusion 1b: Alpha testing with persons who are content knowledgeable and computer literate was very appropriate.

Discussion: A core of about a dozen people evaluated the program at several points. This group included the Extension Agents, *La Cocina Saludable* coordinators, and several abuelas from the southern Colorado areas. The impressions and possible solutions to challenges provided by this group were invaluable and helped to guide the project.

With the group evaluation that occurred among the state Extension Agents, there were more people involved than originally planned. Although the comments and recommendations were timely and very helpful, the group style of evaluation had a

disadvantage. It was difficult to determine how many in the group agreed with the noted comment. It is important to be able to prioritize potential modifications objectively since they are time consuming and can be expensive. A recommendation for future group evaluations would be to have a combination of group and individual evaluation methods. There should be a set time for the group evaluation; and, space permitting, a computer or full kiosk should be set up in a convenient location for individuals to try the program on their own and evaluate it. The data from both evaluation methods could be analyzed and compared to make necessary and valid conclusions about recommended modifications. Formal focus groups are another alternative that have been applied to formative evaluation of IMM applications (Matheson, 1994).

Participant Evaluation

The initial groups ranged in size from 20 to 27. It was easier to recruit participants to complete both lessons with the same instruction method than participants in the groups with mixed instruction methods. Sometimes the mixed method lessons had to be held at different locations for each lesson. Several people were willing to complete the IMM module but did not want to commit to a subsequent lesson with an abuela. The opposite was true, also. Those who completed the first lesson with an abuela sometimes had difficulty returning to do the second lesson on the computer. Barriers of transportation, lack of child care, and time constraints were encountered and were consistent with the difficulties Taylor (1997) noted with this population.

Area

The source of the effect influenced by the area variable appears to be only within the IMM group of Area Three (**Appendix K**). Nothing specific was apparent to explain this effect. Recruitment was considered, but the on-site recruitment at places serving low income people was consistent with the recruitment technique of Area One. To begin analyzing and explaining the effect more thoroughly, the sample size from Area Three would have had to be twice its actual size.

Participant Demographics

The profile of the participants included many low income Hispanics and was similar to that of the original participant evaluation of *La Cocina Saludable* completed by Taylor (1997). Most participants were females (89%) with young children. The 46% percent Hispanic was based upon the number of persons who marked that they spoke some Spanish at home. This probably was a conservative estimate since an additional 19 participants had Hispanic surnames. Thus, more than 60% of those reached probably were of Hispanic decent. A substantial proportion of this ethnic group was represented during this study since the Hispanic population of these areas of southern Colorado ranges from 23 to 77% (Colorado Department of Health and the Environment, 1996). Eighty two percent of the sample were under 41 years of age while 77% of the Taylor sample were in that age group. Sixty five percent reported that their annual income was less than \$10,000 compared with 60% of the Taylor study. Thus, the intended population in southern Colorado was reached within this research.

Selection of Kiosk Sites to Maximize Usage

Eighty one percent of the participants in this research used at least one food or other assistance program. More than half were recruited at or through an assistance program. Recruitment was easier at some places and times than others depending on the number of clients served by the program and the support received from the staff. An important recommendation for where to place the kiosk to optimize the potential number of people reached is to track when the participants visit the assistance programs. A food bank in one area was very busy at the end of the month when food stamps and WIC vouchers had been used. Other programs have greater usage at the beginning of the month. Some Head Start centers recruit and register participants during certain periods in the Spring and/or Fall. A migrant housing project is busier during the farming season from June through October.

Knowledge Indicators

Conclusion 2a: Participants who received the lesson(s) from the abuela and those who completed the IMM module(s) had improvements in the total knowledge score from Entry to Post surveys. These improvements were maintained at Follow-up, but did not improve further from Post to Follow-up. Thus, the null hypotheses $\mu_1 = \mu_2 = \mu_3$ (Entry = Post = Follow-up) was rejected for $\mu_1 = \mu_2$ and $\mu_1 = \mu_3$, but not for $\mu_2 = \mu_3$ (no differences were seen from Post to Follow-up) (**Results**, Tables 11, 12, 13).

Discussion: This provides evidence that both the abuela and IMM are viable instruction methods for delivering nutrition education information to low income participants. At

Entry, 43 (45%) of all participants regardless of instruction method left the MIH indicator (the pyramid) blank. Only 3 (3%) left the MAC indicator blank. Therefore, improvements were seen with both the abuela and IMM instruction methods for a range of initial knowledge levels.

Conclusion 2b: The null hypothesis that the instruction methods would provide similar knowledge outcome results ($\mu_1 = \mu_2$) was rejected for the MIH instruction methods but not for those of MAC (**Results**, Tables 11, 12).

Discussion: Participants who completed the abuela MIH lesson had better total knowledge scores at Post and Follow-up ($p \leq 0.05$) than those who completed the IMM MIH module. The source of this difference was the MIH unit. Those who had the abuela for MIH had significantly better improvements for the MIH outcome than the IMM group. This was reflected in the total knowledge score. The MAC instruction methods, however, did not influence either the MIH or MAC indicator outcomes.

This better improvement for the abuela group with the MIH outcome was further analyzed through histograms (plotted together in Figure 12 and separately in Appendix N) comparing the distribution of percent differences of least squares means (ls means) for the instruction methods within MIH. The percent differences for those who improved less than 50% were similarly distributed whether they had the abuela or IMM instruction method for MIH. The distribution for those who had the abuela for MIH and improved more than 50% appeared to be shifted somewhat higher than that of the corresponding IMM participants. The abuela appears to have a stronger effect at the top

end, but not at the lower end. When the percent difference from Entry to Post is compared to the Entry score, furthermore, it is apparent that the Abuela is very effective with those who have the most improvement (Figure 13). Of those who scored less than 20% correct on the MIH indicator at Entry, the average improvement was 68% for those who had the Abuela for MIH from Entry to Post compared with a 41% average gain with those who completed the IMM. Yet for those who scored above 20% initially, the average gain tended to be similar, 25% for the participants in the abuela group and 22% for those in the IMM group. Thus, the abuela instruction method appears to have a stronger influence than the IMM method on those who have more to learn than those who have less to learn.

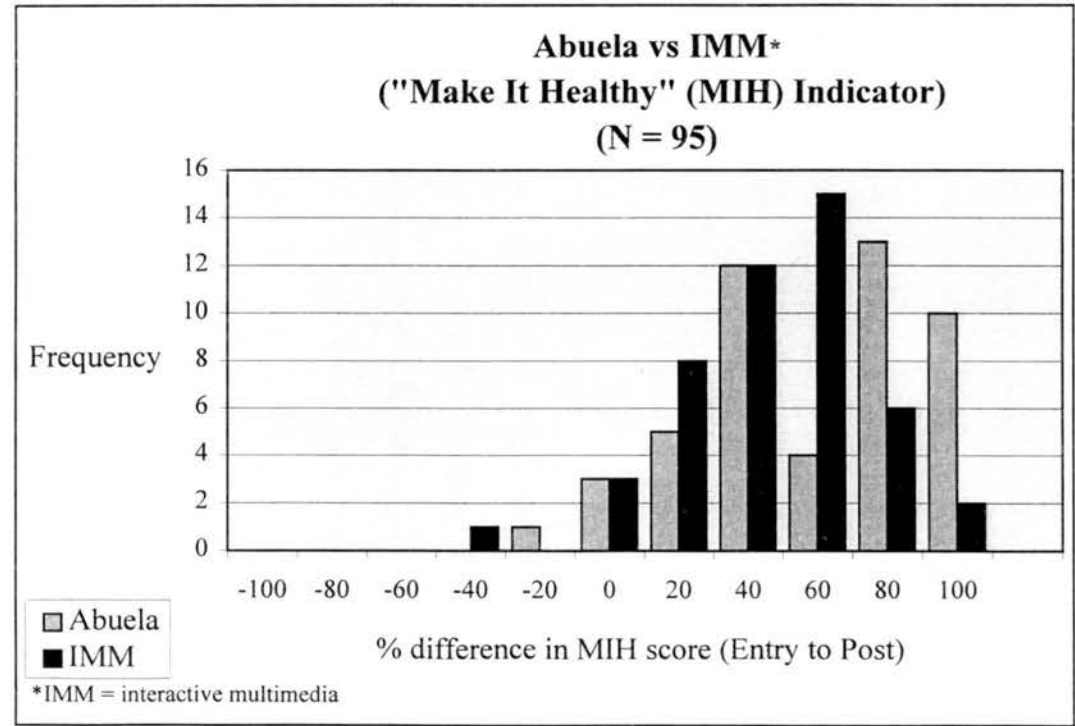


Figure 12: Combined histograms displaying distributions of Entry to Post difference for the "Make It Healthy" (MIH) indicator by instruction method. (Separate histograms are displayed in Appendix N.)

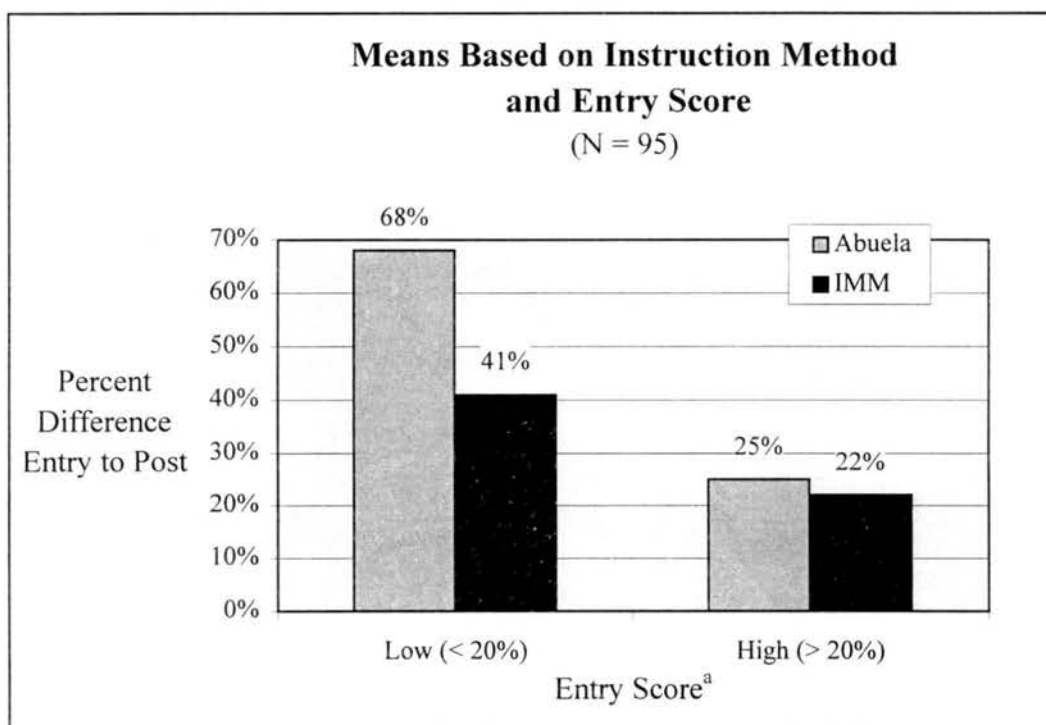


Figure 13: Mean improvements (percent correct) based on abuela and interactive multimedia (IMM) instruction methods and percent correct at entry.

Two potential factors that could have influenced this result individually or in combination are the difference in time spent on the lessons and the selection of abuelas. The time spent on the MIH unit with the abuela is intended to range between one and a half to two hours. The average time spent on the corresponding IMM lesson was about thirteen and a half minutes (**Results**, Table 19). From the on-line data, it was observed that less than half of the participants who completed the MIH unit on the computer explored beyond the basic information provided. Furthermore, each of the options for basic information of the unit was selected only between 40 and 60% of the time. The abuela MIH lesson included repetition of the messages and encouragement for discussion among participants to help reach those at the different Stages of Change

(SOC). Although some change process techniques of the early stages of the SOC model such as recruitment, consciousness raising, self re-evaluation, and self-efficacy lend themselves to simulation using IMM, other constructs may require more and very specific interaction that can be provided more effectively by an abuela in a group situation in which helping relationships are easier to establish (Prochaska, DiClemente, and Norcross, 1994). Decisional balance and social liberation also were intended to be enhanced by the presence of an abuela leading a group discussion (Taylor, 1997).

Greater improvement within the Abuela group also may have been due to the abuela selection process. The best abuelas were chosen to teach the MIH and/or MAC lessons in this research project. Thus, they were the best models and provided vicarious experience, a Social-Cognitive Theory determinant, for the participants (Bandura, 1977a). In fact, two of the abuelas from different areas had decreased their obesity and consequently decreased other health risks such as high blood pressure during their participation as peer educators in the original evaluation of *La Cocina Saludable**. Since the IMM application used in the evaluation was a Beta version, an increased focus on modeling through the use of more video clips and photos with abuela(s) is recommended to optimize the effectiveness of this instruction method. Modeling by the abuelas could include food selection and preparation demonstrations or the abuela could be observing and/or helping a young mother choose and prepare healthful foods. Another effect of modeling could be the social liberation of the abuelas validating that it

* Personal communication with the abuelas, 1997

is okay to choose and prepare foods somewhat differently than traditionally and culturally expected.

Vitamin Indicators

Although the IMM MAC module had no content regarding vitamins, there was evidence that two distributions for percent of correct answers were dependent on the instruction method for this unit (**Results**, Table 15). At Follow-up, more MAC IMM participants were able to identify the good source of Vitamin A than the MAC abuela participants. Although it would be inappropriate to base a conclusion on this outcome since there was only one vitamin A indicator (**Appendix I**, Question 3), it would be interesting to speculate why this difference occurred. Since the content messages of the abuela and IMM lessons were based on the same resource guide, there might have been something about the way the information was presented on the computer that influenced the responses at follow-up. This situation is similar to the antecedent determinant of the Social-Cognitive Theory where a stimulus is provided for practicing a particular behavior; that practice in turn influences a related bit of knowledge or behavior. Perhaps the emphasis of low-fat, high fiber foods within the IMM MAC module made a different impact since the visual stimuli included many vegetables and fruits, the majority of foods which contain vitamin A.

It appears, also, that the way the abuela taught the MAC lesson might have influenced the ability to identify the correct food sources of vitamin C immediately after the lesson. Again, it is difficult to draw a conclusion based on one indicator. There

may have been, however, an unintentional message (Gillespie, 1981) given by the abuela and/or misinterpreted by these participants that was reflected in the Post survey responses. At Follow-up, however, the distributions were not different. Perhaps the information was better understood after a time to evaluate and assimilate or the information given by the abuela did not have as much impact at Follow-up as it had immediately after the lesson. This outcome provides some evidence to the importance of consistent nutrition information that can be provided in an IMM format.

Reported Behavior

Conclusions 2c: The null hypotheses that behavior would not change due to the nutrition education was rejected based on significant differences of one or both indicators over time. The null hypotheses that instruction methods would result in similar behavior was rejected since some differences were found between methods (**Results**, Tables 16 and 17).

These conclusions should be considered with caution since they have been drawn from only two survey questions, one for each behavior (**Appendix I**, Questions 1 and 2). Participants in the MIH abuela group reported healthier behaviors for using low-fat foods and use of salt on foods at the Post survey. At Follow-up, only the fat behavior remained significantly different. Those who had the abuela for the MAC unit reported healthier behavior regarding use of salt at Post, but they did not maintain through Follow-up. These results could be due to a reassessment of their behavior from what they recently learned or to a desire for immediate positive feedback from the

abuela. The positive feed back could be considered a type of consequent determinant of the Social-Cognitive Learning Theory (Bandura, 1977a). At Follow-up, that immediate feedback was not available to potentially influence the responses.

Persons who had the IMM instruction method for MAC did not report improvements in salt use from Entry to Post, but reported significantly healthier behavior at follow-up. Based on the analysis of the on-line data (**Results**, Table 21), 77% of the participants chose to explore the salt portion beyond the basic information. This was corroborated somewhat by several users who wrote on the IMM qualitative evaluation that they would change their behavior regarding salt. The choice of message(s) received from the IMM module was participant driven, while the abuela may put more emphasis on the messages she feels are most important.

Stages of Change

Even though the instrument to measure Stage of Change was still in testing in the Taylor (1997) study, responses from the groups reported here were analyzed (Appendix I, Questions 7 and 8). Since there were no significant differences between the MIH or MAC instruction method groups at Entry, Post, or Follow-up, the abuela and IMM groups probably were similar in their interpretation of the indicators. Forty five to seventy participants marked the section of the indicators intended to reflect the Maintenance stage. These results correspond with those of Taylor's research (1997). Based on the results from the original peer education study, Taylor recommends that the

paper versions for the indicators need to be reworked to allow participants to more accurately assess their behavior stage.

The basic flowchart format of the written version, however, is easily adapted to an IMM version. In contrast to the written format on which participants could circle multiple responses, the IMM narrator would guide the user through the indicator by asking one question at a time. In addition, only the response options corresponding with that question would be presented. Based on the response option chosen by the participant, the narrator asks the next question and presents the corresponding response choices. Multiple stage outcomes would be eliminated and data collected potentially would be more accurate. After the lesson(s), the user could be offered the option to reassess these indicators and would be directed through the flow chart again. Thus, the flowchart would be communicated through a logical *intervening process* (Communication Model) and the response (*output*) would be more specific to the most recent query (*input*). This would decrease the complication of the processes that need to be utilized such as reading and processing several questions simultaneously.

On-line Tracking

Future IMM research using the Communication Model (Gillespie, 1981) as the basis for determining variables could be valuable in describing the processes people use during nutrition education interventions. A method for assessing some of the input components of the receiver could be created and validated for IMM through the use of descriptive graphics and appropriate interactions. The inputs of the IMM program

remain constant. This study allowed for some exploratory analysis of the on-line tracking. Time spent at the computer and how far the users chose to explore at various options of the program (*intervening processes*) were analyzed.

One the challenges realized in this on-line tracking was that with the authoring software used in the *La Cocina Saludable* IMM program (Asymetrix® Multimedia Toolbook) although labeling every object with a specific name was not necessary for the program to work, labeling of objects was necessary to interpret the on-line data. In particular, the pyramid sections had not been specifically labeled, so the selections participants made during the MIH activity were unclear. Furthermore, the ability to compare these on-line selections to the participant's corresponding responses on the written survey was not possible. Another challenge of the on-line tracking was that the file of recorded data was extensive. One 8½ by 11 inch sheet could include hundreds of interactions, the management of which needs to be explored further (Appendix O).

Validated on-line tracking systems have tremendous application potential by nutrition professionals. Responses to survey questions and participant evaluations of food and other community assistance programs could be adapted to IMM. Fong and colleagues (1990) found that dietary intake could be obtained using interactive software with savings in time and labor of 80% and a potential net savings over two years of \$15,000. Use of this technology also would allow program administrators to learn more about those who are interested in nutrition education as they would be recorded as completing more units on subsequent visits.

Cost analysis

Conclusion 4: The IMM program is cost-effective for the "Make A Change" Unit, but may not be as cost-effective for the "Make It Healthy" Unit in the Beta format tested in the present research.

Discussion: The cost-effective points for the IMM are important considerations. The cost per participant per unit for the abuela instruction method was similar to that for one IMM system at 600 people. After 633 people, however, the IMM program becomes more cost-effective. One IMM system potentially could reach 633 participants with one unit in forty days (one person per hour during eight hour days). Because it was necessary to recruit participants in this study in order to explain the research, obtain informed consent, and administer surveys, on-line usage numbers from the present study were not indicative of realistic usage. Potentially, however, completion of two modules per hour, both by one participant or one by two different people, could occur. This potential availability of the IMM is based on eight open hours daily and an average time of about 16 minutes for the introduction and MIH, the longer module. This translates into 16 people per day and 4,000 people per year. That is only eight and a half percent of the 47,000 persons in southern Colorado being reached in just the WIC and Food Stamp Program (Colorado Department of Health and the Environment, 1997). In addition, reaching 4,000 people with one system pays not only for itself, but for the other three (see **Results**, Figure 10).

It also was interesting to look at the cost for one to four IMM systems (including the respective proportion of development and evaluation costs) and compare that figure

to the potential earnings of a nutrition educator. Based on the total amount paid to the Expanded Food and Nutrition Program (EFNEP) educators in Colorado in 1996, and a goal of reaching at least 2,000 adult participants with a minimum of six lessons (units) (12 maximum) of nutrition education, a cost per participant was determined to be \$12.08. The cost to reach 2,000 with one IMM system would be \$4.67 per participant per unit and \$9.34 if two IMM systems were used. The cost savings becomes even more apparent for a Food Stamp Nutrition Education Program (FSNEP) educator with a calculated cost of \$26.42 per participant.

It is important, however, to remember that the intent for using the computer as a means to deliver nutrition education is not to replace the abuelas or other nutrition educators, but to expand the potential for people at nutritional risk to be reached. Although IMM provides a means to do this with accurate, consistent, and effective nutrition education at convenient times and locations, it may not be as effective as a peer educator with certain content. Participants will learn about nutrition, have positive behaviors reinforced, and learn how to improve behaviors as needed. More importantly, their interest may be stimulated enough to pursue more nutrition education facilitated by a trained nutrition educator such as one of the abuelas teaching the *La Cocina Saludable* program in a group session.

Limitations

Additional limitations to those listed within the Introduction need to be addressed regarding the evaluation of the interactive multimedia program. First, being a

research project may have affected the responses of the participants. Since the evaluation technique was the same for both those who had the abuela instruction method and those who completed the IMM method, any effect most likely would be similar for both methods. A second limitation was the difference in recruitment techniques. The IMM program is intended to be "self-recruiting" while the abuelas actively recruit for the peer education component. A third limitation within the cost analysis is that the total costs for the IMM program were determined by what was actually paid. Costs for another project may be higher if student help is not used; but, also may be lower with an experienced project manager who could coordinate more efficiently and effectively. The first unit of the *La Cocina Saludable* IMM project, "Make It Healthy" took 18 months to complete while the "Make A Change" module took less than three months to complete. Based on the results of this project, the "Make A Change" unit resulted in similar outcomes to that for the abuela instruction method. Thus, experience in development may result not only in lower costs, but also in a better IMM module.

SUMMARY

The intent of this brief summary is to provide insights from the researcher regarding the application of computer technology in nutrition education based on the described research projects. Overall, the results provided support for the use of computer technology with low income populations in the print form and with interactive multimedia (IMM). The pictorial version of the *Colorado WIC Program Allowable Foods* list was preferred by the majority of potential users: low-income women, grocery store clerks, and WIC staff. Furthermore, there was some evidence from the second project of this research to support use of interactive multimedia (IMM) nutrition education with low income persons, but perhaps not as an exclusive instruction method. In addition to this primary conclusion, several other secondary findings occurred for the researcher.

Nutrition Education Theory

The application of nutrition education theory was very helpful in the development, implementation, and evaluation of these research projects. Prochaska's Stages of Change Model gave guidance for adapting *La Cocina Saludable* to an IMM format (Prochaska, 1994). The Communication Model (Gillespie, 1981) provided structure on which to base development and implementation considerations for both

projects. Several constructs of the Social-Cognitive Learning Theory (Bandura, 1977a) including *self-efficacy* and *vicarious experience* were incorporated with change elements from the Stage of Change model. All three of the theories/models were particularly useful during the interpretation of the results and developing recommendations.

Alpha Testing

Although summative evaluations are key in measuring impact of interventions, the formative evaluations completed during these projects were of considerable value. An appropriate amount of formative evaluation was accomplished during the development of the printed piece (Project I); but, more frequent alpha testing during the development of the interactive multimedia program (IMM) would have been helpful in solving some of the content and media component challenges encountered (Project II). They would not have needed to be formal, but a combination of group and individual feedback would have saved time and effort.

Recruitment of Study Participants

Recruitment of target population participants was very difficult for both projects. A comment made to the researcher from an Extension Agent in one of the areas indicated that many people within the low-income population have been evaluated extensively.

During the brief interview evaluation of the WIC list at a low income health clinic, over 100 participants were recruited in three days. Most likely this was due to the convenience of being able to complete the evaluation there and immediately receive their incentive (monetary). For the user portion, however, although those recruited seemed very willing to help, half did not return any of the completed materials. Follow-up was not possible since addresses and phone numbers were not placed on the consent forms. Of those who did return their survey, several did not return all of the requested items. A follow-up letter was sent to these participants requesting the missing items. Responses to these letters was minimal.

Likewise for the IMM summative evaluation, recruitment was a challenge. Often the participant agreed to return to complete the second lesson, but would not show-up even after numerous contacts. Barriers of child care, transportation, and working hours were mentioned most often, but "I don't have time" also was common.

Computer technology provides a means to potentially overcome these recruitment problems. Use of a WIC voucher at a grocery store could be simulated on interactive multimedia. This would allow the client to practice in a less stressful situation to build self-efficacy before going out into the general public (Bandura, 1977a).

IMM was found to be a viable and acceptable option for nutrition education of a low income population based on results of the research described in Project II of this dissertation. Subjects were usually willing to try the IMM program, but sometimes reconsidered when the survey component was explained. On-line tracking of validated

outcome indicators would minimize this recruitment barrier. If the assessments are done in the form of fun behavior oriented activities such as simulating making healthful choices, recruitment issues may be minimized.

Overall Conclusion

The research projects described here provide further evidence of the value of using computer technology in nutrition education, in particular of low income individuals. Although more research needs to be focused on the on-line evaluations, it is highly recommended to continue evaluating the IMM with the peer or nutrition educator in order to add to this scant body of knowledge and be able to improve the position of both the live educator and IMM methods. Only a very small segment of the potential for this expanding technology has been explored here and in other studies (Fong and Kretsch, 1990; Suitor and Gardner, 1992; Carroll, Stein, Byron, and Dutram, 1996). That potential is limited only by imagination, flexibility, and perseverance.

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APPENDICES

Appendix A:

Map of Intervention Areas for *La Cocina Saludable*



COLORADO

Area

1

San Luis Valley
(Alamosa Area)

Area

2

Pueblo Area

Area

3

Arkansas Valley
(La Junta, Rocky Ford)

Appendix B:

Materials and Incentives of Peer Education Component of *La Cocina Saludable*, “The Healthy Kitchen”



Figure B1: Materials (Top) and Incentives (Bottom) for *La Cocina Saludable*
 (Photos used with permission from Colorado State University's Department of Food Science and Human Nutrition Cooperative Extension)

Appendix C:

Colorado WIC Program Allowable Foods List–
Original And Pictorial Versions

ALLOWABLE FOODS FOR WIC AS OF JANUARY 1996

CEREAL

Cold Cereal Sizes allowed for both hot and cold cereals--Any combination which is less than or equal to the WIC shopper's allotment (usually 28 oz. or 36 oz.)

Bran Flakes (Kellogg's & Post)	Kix (Regular only)
Cheerios (Regular & Multi-Grain only)	Life (Regular only)
Chex (Corn, Rice, and Wheat)	Product 19
Grape Nuts & Grape Nuts Flakes (No Raisins)	Puffed Rice & Puffed Wheat (Malt-O-Meal Brand)
Kellogg's Common Sense Oat Bran	Quaker Oatmeal Squares
Kellogg's Corn Flakes	Special K
Kellogg's Just Right Crunchy Nugget	Total (Corn and Wheat)
Kellogg's Raisin Squares	Triples
	Wheaties

Hot Cereal

Cream of Wheat (Unflavored)	Maypo Oatmeal (Maple Flavored)
Malt-O-Meal (Unflavored)	
NOT approved in individual packets	

Infant Dry Cereal Size allowed: 8 ounce box

Beechnut, Gerber, and Heinz only Barley, Oatmeal, Rice, or Mixed

NOT APPROVED: Cereal in jars; cereal with fruit or formula added

JUICE

Infant 100% Juice Size allowed: 4, 4.2, or 8 ounce (as listed on WIC check)
Beechnut, Gerber, and Heinz only All flavors

Frozen 100% Juice Size allowed: 12 ounce cans

Apple (Seneca & Tree Top)	Grapefruit
Grape (Welch's & Seneca)	Orange (store or generic brand only)
(Welch's white and Welch's	Pineapple (Dole only)
100% juice with yellow pull-off strip)	

Single Strength Juice only if specified on the WIC check.

Single Strength 100% Juice Size allowed: 46 ounce cans

Apple (Seneca only)	Orange-Pineapple	Tomato (Del Monte)
Grapefruit	Pineapple	V-8 (Campbell's)
Orange		

6 oz. can Single Strength Juice only if specified on the WIC check

Grapefruit	Orange	Orange-Grapefruit	Orange-Pineapple
------------	--------	-------------------	------------------

NOT APPROVED: Calcium-added juice or Granny Smith Apple Juice

FORMULA

The specific brand, type, and amount of formula which is authorized is shown on the WIC check.

MILK

Fluid: Size allowed: Size is authorized on the WIC check

Whole	Skim	Acidophilus
Lowfat	Buttermilk	Lactose-reduced Milk

Powdered: Size allowed: 3 or 8 quart boxes

Nonfat

Evaporated: Size allowed: 12 ounce cans

Whole, Lowfat, Skim

UHT Long Life Milk only if specified on the WIC check

NOT APPROVED: Flavored, raw, calcium-added, or organic labeled milks

CHEESE

Only Domestic Cheese is Approved

Sizes allowed: Any size package from 8 ounce to 16 ounce

American	Longhorn	Provolone
----------	----------	-----------

Brick	Monterey Jack	Swiss
-------	---------------	-------

Cheddar	Mozzarella
---------	------------

Colby	Muenster
-------	----------

Kraft Brand Reduced Fat Cheese in any type above

NOT APPROVED: Imported cheese, deli cheese, shredded, individually wrapped, cheese spreads, flavored cheese, cream cheese, cottage cheese, string cheese, individually sliced cheese (except American, which may be sliced but not individually wrapped), raw milk cheese, organic cheese. Any product with cheese food or cheese product on the label.

EGGS

Grade AA, White or Brown (large or smaller size)

(Generic or store brand only when available)

NOT APPROVED: Eggs known as free range, organic, nest laid, or nest fresh

PEANUT BUTTER

Size allowed: 18 ounce

Smooth or crunchy

ALSO APPROVED: "All Natural" peanut butter in a 16 ounce jar and
"Whipped" peanut butter in a 14 ounce jar

TUNA

Any combination less than or equal to allotment of 26 ounces water pack tuna

NOT APPROVED: Albacore, chunk white, or solid white tuna

CARROTS

Any combination of fresh, frozen, or canned equal to or less than allotment of 2 pounds

NOT APPROVED: Any size less than 8 ounces

DRIED BEANS AND PEAS

Size allowed: 16 ounce

Black Beans

Garbanzo Beans

Kidney Beans

Lima Beans

Pinto Beans

Split Peas

Black-eyed Peas

Other similar varieties

Colorado WIC Program Allowable Foods Lists (1997)

English and Spanish versions

Folded plates located in pocket on back cover

Appendix D:

Project I: Formative Evaluation Questionnaires

Colorado WIC and Colorado State University
Allowable Food Guide Study

Thank you for your help in our study. After you have looked at the food guide for a few minutes, please answer the questions.

1. Would this guide be easy to use?



2. Would mothers like using it?



3. Are the pictures clear?



4. The amount of information is



5. The words are

To
small

Okay

Too
large

6. Would you like the color of the paper to be
yellow? other color?

Other comments?

Thank you very much for your time and your help with this study.

Colorado WIC and Colorado State University
Allowable Food Guide Study

Thank you for your help in our study. After you have looked at the food guide for a few minutes, please answer the questions.

1. Would this guide be easy to use?



2. Would mothers like using it?



3. Would pictures be helpful?



4. The amount of information is



5. The words are

To
small

Okay

Too
large

6. Would you like the color of the paper to be

yellow?

other color?

Other comments?

Thank you very much for your time and your help with this study.

COLORADO WIC and COLORADO STATE UNIVERSITY
ALLOWABLE FOOD GUIDE STUDY

1. In your opinion, which food(s) do WIC clients have the most problems choosing at the grocery store?
Most _____ 2nd Most _____ 3rd Most _____

After you have looked at the food guide for a few minutes, please give us your opinion regarding the following questions.

2. Would this guide be easy for WIC clients to use?
Very easy 1 2 3 4 5 Difficult
3. Would mothers like using it?
Like 1 2 3 4 5 Dislike
4. Are the pictures helpful?
Helpful 1 2 3 4 5 Not helpful
5. Are the pictures clear?
Clear 1 2 3 4 5 Unclear
6. The amount of information is
To little 1 2 3 4 5 Too much
7. The words are
Too small 1 2 3 4 5 Too large
8. The color of the paper should be
_____ same as text version _____ different than text version

Please tell us a little about yourself.

9. Number of years employed with WIC: _____
10. Position with WIC: _____
11. Number of years (months) in that position: _____
12. Ethnic background: _____

Other comments and suggestions? Please use other side if needed.

Thank you very much for your time and your help with this study.

Appendix E:

Project I: Preference Evaluation Surveys

Colorado WIC And Colorado State University
Allowable Food Guide Questions

(asked verbally after having a few minutes to view text and pictorial lists)

Which guide did you prefer?

Why?

Comments

Colorado WIC And Colorado State University
Allowable Food Guide Questions

(asked verbally after having a few minutes to view text and pictorial lists)

Which guide did you prefer?

Why?

Comments

Directions
(WIC clients)

1. Use the pink WIC Allowable Foods List (guide) as needed when you go to shop for your WIC foods. Circle the WIC foods you chose.
2. Finish the survey.
3. Write your name and address on the back of the red form so we know where to send your \$5.00.
4. Put the following into the addressed and postage paid envelope:
 - The WIC foods list (guide) you used.
 - The grocery receipt with your WIC choices.
 - The finished survey.
 - The red form with your name and address.
5. We will send to you:
 - Another WIC foods list (if you need it).
 - The grocery receipt.
 - \$5.00.

Thank-you very much for your time and help with this project.

Survey - WIC
(WIC Clients)

1. On the pink guide, please circle the WIC item(s) that you chose at the store.
2. How much did this guide help you find the items listed on the WIC check?
_____ very much _____ some _____ none
3. What did you like about using this guide?
4. What did you not like about using this guide?
5. Did you use mostly the _____ pictures? _____ words? _____ both?
5. Other comments about the guide:

6. How many times have you shopped at this store before today?
 _____ 0 times _____ 1 to 5 times _____ 6 to 10 times _____ 10+ times

7. Have you received WIC foods before today? ____ yes ____ no

If "yes": When? _____ Where? _____
 year(s) state(s)

8. How old are you? years

9. What level of education have you finished?

☐ Elementary School	☐ Junior High School	☐ High School Diploma
☐ Some College credit	☐ Associate Degree	☐ Bachelor Degree
☐ Certificate Program	☐ Some Graduate credit	☐ Master's Degree
☐ Other:		

Thank-you very much for your time and help with this project.

Direcciones
(WIC Clients)

1. Usa esta guía de WIC cuando va a la tienda a escoger los alimentos de WIC.
2. Ponga un círculo en la guía rosa en los alimentos de WIC que ha escogido.
3. Termine el cuestionario.
4. Escribe su nombre y la dirección en el papel rojo. Entonces, sabremos a donde mandarle \$5.00.
5. Ponga estas cosas en la cubierta con la dirección de la universidad y con el sello de correo:
 - La guía que Ud. usó.
 - El recibo de la tienda por los alimentos de WIC que Ud. ha escogido.
 - El cuestionario cumplido.
 - El papel rojo con su nombre y la dirección.
6. Le mandaremos:
 - Una otra guía.
 - El recibo.
 - \$5.00.

Muchas gracias por su ayuda en este proyecto.

Cuestionario – WIC Clients

1. Por favor, ponga un círculo en los alimentos de WIC en la guía rosa que ha escogido.
2. ¿Cuanto le ayuda esta guía a usted para escoger los alimentos que fueron escrito en el cupón/cheque de WIC?
_____ mucho _____ poco _____ nada
3. ¿Que le gustó sobre usar esta guía?
4. ¿Que no le gustó sobre usar esta guía?
5. Usó mas _____ las picturas/fotos/dibujos? _____ las palabras _____ ningún
6. ¿Cuantas veces ha comprado comida de esta tienda antes de hoy?
_____ 0 tiempos _____ 1 a 5 tiempos _____ 6 a 10 tiempos _____ 10+ tiempos
7. ¿Recibió los alimentos de WIC antes de ahora? _____ sí _____ no
Si contestó “sí”, ¿hace cuanto tiempo _____?
Los años
¿Donde recibió los cupones? _____?
El estado

1. Otros comentarios/observaciones sobra la guía:

2. ¿Cuantos años tiene Ud.? _____ años
3. ¿Qué tanto escuela ha cumplido Ud.?
_____ La escuela primaria _____ La escuela secundaria / colegio
_____ Pocas clases de la universidad _____ Dos anos de la Universidad tecnica
_____ Licenciado (en la universidad) _____ Certificado: _____
_____ Pocas clases después del título de la universidad
_____ Maestria _____ Otra: _____

Muchas gracias por su ayuda en este proyecto.

Directions
(Grocery Store Checkers)

The enclosed WIC Allowable Foods List has been developed in conjunction with a nutrition education project in Southern Colorado and in collaboration with the Colorado WIC program. The information contained is the same as that of the current list used by the program; the format of presentation is the only difference. We would like to have checkers at the grocery store give us feedback regarding the usability of this modified list and their preference of format.

1. Please read the informed consent form which reviews the project and your role. If you decide to participate, sign the second page and initial each page (at the bottom) of one copy. The other copy is for you and has been signed by one of the researchers. If you are under 18 and would like to participate, you will need to have one of your parents or guardians sign the section at the bottom of the second page for consent for a minor.
2. Use the pictorial WIC Allowable Foods List as often as you like during the next two weeks when dealing with WIC recipients.
3. After the two weeks, finish the survey.
4. Write your name and address on the back of the red form so we know where to send your \$5.00.
5. Please return the following to [the head checker] in the envelope provided:
 - The copy of the consent form with your signature;
 - The finished survey;
 - The red form with your name and address.
6. We will send to you:
 - \$5.00.

Thank-you very much for your time and help with this project.

7. Any other comments?

Please tell us a little about yourself:

8. How long have you worked with the Colorado WIC program at this or any other grocery store?

☐ 1 to 3 months

☐ 4 to 6 months

☐ 6 to 9 months

☐ 10 to 12 months

☐ more than 1 year

9. How old are you? years

10. Are you ☐ female or ☐ male?

11. What level of education have you finished?

☐ Elementary School

☐ Junior High School

☐ High School Diploma

☐ Some College credit

☐ Associate Degree

☐ Bachelor Degree

☐ Certificate Program

☐ Some Graduate credit

☐ Master's Degree

☐ Other:

Thank-you very much for your time and assistance with this project.

Survey - Grocery Store Personnel

During the past two (2) weeks, you have had the opportunity to use two different formats of the WIC Allowable Foods guides. Please answer the following questions?

1. Which version of the WIC Allowable Food guide did you use more often?
___ one without pictures ___ one with pictures ___ none

Why? _____

2. What did you like about the version you used more often?

3. What did you dislike about the version you used less often?

4. For which foods was this food guide helpful and why? (*Please check all that apply.*)

___ carrots:	___ type	___ amount	___ other
___ cereal:	___ type	___ amount	___ other
___ cheese:	___ type	___ amount	___ other
___ dried beans and peas:	___ type	___ amount	___ other
___ eggs:	___ type	___ amount	___ other
___ formula:	___ type	___ amount	___ other
___ juice:	___ type	___ amount	___ other
___ milk:	___ type	___ amount	___ other
___ peanut butter:	___ type	___ amount	___ other
___ tuna:	___ type	___ amount	___ other

5. How readable was the text?

___ very readable ___ somewhat readable ___ not very readable

6. Were the pictures clear?

___ very clear ___ somewhat clear ___ not very clear

(continued)

Colorado WIC & Colorado State University Allowable Food Guide Study Survey - WIC Staff

After you have looked at the food guide for a few minutes, please answer the following questions.

1. When working with clients would you use this guide:
___ More than current guide? ___ Same as current guide? ___ Less than current guide?
2. Would this guide help with client education:
___ More than current guide? ___ Same as current guide? ___ Less than current guide?
3. How easy would this guide be easy for WIC clients to use?
Very easy 1 2 3 4 5 Difficult
4. How much would mothers like using it?
Like 1 2 3 4 5 Dislike
5. Are the pictures clear?
Clear 1 2 3 4 5 Unclear
6. The amount of information is
Too little 1 2 3 4 5 Too much
7. The words are
Too small 1 2 3 4 5 Too large
8. Other comments or suggestions? Please use other side if needed.

Please tell us a little about yourself:

9. Number of years employed with WIC: _____
10. On average, about how many hours per week do you work?
___ 1 to 10 ___ 11 to 20 ___ 21 to 30 ___ 31 to 40
11. How old are you? ___ years
12. What level of education have you finished?
___ Elementary School ___ Junior High School ___ High School Diploma
___ Some College credit ___ Associate Degree ___ Bachelor Degree
___ Certificate Program ___ Some Graduate credit ___ Master's Degree
___ Other: _____

Thank-you very much for your time and assistance with this project.

Appendix F:

Project I:

Consent Forms

**COLORADO STATE UNIVERSITY
INFORMED CONSENT FOR PARTICIPATION IN RESEARCH PROJECT**

PROJECT TITLE: Using Distance Learning and Abuelas to Teach Low-Income Hispanics and Migrants

PRINCIPAL INVESTIGATOR: Jennifer Anderson, Ph.D., R.D. and Pat Kendall, Ph.D., R.D.

CO-INVESTIGATOR: Susan M. Gould, M.S., R.D.

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:

Jennifer Anderson, Ph.D., R.D. (970)491-7334
Department of Food Science and Human Nutrition

SPONSOR OF PROJECT: United States Department of Agriculture

PURPOSE OF RESEARCH: The overall goal of this project is to develop a nutrition education program that targets low-income Hispanic women and children with special emphasis on migrant farm worker families in specific areas of Southern Colorado. Because there is little nutrition education available for professionals in this geographically isolated area, professionals, paraprofessionals, and volunteers (Abuelas or Hispanic grandmothers) will be targeted for nutrition education training. They in turn will assist in the nutrition education of Hispanic women and children and migrant farm worker families who live in these areas.

PROCEDURES TO BE FOLLOWED: Individuals will be asked to complete a survey after using one or two formats of the WIC Food Guidelines. Your answers will assist us in modifying the guideline formats for use in a nutrition education program for Hispanic mothers of pre-school children. The survey will take about ten (10) minutes to complete. A Spanish or English version will be available for your convenience.

You will be paid \$5.00 for completing the survey.

RISKS: This project is for educational research only. There are no known risks.

I understand that it is not possible to identify all potential risks in an experimental procedure, but I believe that reasonable safeguards have been taken to minimize both the known and the potential, but unknown, risks.

BENEFITS: This project will help in the development of nutrition education materials and delivery methods which consider the customs, norms, beliefs, and values of the Hispanic people. In doing so, knowledge, attitudes, skills, and behaviors will be acquired that contribute to nutritionally sound diets and a healthy lifestyle for Hispanic women and children in this area.

CONFIDENTIALITY SAFEGUARDS: No one will have access to any identifying information, such as name or address, except the investigators and the educators, and your name will not be used in any data analysis. Final reporting for the project will not disclose any names or other identifying information in order to maintain confidentiality.

LIMITATION OF LIABILITY: Because Colorado State University is a publicly-funded, state institution, it may have only limited legal responsibility for injuries incurred as a result of participation in this study under a Colorado law known as the Colorado Government Immunity Act (Colorado Revised Statutes, Section 24-10-101, et seq.). In addition, under Colorado law, you must file any claim against the University within 180 days after the date of the injury.

In light of these laws, you are encouraged to evaluate your own health and disability insurance or determine whether you are covered for any injuries you might sustain by participating in this research, since it may be necessary for you to rely on your individual coverage for any such injuries. If you sustain injuries which you believe were caused by Colorado State University or its employees, we advise you to consult an attorney.

Questions concerning treatment of subjects' rights may be directed to Celia S. Walker at (970)491-1563.

PARTICIPATION: I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.

I have read and understand the information stated and willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing 2 pages.

Participant name (printed)

Participant Signature

Date

Investigator or Co-investigator Signature

Date

PARENTAL SIGNATURE FOR MINOR SUBJECT

I authorize _____ (print name) to become a subject for the described research. The nature and general purpose of the project has been satisfactorily explained to me by _____ and I am satisfied that proper precautions are to be observed.

Minor's Date of Birth

Parent/Guardian Name (printed)

Parent/Guardian Signature

Date

**UNIVERSIDAD DEL ESTADO DE COLORADO (COLORADO STATE UNIVERSITY)
CONSENTIMIENTO INFORMADO PARA PARTICIPACIÓN EN UN PROYECTO DE
INVESTIGACIÓN**

TITULO DEL PROYECTO: Utilizando distancia conocimientos y abuelas para enseñar hispanos y familias hispanas de migrantes.

INVESTIGADORES PRINCIPALES: Jennifer Anderson, Ph.D., R.D. y Pat Kendall, Ph.D., R.D.

CO-INVESTIGADORA: Susan M. Gould, M.S., R.D.

NOMBRE Y NUMERO DE TELÉFONO PARA INFORMACIÓN Y PREGUNTAS:

Jennifer Anderson, Ph.D., R.D. (970)491-7334
Departamento de Ciencia de los Alimentos y Nutrición Humana
(Department of Food Science & Human Nutrition)

PATROCINADOR DEL PROYECTO: Departamento de Agricultura de los EE.UU. (U.S. Department of Agriculture)

OBJETIVOS DEL PROYECTO: El propósito de este proyecto es desarrollar un programa de nutrición y educación para mujeres y niños hispanos de bajos ingresos con énfasis especial en las familias que trabajan en los campos (los migrantes/los braceros), específicamente en el Sur de Colorado. Porque hay poca educación nutricional en este área disponible a los profesionales, un entrenamiento de educación nutricional harán cumplidos par profesionales, para-profesionales y voluntarios (Abuelas Hispanas). Ellos en turno participar/ayudar en el entrenamiento y la educación nutricional de familias hispanas con niños y de migrantes.

PROCEDIMIENTOS: Individuos tendrán que completar un cuestionario después de usar uno o dos de las guías de comidas del programa WIC. Sus respuestas nos ayudarán modificar las guías para un un programa nutritivo que ayuda madres hispanas de niños preescolares. El cuestionario se puede llenar en casi diez (10) minutos. El cuestionario está escrito en inglés o español para su conveniencia.

Ud. recibe \$5.00 (cinco dólares) por el cuestionario que Ud. complete.

RIESGOS: Este programa es una investigación educacional solamente. Este programa no tiene ningún riesgo.

Yo entiendo que no es posible identificar los riesgos en un procedimiento experimental, pero considero que existen razonables medidas de seguridad para minimizar ambos el conocimiento y el potencial pero sin saber riesgos.

BENEFICIOS: Este proyecto ayudará en el desarrollo de avisos educativos de nutrición, y el reparto de métodos que toman consideración las costumbres, normas, el creer y los valores del pueblo hispano. En el hecho, conocimiento, actitudes, habilidades y mañas serían adquiridas que contribuyen a dietas que son sanas y salvas para la vida típica de las mujeres y niños de la área.

CONFIDENCIALIDAD: Nadie tendrá acceso a ninguna información que identifica al participante: Nombre, domicilio, etc., solamente los investigadores y educadores. Su nombre no se usa en datos de análisis. El reportaje final del proyecto no revelará ningunos nombres y otra información que los identifican para mantener su confidencialidad.

pagina 1 de 2

Iniciales del Participante _____ Fecha _____

LIMITACIÓN DE RESPONSABILIDAD: Porque la Universidad del Estado de Colorado (Colorado State University) es fondado de servicios públicos, puede solo tener responsabilidad legal limitada por accidentes ocurridos en la participación de este estudio sobre la Ley de Colorado Gubernamental Acta de Inmunidad (Colorado Revised Statutes Section 24-10-101, et seq.). Por consiguiente sobre la Ley de Colorado debe Ud. reclamar a la Universidad en el transcurso de 180 días de la fecha del accidente.

En lo que son estas leyes Ud. debe esforzar sus seguros de salud y discapacidad para que determine si esta cubrido por cualquier heridas que puede sostener durante la investigación como sea necesario que Ud. es responsable por cubrir cualquier heridas. Si Ud. sostiene heridas que Ud. cree son causadas por la Universidad del Estado de Colorado (Colorado State University) o sus empleados, entonces le aconsejamos que consulte un abogado.

Preguntas en relación a los derechos del súbdito deben ser dirigidos a Celia S. Walker, (970)491-1563.

PARTICIPACIÓN: Yo entiendo que mi participación en esta investigación es voluntario. Si yo decido participar en el estudio, yo puedo retirar mi consentimiento y dejar de participar sin pena o perdido de beneficios.

He leído y entiendo la información exponida y firmo voluntariamente. Mi firma también reconoce que recibí, en la fecha firmada, una copia de este documento contenido de 2 paginas.

NOMBRE DEL PARTICIPANTE (Letra de Molde)

FIRMA DEL PARTICIPANTE

Fecha

INVESTIGADOR/CO-INVESTIGADOR (Firma)

Fecha

FIRMA DE PADRE DE PARTICIPANTE DE AUN MENOR DE EDAD

Yo autorizo a _____ (Nombre en letra de molde) participar en la investigación descrita. Que el propósito general se ha explicado a mi por _____ y estoy satisfecha por las precauciones observadas.

Fecha de Nacimiento de Menor de Edad

Padre/Guardián (Letra de Molde)

Firma de Padre/Guardián

Fecha

Appendix G:

Project II:

Scripts for Interactive Multimedia Modules:

"Make It Healthy" and "Make A Change"

(MAKE IT HEALTHY SCRIPT)

2.1a

- en21a1 What does health mean to you?
- en21a2 Your health affects your quality of life.
- enmore To hear more, please touch the "NEXT" button.

2.1b

- en21b1 Family history,
- en21b2 the immune system,
- en21b3 working and living conditions,
- en21b4 the amount of exercise and rest,
- en21b5 and stress levels all influence your quality of life.
- en21b6 Foods and nutrition are very important to your health.

2.2

- en221 Nutrition is how much food you eat,
- en222 what kind of food you eat,
- en223 and how you prepare the food.

2.3

- en231 The benefits of good health and nutrition are
- en232 healthy bodies,
- en233 healthy minds,
- en234 healthy teeth,
- en235 healthy weights and check-ups.
- en236 Good health saves money.
- englow To hear more, touch one of the pictures with a glow.

2.3a

- en23a1 Healthy bodies are active and energetic, live longer,
- en23a2 and are free from hunger
- en23a3 and malnourishment.
- en23a4 Healthy bodies also have less diseases such as high blood pressure,
- en23a5 heart disease,
- en23a6 and cancer.
- en23a7 Eating more grains, fruits, and vegetables along with eating less fat
may help against these diseases.
- en23a8 Practicing good food safety habits helps protect you and your family
against intestinal diseases caused by food poisoning.

2.3b

- en23b1 Healthy minds are less stressed, pay attention in school and work,
and learn more.
- en23b2 Children who do not eat enough nutrients often do poorly in school
and have difficulty learning.

2.3c

- en23c1 Healthy teeth are strong and have fewer cavities. Decay of teeth or
cavities can lead to tooth loss and gum disease.
- en23c2 Wise food choices, especially eating less sugar, can help protect
your teeth.

2.3d

- en23d1 Healthy weights lower the risk for obesity.
- 23d4 OBESITY is when you have too much fat in the body and can lead to
other health problems such as diabetes,
- en23d5 high blood pressure,

- en23d6 heart disease,
- en23d7 and cancer.
- en23d8 You can help your children to have healthy weights and check-ups by teaching them healthy eating habits.

(THE FOOD GUIDE PYRAMID)

2.4

- en241 How would you group foods to help your body?
- en242 Please touch the "NEXT" button to see how The Food Guide Pyramid groups foods.

2.5a

- en25a1 The Food Guide Pyramid has a special shape.
- en25a2 It is wide at the base and narrow at the top.
- en25a3 The Food Guide Pyramid is divided into 6 sections.
- en25a4 Each section is a different color and represents a food group or type of food.

2.5b

- en25b1 See if you can place the foods in the pyramid based on how much we should eat. First touch the food group, then drag them to the place on the pyramid where these foods belong.
- enplace (If you have never seen the foods or do not know where they belong, please touch my picture and I will place them in the pyramid for you.)
- en25b2 Yes, Tortillas, Breads, Cereals, Rice, Pasta, & Grains make up the base of the pyramid and should make up the base of your meals and snacks.

- en25b3 That's right, vegetables belong here in this large section because we need to eat more vegetables each day.
- en25b4 Very good, fruits belong here in this large section because we need to eat more fruits each day.
- en25b5 Great, Cheese, Milk, and Calcium foods belong here. We need to choose foods from this group everyday.
- en25b6 That's right, Meats, Beans, and Eggs belong here. We need to eat foods from this group everyday.
- endrag Please drag these foods to a different section or touch my picture for help.
- endone When you are done, please touch the "NEXT" button.

2.5c

- en25c1 The circles and triangles are used to show added fats and added sugars.
- en25c2 The tip of the pyramid are items eaten for taste rather than nutritional value such as butter, lard, and gravies and extras like candy and sugary drinks.
- en25c3 Also, all the groups have foods with added fats and sugars such as sugar added to some canned fruits or the fat used to fry potatoes.
- en25c4 We should make and eat foods with less added fat and sugar to keep the pyramid shape.
- en25c5 The top of the pyramid can overflow like a volcano if there are too many highfat and sugary foods in the diet.

2.6

en261 For each group, you will hear a little about servings, what is in the food that helps your body, and low fat or sugar choices. Let's begin with the largest section at the base of the pyramid and build up to the tip.

2.6a

en26a1 Touch another part of the pyramid to hear about that food group.

(THE TORTILLAS, BREAD, CEREAL, RICE, PASTA AND GRAINS GROUP)

2.7a

en27a1 Foods from the tortillas, bread, cereal, rice, pasta and grains group make up the base of the Food Guide Pyramid and should make the base of your meals.

enlike What foods from this group do you and your children like best?

enpyra To choose another food group, touch the pyramid,

enor ... or ...

enservg touch the "NEXT" button to hear more about servings.

2.7b

en27b1 You should eat 6-11 servings of this group each day.

encount Count how many servings you eat for the whole day.

enbowl To learn what makes a serving, touch the picture of a food or type of food in the measuring bowl.

endone When you are done, touch the "NEXT" button.

enserv One serving is:

en27b2 1 slice of bread,

- en27b3 ½ cup of cooked pasta or rice,
- 27b4 1 small flour tortilla or 1½ corn tortilla,
- en27b5 ½ cup cooked cereal or 1 cup of dry cereal

2.7c

- en27c1 Foods in this group give your body starch, lots of fiber, and vitamins and minerals.
- enplate To learn a little more about the things in these foods, touch the items on the plate, one at a time.
- endone When you are done, touch the "NEXT" button.
- en27c2 Starch is a good source of energy and often low in fat.
- enfiber Fiber helps your digestive system work better and may be important in prevention of some diseases.
- en27c3 Foods with whole grains such as whole wheat bread, brown rice, and cornmeal have more fiber.
- envit The vitamins and minerals in these foods help your body to develop, grow and function properly.
- en27c4 There are many foods in this group that you may choose that are low in fat. Some of these foods include corn tortillas, bread, rice, and noodles.

(THE VEGETABLE GROUP)

2.8a

- en28a1 The foods in the Vegetable Group help your body grow, develop properly, and keep good health, and may help prevent some diseases.
- enlike What foods from this group do you and your children like best?
- enpyra To choose another food group, touch the pyramid,

enor ... or ...

enservg touch the "NEXT" button to hear more about servings.

2.8b

en28b1 You should eat 3-5 servings of vegetables each day.

encount Count how many servings you eat for the whole day.

enserv A serving is:

en28b2 1 cup raw leafy vegetables

en28b3 $\frac{1}{2}$ cup cooked vegetables

en28b4 $\frac{1}{2}$ cup raw vegetables

en28b5 $\frac{3}{4}$ of a cup vegetable juice

2.8c

en28c1 Vegetables provide Vitamin A and beta-carotene, vitamins and minerals, fiber and are low in fat.

enplate To learn a little more about the things in these foods, touch one of the items on the plate.

endone When you are done, touch the "NEXT" button.

envitA Vitamin A and beta-carotene help your eyes, skin, hair, bones, teeth, and the prevention of some diseases.

en28c2 Vegetable sources of Vitamin A are yellow, orange, and dark green in color like carrots, squash, sweet potatoes, red chile, spinach, and kale.

envitC Vitamin C helps to maintain blood vessels, bones, teeth and helps the body use iron.

enfiber Fiber helps your digestive system work better and may be important in prevention of some diseases.

en28c3 Everyday you should eat a variety of vegetables with different colors and textures so that different vitamins and minerals are being eaten.

en28c4 Choose vegetables that are low in added fats. Steam vegetables or eat them fresh. Add spices or lemon juice instead of high fat items like butter, gravies, or sauces.

(THE FRUIT GROUP)

2.9a

en29a1 Foods in the Fruit group help your body grow and may protect it from some diseases. Children love fruits so fruits are good additions to meals and are great for desserts and snacks.

enlike What foods from this group do you and your children like best?

enpyra To choose another food group, touch the pyramid,

enor ... or ...

enservg touch the "NEXT" button to hear more about servings.

2.9b

en29b1 You should eat 2-4 servings of fruits each day.

encount Count how many servings you eat for the whole day.

enserv A serving is

en29b2 $\frac{1}{2}$ cup canned fruit

en29b3 $\frac{1}{4}$ cup of dried fruit

en29b4 1 whole medium fresh fruit

en29b5 $\frac{3}{4}$ cup of fruit juice

2.9c

en29c1 Fruits give your body Vitamin A and C as well as many other important vitamins and minerals and fiber.

enplate To learn a little more about the things in these foods, touch one of the items on the plate.

- endone When you are done, touch the "NEXT" button.
- envitA Vitamin A and beta-carotene help your eyes, skin, hair, bones, teeth, and the prevention of some diseases.
- envitC Vitamin C helps to maintain blood vessels, bones, teeth and helps the body use iron.
- enfiber Fiber helps your digestive system work better and may be important in prevention of some diseases.
- en29c2 Everyday you should eat a variety of fruits with different colors and textures so that different vitamins and minerals are being eaten.
- en29c3 Make low added sugar choices such as fresh fruits, 100% fruit juices, and canned fruit in "light syrup" or fruit juice.

(THE CHEESE, MILK AND CALCIUM FOODS GROUP)

2.10a

- en210a1 Foods in the Cheese, Milk, and Calcium Foods Group help your body grow and keep your bones, teeth, and muscles healthy.
- enlike What foods from this group do you and your children like best?
- en210a2 If you or someone you know get sick when you drink milk, please touch the milk carton to learn more about "lactose intolerance".
- en210a2a Lactose intolerance causes you to feel sick when you drink milk or eat foods made with milk. You can eat other calcium foods like dried beans, corn tortillas, broccoli, and the bones in canned salmon and sardines. You may be able to eat yogurt, cottage cheese, buttermilk or cheeses rather than milk. There also are drops or tablets that can be put into milk to help the body digest it better.
- enpyra To choose another food group, touch the pyramid,
- enor ... or ...
- enservg touch the "NEXT" button to hear more about servings.

2.10b

en210b1 You should eat 2-3 servings from the Cheese, Milk, and Calcium Foods group everyday.

encount Count how many servings you eat for the whole day.

enserv A serving is:

en210b2 1 cup of milk or yogurt

en210b3 ½ cup of evaporated milk

en210b4 2 slices or 2 ounces from a block of cheese

2.10c

en210c1 Cheese, milk and calcium foods give your body protein, calcium, and important vitamins.

enplate To learn a little more about the things in these foods, touch one of the items on the plate.

endone When you are done, touch the "NEXT" button.

enprot Protein is important for your body to develop and grow.

en210c2 Calcium is important for strong bones, strong teeth, the nervous system, and strong muscles. Without enough calcium, people develop osteoporosis. To hear more about osteoporosis, please touch the leg bone.

en210c2a Osteoporosis is a disease that can affect all people. The bones lose calcium and become weak and brittle and break easily. Eating foods with large amounts of calcium throughout life plus moderate exercise helps to prevent osteoporosis or at least slow the effects.

en210c3 There are foods in other groups with the calcium you need. Touch the plate with some of these foods to hear more.

- en210c3a Beans (red, pinto, kidney), small fish, like sardines, which are eaten with the bones, broccoli, greens, kale, and corn tortillas made with lime all have calcium. Boil chicken or turkey bones in water with a few tablespoons of vinegar to make soup stock high in calcium.
- en210c4 The vitamins in milk are important for maintaining energy levels, normal vision, healthy skin, bones, and teeth, and prevention of diseases.
- en210c5 Low fat choices include milk (skim, 1%, 2%), cottage cheese, low fat cheeses, low fat yogurt, and low fat buttermilk.

(THE MEAT, BEANS AND EGGS GROUP)

2.11a

- en211a1 Foods in the Meat, Beans, and Eggs Group help the body grow and maintain good health and use energy.
- enlike What foods in this group do you and your kids like best?
- enpyra To choose another food group, touch the pyramid,
- enor ... or ...
- enservg touch the "NEXT" button to hear more about servings.

2.11b

- en211b1 You should eat 2-3 servings from the meat, beans, and eggs group each day.
- encount Count how many servings from this group you eat for the whole day.
- enserv A serving is
- en211b2 2 to 3 ounces of cooked meat, fish or poultry
- en211b3 2 eggs
- en211b4 1 cup of cooked dried beans
- en211b5 4 tablespoons of peanut butter

2.11c

- en211c1 Meat, beans and eggs provide the body with protein, vitamins, and minerals.
- enplate To learn a little more about the things in these foods, touch one of the items on the plate.
- endone When you are done, touch the "NEXT" button.
- enprot Protein is important for your body to develop and grow. Starvation happens from not eating enough protein.
- envit Vitamins are important for the body to make energy and for children to grow properly.
- en211c2 Iron is important for the body's energy supply, and zinc is important for children to grow and develop.
- en211c3 Low fat choices include beans without added lard or fats, lean meats, and chicken and turkey cooked after the skin has been removed.

(THE FATS, OILS AND SWEETS GROUP)

2.12a

- en212a1 Items in the Fats, Oils and Sweets Group make up the very tip and smallest part of the Food Guide Pyramid and eating too much can lead to health problems.
- en212a2 Use choices from the top triangle of the Pyramid in small amounts or leave them out completely when possible. Remember that the circles and triangles remind us that foods throughout the pyramid may have added fats and sugars.

2.12b

- en212b1 This group includes "extras" which are added to foods, used in cooking or eaten for taste rather than nutritional value such as mayonnaise and salad dressings,
- en212b2 lard, oils, and shortening,
- en212b3 butter, margarine, and cream,
- en212b4 and soft drinks, gelatin desserts, and candies.
- en212b5 Eating too much fat and added sugar can lead to health problems such as heart disease, cancer, diabetes, hypertension, and obesity.

2.13

- en25b1 See if you can place the foods in the pyramid based on how much we should eat. First touch the food group, then drag them to the place on the pyramid where these foods belong.
- en2131 The foods will stay in the pyramid when you have placed the foods in the correct place.
- endrag Please drag these foods to a different section or touch my picture for help.
- endone When you are done, please touch the "NEXT" button.

2.14

- en2141 Great job! You have finished learning about the Food Guide Pyramid. If you would like a quick review, you may touch the pyramid.
- enmenu When you are done, please touch the "MENU" button to go to another section of the program.

2.14a

- en214a1 The Food Guide Pyramid is a good way to plan for healthy eating. It has 6 sections for the different food groups that have different nutrients your body needs to be healthy:
- en214a2 We should eat 6-11 servings from the Tortillas, Bread, Cereal, Rice, Pasta and Grains Group.
- en214a3 We should eat 3-5 servings from the Vegetable Group.
- en214a4 We should eat 2-4 servings from the Fruit Group.
- en214a5 We should eat 2-3 servings from the Cheese, Milk & Calcium Foods Group.
- en214a6 We should eat 2-3 servings from the Meat, Beans & Eggs Group.
- en214a7 We should choose sparingly from the Fats, Oils and Sweets Group.

(MAKE A CHANGE SCRIPT)

4.1a

- en41a1 How can you change your diet to improve your health?
- en41a2 Do you ever change the recipes or the way you cook to make food better for your health?
- enmore to hear more, please touch the "NEXT" button.

4.1b

- en41b1 A diet is just the food you eat from day to day.
- en41b2 Choose foods using the Food Guide Pyramid and prepare those foods in healthy ways.
- enmore To learn more, touch the "NEXT" button.

4.2

- en421 Healthy changes include:
- en422 decreasing fat to help lower the risk of heart disease, obesity, high blood pressure, and some cancers;
- en423 decreasing sugar to help lower the risk of obesity and tooth decay;
- en424 decreasing salt to help lower the risk of high blood pressure;
- en425 and increasing fiber to help lower the risk of heart disease and some cancers.
- en426 Most of the time the changes cannot be tasted. The foods may even taste better.
- en427 To learn how to eat more healthfully, touch the type of change you may be considering.

Enchange To choose another type of change, touch the measuring spoons

(FAT)

4.3

- en431 Have you thought about lowering the fat in your diet and in your recipes? What are some of your ideas?
- en432 Which foods will help this family eat less fat? Touch that group.
- en433 Great, these foods are lower in fat. Eat them more often.
- enagain Try again, eating these foods often may increase your risk for health problems.
- enmore To learn more, please touch the "NEXT" button.

4.3a

- en43a1 We all need to eat a small amount of fat each day because fat
- en43a2 supplies energy for the body,
- en43a3 protects important organs,
- en43a4 helps warm the body,
- en43a5 and helps carry vitamins to the body.
- en43a6 Small amounts of fats add to the taste, texture, and smell of foods.

4.3b

- en43b1 There are 3 main kinds of fat:
- en43b2 Saturated fats should be eaten in small amounts.
- en43b3 Polyunsaturated fats are a better choice than saturated fat.
- en43b4 Monounsaturated fats are the best choice of fat. For more information about the types of fat, touch one of the pictures.
- en43b2a1 Saturated fats are usually solid at room temperature, such as lard, shortening, butter and margarine. Cheese, and fats from meats and poultry also contain saturated fats. These fats may be responsible for the health problems that result from eating too much fat, especially heart disease.

en43b2a2 "Hydrogenated oils" are also saturated fats.

en43b3a Polyunsaturated fats are found in plant foods such as vegetables and corn, but not in meats. They are usually liquid at room temperature and, in small amounts, are better choices than saturated fats.

en43b4a Monounsaturated fats are found in avocados, nuts, canola oil and olive oil. Small amounts, used in place of the other fats, may actually lower the risk of heart disease and are the best choice of fat.

4.3c

en43c1 Too much fat in the diet can put you and your family at risk for many diseases including obesity, high blood pressure, diabetes, and heart disease. Protect your health by eating less fat.

en43c2 To hear tips about lowering the fat in your diet, your cooking and in recipes, touch a food in the picture with the yellow glow.

en43c3 Buy canned tuna and chicken packed in water instead of oil.

en43c4 Choose low fat sour cream or use plain yogurt.

en43c5a1 Replace the oil or shortening in baking recipes with low fat yogurt or unsweetened applesauce.

en43c5a2 Reduce fat in recipes by 1/3. If a recipe calls for 1 cup shortening, use 2/3 cup oil.

en43c6 Replace butter with margarine or oil to lower saturated fat.

en43c7 Use low fat forms of cheeses and cream cheeses. Hard, white cheeses such as parmesan, mozzarella, Farmer's cheese and feta are lower in fat than cheeses such as American, Monterrey Jack, and cheddar.

en43c8 Choose skim, 1% or instant non-fat dry milk.

en43c9a1 Cut off as much fat as possible. Broil, bake, poach or grill meats instead of frying.

- en43c9a2 Choose small amounts of fish, skinless chicken or turkey or lean cuts of meat.
- en43c9a3 Use spices and various vegetables to add flavor in place of lard, butter, and meat drippings.
- en43c9a4 or use lentils, split peas, or dried beans in foods such as burritos.

(SUGAR)

4.4

- en441 What do we need to know about added sugar and its effects on our family's health?
- en442 Which foods will help this family eat less sugar? Touch that group.
- en443 Great, these foods are lower in added sugar. Eat them more often.
- enagain Try again, eating these foods often may increase your risk for health problems.

4.4a (b)

- en44a1 Sugar provides flavor, moisture and texture to foods.
- en44a2 It also increases the tenderness and browning in baked goods.
- en44a3 Sugar acts as a preservative to keep food from spoiling
- en44a4 and helps yeast dough to rise.
- en44b1 White table sugar, honey, molasses, brown sugar, corn syrup, and maple syrup are all examples of sugars.
- en44b2 Check the label.

4.4c

- en44c1 Too much sugar in the diet leads to tooth decay and may increase the risk for obesity. You should use only moderate amounts of sugar.

- en44c2 You can help children learn to eat foods lower in sugar by giving them healthful, low sugar and low fat choices.
- en44c3 To hear a tip about lowering the sugar in your diet and recipes, touch a food in the picture with the yellow glow.
- en44c4 Choose canned fruit packed in juice instead of in syrup.
- en44c5 Choose milk, reconstituted non-fat dry milk, 100% fruit juice or water for meals and snacks. These foods have no added sugar and provide vitamins and minerals. Water is refreshing and important for good health.
- en44c6 Use $\frac{1}{3}$ less sugar in baked goods and pudding. A little extra spice such as cinnamon or nutmeg or some vanilla can be added for a sweeter taste. Reduce the amount of sugar you use when you freeze fruit.
- en44c7 Replace $\frac{1}{3}$ of sugar in baked goods with the same amount of fruit juice or applesauce or replace $\frac{1}{4}$ cup of sugar in a recipe with $\frac{1}{4}$ cup non-fat dry milk.
- en44c8 Choose fruit, cheese, breads, pretzels, or crackers for snacks or dessert instead of doughnuts, cookies, cake, gelatin, candy, or other sweets.
- en44a5 Many foods can be purchased which are low in sugar. Sugar substitutes can be used instead of sugar. This choice may be better for people who need to lose weight or can not eat sugar.

(SALT)

4.5

- en451 What do we need to know about added salt and its effects on our family's health? What kinds of foods have salt in them?
- en452 Which foods will help this family eat less salt? Touch that group.
- en453 Great, these foods are lower in salt. Eat them more often.
- enagain Try again, eating these foods often may increase your risk for health problems.

4.5a (b)

- en45a1 Salt has specific functions in foods. Salt provides flavor.
- en45a2 Salt acts as a preservative in meats and vegetables to help keep them from spoiling.
- en45b1 When reading food labels, any ingredient which has "sodium" as part of its name contains salt.
- en45b2 Salt and sodium are found in high amounts in processed foods like: lunch meats, canned vegetables and soups, and frozen meals.
- en45b3 Salt is also added to foods during cooking and at the table.

4.5c

- en45c1 Salt and sodium are linked to health problems caused by high blood pressure. It is recommended that people use only small amounts of salt and sodium.
- en45c2 To hear a tip about lowering the salt in your diet and recipes, touch a food in the picture with the yellow glow.
- en45c3 Choose fresh and frozen vegetables without added salt when possible.

- en45c4 Choose "low salt," reduced salt, or "low sodium" canned vegetables, soups, broths, and soy sauce.
- en45c5 Reduce or simply do not add salt to foods.
- en45c5a1 Do not reduce the salt in cured meats or in canned foods which will be stored for a long time, because the salt acts as a preservative keeping the foods safe to eat. Instead, reduce the amount of these foods you eat for better health.
- en45c6 Replace salt in meals, snacks, and recipes with herbs, spices, lemon or lime juice. Cut back on salt a little at a time to grow used to using less salt.
- en45c7 Do not use salt when cooking pasta, noodles, or rice.
- en45c8 Use garlic & onion powder instead of garlic & onion salt.
- en45c9 Bake tortilla pieces in the oven to make your own salt and fat free chips.

(FIBER)

4.6

- en461 What do we need to know about fiber and its effects on our family's health?
What foods are high in fiber?
- en462 Foods from which part of the pyramid will help this family eat more fiber? Touch that part.
- en463 Great,
foods from the bottom three sections of the pyramid usually have more choices with high fiber. Eat them more often.
- en464 There are some foods in the second row from the top of the pyramid which have fiber; foods from the bottom three sections of the pyramid have more choices with high fiber. Eat them more often.

4.6a

- en46a1 Fiber or roughage is very important for the body's digestive system and to lower the risk for some cancers and heart disease. A high fiber diet may also help people with diabetes control their blood sugar levels.
- en46a2 You should eat more high fiber foods such as whole grains, vegetables, and fruits for better health.

4.6b

- en46b1 Touch a group in the pyramid to learn about high fiber choices from that group.
- en46b2 Breads, tortillas, crackers, and muffins made with whole grains are very high in dietary fiber. Whole grain cereals such as corn flakes and oat meal are good sources of fiber. Bran, another excellent source of fiber, can be found in bran cereals, whole grain breads, and bran muffins.
- en46b3 Vegetables are also good sources of dietary fiber. Green beans, broccoli, cabbage, carrots, cauliflower, celery, lettuce, tomatoes, and squash are all high in fiber. Starchy vegetables like potatoes, yams, and corn also are good sources of fiber.
- en46b4 Most fruits are very high in dietary fiber. Fruits that can be eaten with the skin like apples, pears, peaches, plums, raisins, berries and apricots are especially high in dietary fiber.
- en46b5 Broccoli, greens like beet tops, leaf lettuce, and kale provide both fiber and calcium.
- en46b6 Pinto, black, kidney, and other beans are very good sources of dietary fiber. Dried peas and lentils also have large amounts of fiber.

Nuts such as almonds, peanuts, walnuts and sunflower seeds are very high in dietary fiber.

en46b7 Many high fiber foods are also low in fat.

(Activity)

4.7

en471 On this page you will be able to make healthy choices.

4.7a

en47a1 Touch a food that is high in fiber.

4.7b

en47b1 Touch a food that has less added sugar than fruit packed in syrup.

4.7c

en47c1 Choose something that can be used to season food instead of salt.

4.7d

en47d1 Touch a food that would be a better choice than a candy bar for a snack.

4.7e

en47e1 Touch a food that would be a better choice than fatty meat.

4.7f

en47f1 Choose something that can be used to sweeten food without adding extra sugar.

4.7g

en47g1 Touch an item that can be used in place of lard to reduce saturated fat.

entry Please try again.

enright That's right.

4.8

enreview Let's review this section.

en421 Healthy changes include:

en422 decreasing fat to help lower the risk of heart disease, obesity, high blood pressure, and some cancers;

en423 decreasing sugar to help lower the risk of obesity and tooth decay;

en424 decreasing salt to help lower the risk of high blood pressure;

en425 and increasing fiber to help lower the risk of heart disease and some cancers.

en481 Small changes go a long way towards better health for you and your family.

ennewsec Press the menu button to go to another section of the program

Appendix H:

Project II:

Proposed Scripts for Remaining Interactive Multimedia Modules:

"Make It Fun", "Make It Safe", and "Make A Plan"

(Make It Fun)

3.1a

en31a1 Do your children have healthful eating habits?

en31a2 What can you do to *guide* their eating habits?

3.2b

en31b1 Parents influence how and what children eat by

en31b2 by being a good example,

en31b3 and by offering healthful choices.

enmore To hear more, please touch the next button.

en31b4 Food is very important for children. Eating habits of children are affected by many things:

en31b5 the size

en31b6 shape

en31b7 the taste & smell,

en31b8 food temperature,

en31b9 family and friends,

en31b10 meal schedules.

en31b11 and advertisements

3.2

en32 Children's favorite foods are changed often and for no reason.

Parents who consider a child's food usually.

en32a have children who will try new foods.

en32b experience pleasant meal times.

en32c serve children safe foods which do not cause choking.

3.3

en331 When planning meals and snacks for children think about

en331a color and texture

en331b shape and size and

en331c using the Food Guide Pyramid.

en331d By doing these things, your child will eat a variety of foods with plenty of vitamins and minerals.

en332 To hear more about color and texture, touch the blue plate.

en333 To hear more about size and shape, touch the green plate.

en334 To hear more about how to fit foods from the pyramid, touch the red plate.

(Color & Texture)

3.4

- en341a Foods come in many wonderful colors. Bright and varied colors make meals and snacks fun!
- en341b A variety of textures creamy to crunchy, smooth to hard can make meal time fun and interesting.

- en342a Carrot sticks and green pepper slices are healthy additions to the dinner plate or great for snacks.
- en342b Fruit bowls including strawberries, peaches, and bananas are colorful snacks or desserts.
- en342c Creamy foods include low fat yogurt and peanut butter.
- en342d Crunchy foods such as graham crackers, carrot sticks and broccoli, and dry, low-sugar breakfast cereal are fun.
- en342e Blend frozen fruit and orange juice for a slushy, healthy treat, a smoothie.

- en343a Combine textures and colors to increase meal and snack fun and interest.
- en343b Use low fat yogurt as a dip for fruit.
- en343c Spread peanut butter on apples or carrots or celery.
- en343d Spread pudding between 2 graham crackers.

- en344 How else can you use color and texture to make meal and snack time more fun and interesting for your children?

- en345 Children love to help choose and prepare meals and snacks! They can pick colors and textures, wash vegetables, and peel bananas. They are more likely to eat what they have helped prepare.

(Size and Shape)

3.5

- en35 The size and shape of food can increase your child's interest. Size and shape also can be a safety factor.

- en35a1 Small sizes are easier for children to hold and chew. Children are small and have small hands and fingers. Children have small stomachs and eat smaller portions. Small dishes and utensils help children eat more easily.

- en35b1 Foods can be shaped in fun and unique ways.

- en35b2 Try serving a sandwich cut into strips for a change.
Cookie cutters can be used to shape sandwiches and pancakes.
- en35b3 Fruit and vegetables can be arranged into faces.
- en35c Foods which are the size of children's throats and wind pipes can become lodged. These shapes and sizes should be avoided.
- en35c1 Dangerous foods include
Hard round foods such as hard candy, whole grapes, hot dogs or carrot cut into circles, nuts and foods that must be chewed to children before age two.
- en35c2 cookies, apples, and meat which has not been completely chewed.
- en35c3 and foods with a slippery surface such as peanut butter
- en35d1 How can a parent or care giver help keep mealtime safe for children?
- en35d2 Make sure pieces of food are a safe size and shape.
Cut carrots and hot-dogs into strips instead of circles.
- en35d3 Keep dangerous foods away from young children such as nuts.
- en35d4 Make sure children are sitting up while eating.
- en35d5 Children should not be trying to eat while crying, laughing, talking, running or playing.
- en35d6 Encourage children to chew food completely before swallowing.
- en35d7 Learn what to do if a child does choke.
- en35d8 Vary shapes and sizes in a meal from day to day to keep children interest in foods. Remember to keep the size and shape safe.

cookies, apples, peanut butter, and meat which has not been completely chewed.

These foods and other dangerous foods all have a small, round shape, a firm or hard texture, and a slippery surface.

(Snacks & the Pyramid)

3.6

- en361 Think about where your children's snacks fit into the Food Guide Pyramid.
- en362 Even snacks fit into the Food Guide Pyramid.
- en363 Healthful snacks can be made fun to eat.

- en364 Snacks are an important part of your child's diet.
- en365 Use the Food Guide Pyramid to choose foods for snacks - just like for meals.
- en366 Choose more foods from the base of the Food Guide Pyramid in the Tortillas, Breads, Grains, and Pasta group.
- en367 Next use fruits and vegetables as snack foods.
- en368 Add foods from the Cheese, Milk and Calcium Foods Group and the Beans, Meats and Eggs Group.
- en369 Make choices from the Oils, Fats & Sweets at the top of the Pyramid sparingly. Snacks such as candy bars and soft drinks, do not have many of the things your children's body needs to grow and stay healthy.

SNACKS ARE IMPORTANT

- en37a Remember color, texture, size, shape, variety, and safety!
- en37b Combine a variety of sizes and shapes for children to eat.
- en37c Small food pieces are easier for children to handle.
- en37d Foods can be cut or arranged into fun shapes.
- en37e The size and shape of food must be safe for children.
- en37f Make snacks fit into the Food Guide Pyramid.
- en37g Snacks are an important part of your child's diet.
- en37h Children love to help!

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(MAKE A PLAN)

6.1

- en61a Does your food money last until the next pay check?
- en61b Do you compare prices and read shelf and package labels?
- en61c Touch the "NEXT" button to learn more about smart shopping.

6.2

- en62 Smart shopping is to:
 - have a spending plan;
 - buy only what is needed;
 - buy items that cost less;
 - use labels to choose low cost healthful foods;
 - apply for and use food assistance and other community program when needed.

6.3

- en63 Smart shopping includes several key steps:
- en63a Step #1: Make a plan for shopping.
- en63b Step #2: Budget the household money.
- en63c Step #3: Use package labels to increase nutrition and save money..
- en63d Step #4: Compare the prices of items in the store.
- en63e Touch one of the steps to learn more about smart shopping.
- en63f To return to the steps at any time in Make A Plan, touch the shopping bag on the left.

6.4

- en654 Make a plan for grocery shopping.
Planning ahead can save you much money, time and extra trips to the grocery store.
- en64a ✓Check the food you already have on hand including leftovers.
- en64b ✓Read the newspaper ads for the discounts in the stores.
- en64c ✓Plan for breakfast, lunch, dinner and snacks for a week.
- en64d ✓Make a shopping list and stick to it.
- en64e ✓Use coupons only for items on the list.

6.5

- en65 Budget your money for grocery shopping.

A budget is simply a spending plan to help in managing the household money.

- en65a Figure how much money you have to spend.
Figure monthly household expenses such as rent, car, and medical expenses.
Figure the amount of money left to spend on food.
Leave some money aside for emergencies, if possible.
- en65b Remember to consider food assistance programs.
If there is not enough money for all the food the family needs, programs such as WIC or Food Stamps might mean better nutrition for the entire family.
- en65c Follow the budget in the shopping plan.
Emphasize in your weekly menu foods that are on sale.
Start with the less expensive foods at the base of the Food Guide Pyramid. These foods offer many important vitamins and minerals and often cost less money.
Use the foods received from food assistance programs in your menus.
Use coupons wisely. Coupons should be used only for items which will be bought anyway. Switching to a less expensive brand of the item may save more money.
Buy fruits and vegetables in season.
Include meatless meals in your menus. Use the Food Guide Pyramid to substitute expensive meats with less expensive foods such as dried beans, eggs and peanut butter.

6.6

- en66 **Use the labels and compare prices on shelves and packages. Packages of food in stores are required by law to have a food label. This label must give very specific information about the food inside the package. It can help you choose healthy foods.**
A black box with the title of "**Nutrition Facts**" is located on all food packages.
serving size & servings per container
calories
daily value, and
other specific nutrients like total fat, total carbohydrates, protein, sodium, dietary fiber, sugars, and vitamins & minerals

- en66a **Check the *Serving Size* and *Servings Per Container*.**

The information on the label is given per serving. The Serving Size is based on what a person would normally eat. If you eat more than the Serving Size listed, you must increase the amounts of nutrients accordingly.

This can of soup tells that a Serving Size is 1/2 cup and that there are 6 servings in this container

en66b Check the *Calories* in a serving of the food.

A *Calorie* is a measure of the amount of energy in a food. The food label tells the amount of calories in one serving of the food

en66c Check the % *Daily Value* for each nutrient

Daily Value means the amount of a specific nutrient that a healthy person should eat for a day. % Daily Value means the percent of that amount which is given by one serving of the food in the package.

en66d You can tell if the amount of specific nutrients in a serving of the food is high or low.

Check for:

- | | | |
|-----------------|-----------------------|-----------------------|
| • Total Fat | • Total Carbohydrates | • Sodium |
| • Saturated Fat | • Dietary Fiber | • Protein |
| • Cholesterol | • Sugars | • Vitamins & Minerals |

6.7

en67 Compare prices of brands, packaging, and quantities.

en67a Labels.

* Check the Shelf Label or Package Price Label to compare the price of the products. Unit pricing tells how much the product costs per unit rather than per package because packages are made up of different amounts of food.

Look at the unit pricing of packages and compare this price rather than the package price to see which is the better buy.

Shelf Labels and Package Price Labels tell the following information:

en67a1 The price of the package:

en67a2 The unit the food is measured in:

- en67a3 **The price per unit:**
- en67a3a The **shelf label or package price label** takes the price of the food and divides it by the amount of food in the package to get a **price per unit**.
- en67a3b For example, if one can of beans \$1.59 for 16 ounces, the unit price is 9.9 cents per ounce. If a second can of beans is \$1.49 for 12 ounces, the unit price is 12.4 cents per ounce. At first glance, the second can of beans seems like a better buy because it costs less money. However, the first can of beans is really the better buy. 9.9 cents per ounce is less expensive than 12.4 cents per ounce.
- en67b *** Different brands and types of packaging of the same product cost different amounts.**
- en67b1 Generic and local store brands are cheaper than national brands (**name brands**). Usually, there is no difference in quality of food or nutrition content.
Simple packaging often costs less money. Check the price per unit to decide which package is less expensive.
- en68b2 **Watch for sales. Sales can sometimes save money even on national brands.**
- en68b3 **Buy fresh fruits and vegetables in season when they are cheaper. "In season"** means in the same season in which they are grown. Beans, celery, lettuce, cabbage, onions, potatoes, and carrots are grown all year long.
- en68b3a January, February and March are good months to buy apples, oranges, grapefruits and artichokes.
- en68b3b April, May and June are good months to buy artichokes, asparagus, Pineapples, corn, strawberries, tomatoes, berries, cherries, plums, melons and trout (in Colorado).
- en68b3c July, August and September are good months to buy berries, cherries, corn, grapes, lemons, limes, melons, nectarines, peaches, plums, tomatoes, and cauliflower.
- en68b3d October, November and December are good months to buy apples, brussels sprouts, cauliflower, cranberries, pears, pumpkins, sweet potatoes, and winter squash.

- en68b4 **Compare prices of fresh, canned and frozen fruits and vegetables to decide which is best to buy. "Choose fruits packed in light syrup" or "packed in its own juice and vegetables low in salt".**
- en68b5 **Convenience foods usually cost more. Compare prices with the same food prepared at home or packaged in a different way.**
- en68c **Coupons can sometimes save a shopper money; however, they can also cause you to spend more money.**
- en68c1 **Make out a shopping list before choosing coupons. Then clip coupons for the items you have on the list.**
- en68c2 **Compare the price of the food using the coupon with a cheaper brand of the product or a special sale. Many times switching to a cheaper brand saves more money than using a coupon.**
- en68c3 **Learn when specials and coupons can save money and when they cause people to spend more money. Coupons save you money only if you are planning to buy that specific item anyway and there is not a less expensive choice available.**
- en68d1 **Buying in larger quantities often saves money.**
- en68d2 **Make sure you can use all of the product immediately or store what is not used safely before it spoils or gets too old.**

6.9

- en69 **Plan ahead for shopping by**
- Making a food budget**
 - Checking to see what food is already in the kitchen**
 - Knowing what food resources are available from the community**
 - Looks for special discounts in the store**
 - Planning the menu for the week**
 - Wisely using coupons**
 - Making a shopping list and sticking to it**
 - At the store, smart shoppers use the information provided by reading package labels to choose economical and healthy choices.**
 - At the store, smart shoppers read shelf labels to choose economical choices.**

(MAKE IT SAFE)

- 5.1 Have you ever had a foodborne illness? What happens to you?
- 5.2 Foodborne illness, or food poisoning, means getting sick from germs in foods. A germ is a tiny bacteria or mold living inside of food, living on dirty objects and floating in the air. Most germs cannot be seen.
- en52a Foodborne illness is a major cause of illness in the U.S. Each year, millions of people get sick from food, thousands die, and millions of dollars are lost from lost wages at work due to foodborne illness
- en52b Foodborne illnesses may weaken the immune system. Infections can occur more easily. These infections can become life threatening, especially in some people:
- children • the elderly • pregnant women
 - people who have a weakened immune system from diseases such as diabetes, AIDS and other infections
- en52c Many people who think they have the flu may have a foodborne illness because the **symptoms** are very similar. These are headache, fever, chills, stomach ache, vomiting, and diarrhea.
- en52d PREVENTION is the key to protecting people from foodborne illness. People who practice safe food habits which help protect against foodborne illnesses often:
- protect their family from inconvenient, uncomfortable and possibly life threatening illnesses
 - save money in medical bills
 - save money in lost wages from missing work
 - save money from spoiled and wasted food
- 5.3 The people in the family who shop for food, store the food and prepare the food should follow **four important, yet simple, steps to protect families against foodborne illness.**
- en53a **STEP #1:** Check the containers before you buy food and before you eat food from them.
- en53b **STEP #2:** Keep cold food cold.
- en53c **STEP #3:** Keep hot food hot.
- en53d **STEP #4:** Keep it clean.

Time: Food should be left at room temperature for not more than 2 hours.

Temperature: Food should be kept at a temperature over 140°F or below 40°F. Room temperature is around 70°F.

5.4 There are many things a wise shopper can look for when buying foods:

- damage to containers
- expiration dates
- a bad odor,
- visible molds or bacteria,
- an unusual color of the container or the food inside

54a Check for damage to containers.

- tears • dents • bulges • holes
- leaks from seams or openings
- When the container is damaged, the germs which make people sick can get into the food.

Do not buy foods which have been discounted because the container is damaged.

en54b Check the expiration date on the container.

Buy only as much food as you can store and eat before the "use by" or expiration date shown on the container to keep your family healthy and so that food is not wasted. Check your shelves at home, too. "Sell by" dates tell the consumer that the food will probably be good to eat for a few days after this date. However, the food should not be sold by the store after this date.

en54c Check for bad odors.

Spoiled food smells bad. Never taste or eat food which does not smell fresh. Remember, a food can be spoiled without smelling bad, too. If in doubt, throw it out.

en54d Check for molds or bacteria that you can see.

Molds and bacteria cause illnesses in people when eaten. Remember that a food can make people sick even if the mold or bacteria cannot be seen. Never eat or even taste foods which may be spoiled.

Another sign is a discoloration or unusual color of the container. If you do not know if the food is still good, throw the food out.

KEEP COLD FOODS COLD

- 55 **Do you have a refrigerator that works well?
How do you thaw food that is frozen?**

Molds and bacteria live and grow very well between the temperatures of 140°F. and 40°F. Room temperature is around 70°F.

- **Keep cold foods cold.**
- **Refrigerate food immediately.**
- **Wrap meats separately.**
- **Keep foods frozen at 0°F. in the freezer.**
- **Thaw frozen food in the refrigerator.**
- **Refrigerate bread.**

- 55a **Keep foods cold in the refrigerator at a temperature of 40°F. or less.**

Store food in shallow, covered containers.

Leave airspace between containers in the refrigerator.

- 55b **Refrigerate food and leftovers immediately.**

Never leave food out for more than 2 hours (including preparation and serving time) to protect from illness. If the room temperature is very warm, the time that food can safely stay out of the refrigerator is even less.

Refrigerate leftovers immediately in small, shallow, completely covered containers.

- 55c **Wrap meats separately and refrigerate eggs.**

Sometimes the juice of meat can leak onto other foods in the freezer or refrigerator. This leaking can cause germs to be spread to other foods.

Wrap meats separately and place on a plate or in a pan to protect other foods from juices that drip.

Place meats on the bottom shelf of the refrigerator or in the separate meat compartment to prevent dripping.

Refrigerate eggs.

- 55d **Keep foods frozen at 0°F. in the freezer.**

Check the freezer to see if the temperature is below 0°F.

Before freezing, wrap foods tightly in air tight containers.

Leave some air space for cold air to flow between the containers of food for faster cooling

55e **Thaw frozen food in the refrigerator.**
Frozen food can be thawed safely in the refrigerator.
Thawing frozen foods on the counter is dangerous because it allows the outside of the food to be too warm for too long.
Germs which cause illness collect on the outside of food.

55f **Refrigerate bread.**
Bread molds easily in warm temperatures.
Bread will last longer if kept cool.

KEEPING FOODS HOT

56 **Do you always cook your food completely?**
Do you ever eat raw meats or eggs?
Do you keep foods hot while waiting to eat?

- **Keep hot food at 140°F.**
- **Cook meats, poultry and fish completely at a temperature over 165°F.**
- **Cook eggs completely.**

56a **Keep hot food at 140°F.**
A high temperature will kill the germs which cause illness from getting into the food. Remember, germs which cause illnesses live best at warm temperatures between 40°F. and 140°F. Room temperature is around 70°F. If foods are to be kept warm for more than an hour, the temperature must be higher than 140°F to keep them safe from dangerous germs.

56b **Cook meats, poultry, fish and seafood completely.**
Meats and poultry should not be pink in the middle.
Fish should flake easily with a fork and be completely white when cooked enough.
Do not taste raw meat, poultry, fish, or seafood or eat dishes with these raw foods.

56c **Cook eggs completely.**
Cook eggs completely before eating for safety as well. Germs which cause illnesses live inside of raw and undercooked eggs.
Do not eat foods such as cookie dough and cake mix which contain raw eggs.

Wash dishes, utensils, counters & cloths with hot, soapy water before using them to prepare food or to eat food and after they have touched raw meats, fish, poultry, seafood or raw eggs. Sponges are easier to keep clean because they dry out easier which kills many of the germs causing illnesses. Keep towels used for drying dishes and utensils clean.

57c

Use separate cutting boards for meats.

When meats are cut on a cutting board, dangerous germs get into the tiny holes of the board and hide.

If a vegetable or piece of bread is then placed on the board, the germs move onto the new food which may be eaten without cooking.

A person eating the vegetable or piece of bread can easily become sick with a foodborne illness.

It is best to use a cutting board for foods which will be cooked and a separate cutting board for foods which will not be cooked before being eaten.

A cutting board should be washed completely with hot soapy water to help kill any germs which have been left.

57d

Keep everything sanitary.

Sanitary means more than washing with hot, soapy water.

Use a sanitizing solution to kill the germs that cause foodborne illnesses.

A sanitizing solution is made by mixing 1 tablespoon of chlorine bleach with one gallon of water.

Keep the bleach solution next to the soap in the kitchen.

Use the sanitizing solution often to clean utensils, dishes, counters, tables, dish cloths or sponges, cutting boards, and anything else in the kitchen which may contain germs.

Make sure that the bleach solution is kept out of reach of children. It is dangerous for children to drink bleach. Chlorine bleach is not dangerous to children when used to clean utensils, dishes, and other items. Bleach will also discolor clothing.

- **Wash your hands.**
- **Keep the dishes and wash cloths clean.**
- **Use separate cutting boards for meats.**
- **Keep everything sanitary.**

Do not use eggs if they are cracked as they are more likely to contain dangerous germs.

KEEP IT CLEAN

- 57** **How do you clean your kitchen?**
Do you always wash your hands before you prepare food?
Do you use bleach to sanitize utensils and counters?

Germs can be transferred from one infected object to another. Many of the dangerous germs can be killed by washing items with hot, soapy water for at least 20 seconds.

However, washing alone does not kill all of the germs. A sanitizing solution kills the germs which prevents them from being spread to people eating food.

- Wash your hands
- Keep dishes and dish cloths clean
- Use separate cutting boards for meats
- Keep everything sanitary

Sick people should not prepare food. There is a good chance that the people who eat food prepared by a person who has an infection will also get the infection.

- 57a** **Wash your hands.**
Use hot, soapy water and wash for at least 20 seconds.

- before touching utensils and food,
- after touching raw foods and animals,
- after changing diapers,
- after going to the bathroom,
- after sneezing or blowing your nose,
- after smoking, and
- often when you are sick with an infection.

Encourage children to get into the habit of washing their hands often with warm soapy water.

- 57b** **Keep the dishes and dish cloths clean.**

SUMMARY

- 58 Make food safe for you and your family. Practice food safety habits to prevent foodborne illnesses.**
- 58a (STEP #1): Check containers for:
Expiration date or "use by" date, Damage to the container,
Leaks, Bad odor, and Molds and bacteria.**
- If you do not know that a food is safe, throw it away!**
- 58b (STEP #2): Keep cold foods cold.
Keep frozen food at 0°F, Wrap meats separately, Thaw frozen food in the refrigerator, not on the counter, Keep cold foods cold, Refrigerate foods immediately, and Refrigerate bread.**
- 58c (STEP #3): Keep hot food hot.
Keep hot food at 140°F, Cook meats, poultry, fish and seafood completely, and Cook eggs completely.**
- 58d (STEP #4): Keep it clean.
Wash your hands, Keep the dishes and wash cloth clean, Use separate cutting boards for meats, and Keep everything sanitary.**

Appendix I:

Project II:

Surveys



LA COCINA SALUDABLE
The Healthy Kitchen

SURVEY

DATE: _____

TOWN: _____

ENTRY _____
POST _____
FOLLOW-UP _____

PARTICIPANT NAME: _____
(Please Print)

PARTICIPANT PHONE NUMBER: _____

ABUELA EDUCATOR & PHONE NUMBER: _____
(Where applicable)

This material is based upon work supported by the Extension Service, U.S. Department of
Agriculture, under special project number 93-0507; XCM, 500, 1995.

**LA COCINA SALUDABLE PARTICIPANT
PERSONAL INFORMATION**
(Please Print)

Name: _____

Address: _____

Are you _____ female? _____ male?

Where were you born: _____

How long have you lived in this area? _____

Where were your parents born? _____

Do you speak Spanish in your home? _____ yes _____ no

Do you speak English fluently? _____ yes _____ no

How much education do you have?

_____ High School Diploma	_____ Some College Credit
_____ Associate Degree	_____ Bachelor Degree
_____ Masters Degree	_____ Certificate: _____
_____ Other: _____	

Have you ever used any of the following community services? (Check all that apply.)

_____ WIC	_____ USDA Commodities Food Program
_____ EFNEP	_____ BOCES
_____ SHARE Colorado	_____ Migrant Health Services
_____ Head Start	_____ Food Stamps
_____ Other: _____	

What is your age? _____ under 18 years _____ 31 - 40 years _____ 51 - 60 years
 _____ 18 - 30 years _____ 41 - 50 years _____ over 60 years

What is your annual income? _____ less than \$10,000 _____ \$20,001 to 30,000
 _____ \$10,000 to \$20,000 _____ over \$30,000

What do you do for a living? _____

How many children do you have? _____ What are their ages? _____

Please answer the following questions and check the box that best applies.

How often...	Do not do	Seldom	Some-times	Most of the time	Almost always
1. do you eat low-fat food instead of a regular food?					
2. do you add salt to your foods?					

3. Which of the following foods is the best snack choice for Vitamin A?

- a. milk
- b. meat
- c. tortillas
- d. carrots
- e. I don't know

4. Which of the following foods is the best snack choice for Vitamin C?

- a. oranges and peppers
- b. cheese and milk
- c. rice and beans
- d. fish and beef
- e. I don't know

5. Check all of the foods on the list below which are good sources of fiber.

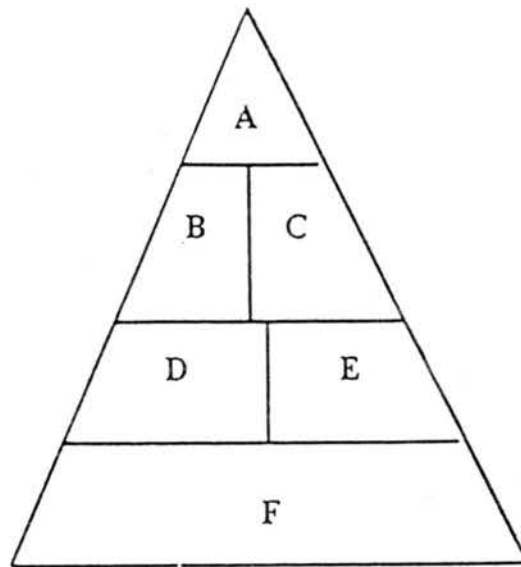
- ___ dried beans
- ___ fruits
- ___ yogurt
- ___ cheese
- ___ whole wheat bread
- ___ brown eggs
- ___ corn tortillas

- ___ whole grains
- ___ tuna
- ___ vegetables
- ___ chicken with skin on
- ___ beef
- ___ corn
- ___ potatoes

6. This is the Food Guide Pyramid.

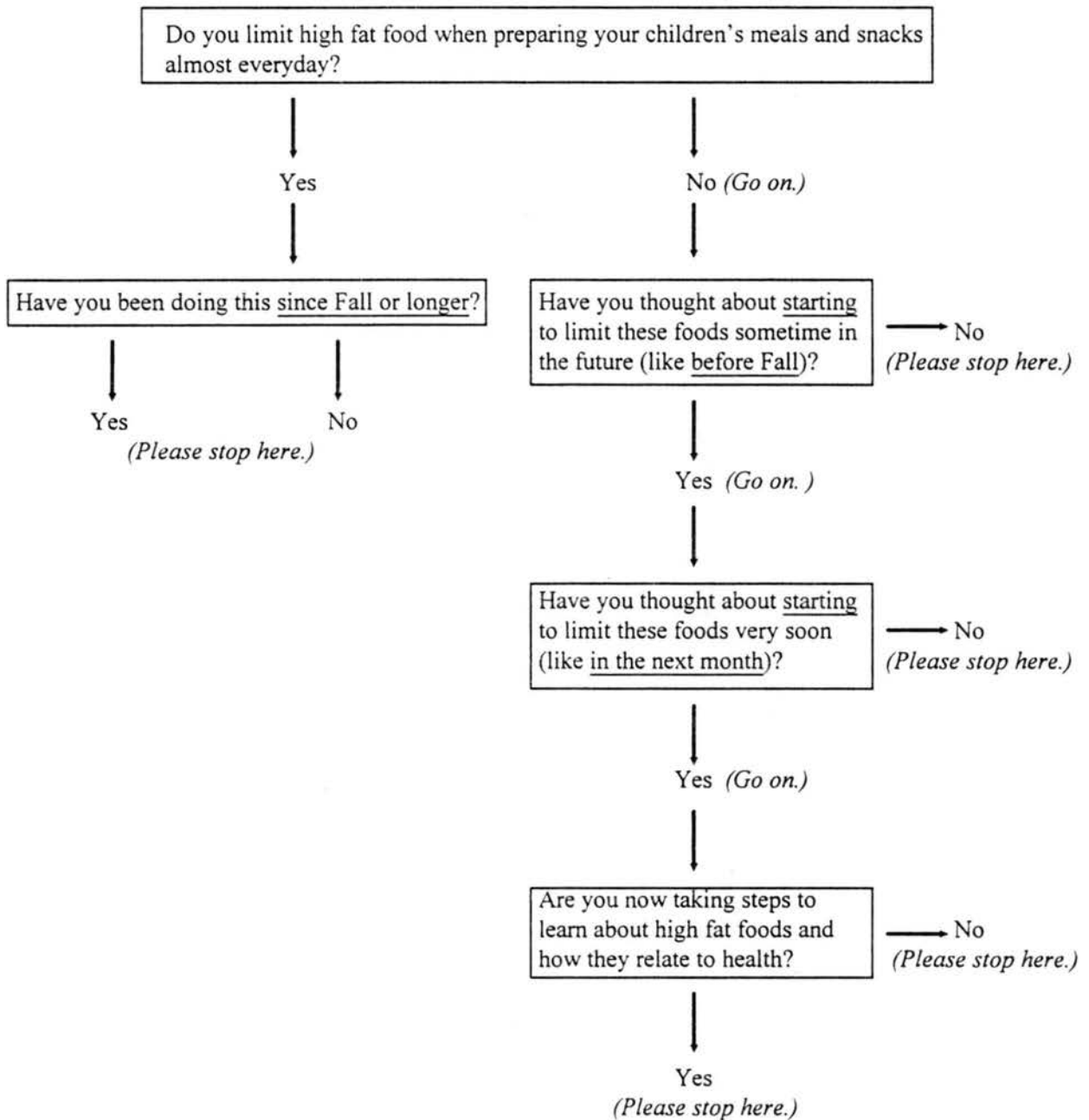
1. Name the major foods found in each section of the Food Guide Pyramid. List each section's major foods under the "Major Foods in the Group" column.
2. Then tell how many servings are recommended from each group. List the number of servings under the "Recommended number of servings" column.

Use this diagram of the Food Guide Pyramid below to identify the sections of the Pyramid.



Pyramid Section	Major Foods in the Group	Recommended number of servings
A		
B		
C		
D		
E		
F		

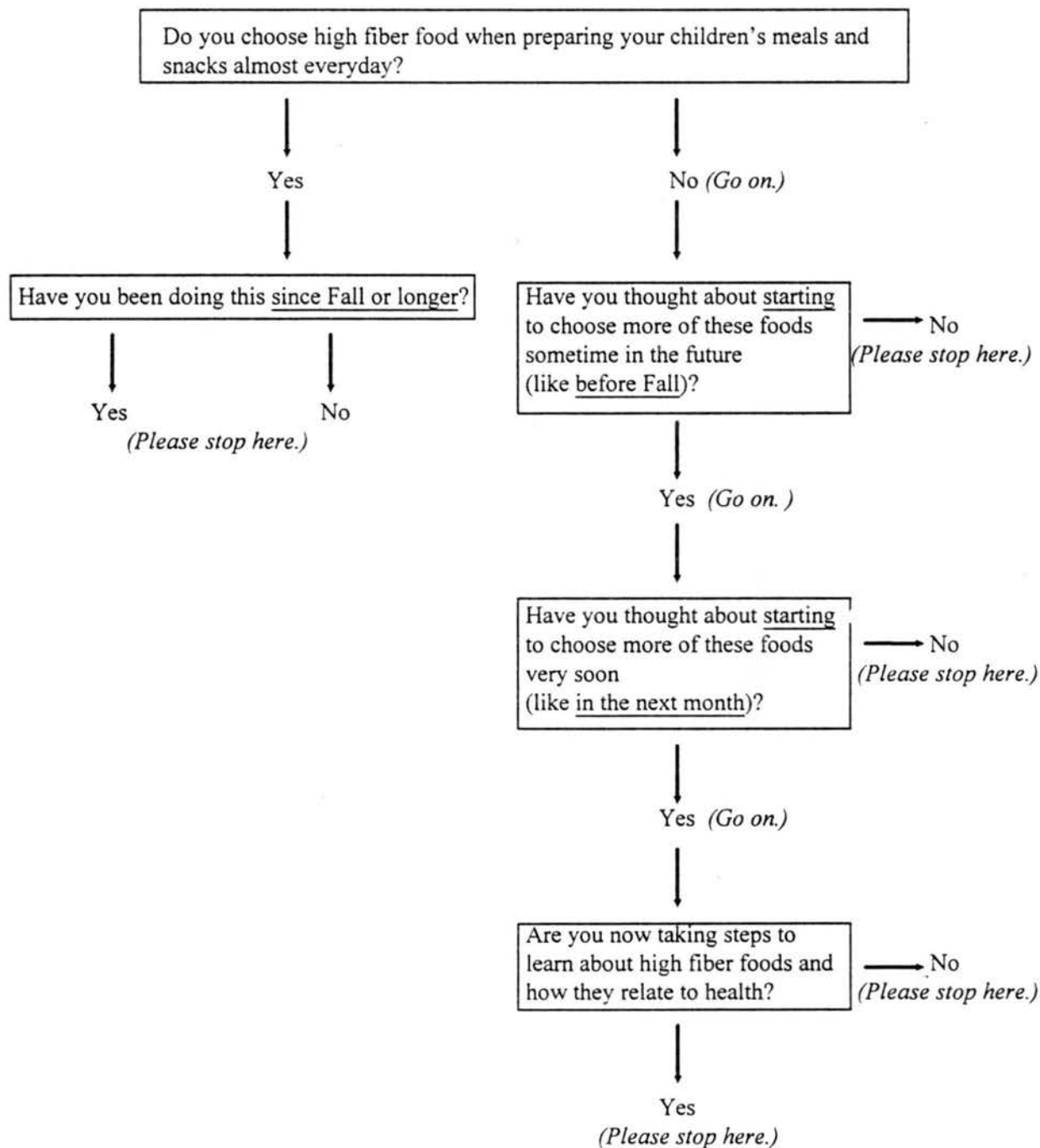
7. High fat foods include:
- | | | |
|------------------------------------|--------------|------------|
| whole milk | sour cream | lard |
| fatty meats | cream cheese | cream |
| ice cream | fried foods | mayonnaise |
| meat drippings added to vegetables | | |



8. High fiber foods include: cereals
pasta
fruits

oatmeal
noodles
vegetables

corn tortillas
whole grains
dried beans





LA COCINA SALUDABLE
The Healthy Kitchen

CUESTIONARIO

FECHA: _____

LUGAR: _____

ENTRADA _____
SALIDA _____
DESPUÉS DE DOS SEMANAS _____

EL NOMBRE DE LA PARTICIPANTE: _____
(Use Letras de Molde)

TELÉFONO: _____

INSTRUCTOR(A) Y NÚMERO DE TELÉFONO: _____
(Si aplique.)

Ese material es apoyado por el Servicio Extensión, el Departamento de Agricultura de los E.E.U.U., el numero del proyecto 93-0507; XCM-185, 500, 1995.

LA COCINA SALUDABLE
LA INFORMACIÓN DE LA PARTICIPANTE
(Use Letras de Molde.)

Nombre: _____

Dirección: _____

Sexo _____ mujer _____ hombre

¿Donde nació Ud?: _____

¿Por cuanto tiempo ha vivido Ud. en esta rea/region? _____

¿Donde nacieron sus padres? _____

¿Habla Ud. español en su casa? _____ sí _____ no

¿Habla Ud. español bien? _____ sí _____ no

¿Qué tanto escuela ha cumplido Ud.?

_____ Colegio	_____ Pocas clases en la universidad
_____ Dos años de la universidad técnica	_____ Licenciado (en la universidad)
_____ Maestría	_____ Certificado: _____
_____ Otro: _____	

¿Ha usado Ud. cualquier de estos servicios?

_____ WIC	_____ Comestibles suplementales del USDA
_____ EFNEP	_____ BOCES
_____ SHARE Colorado	_____ Servicios de salud para migratorios
_____ HeadStart	_____ Estampas para comidas / Food Stamps
_____ Otro: _____	

¿Cuantos años tiene Ud.? _____ bajo de 18 años _____ 31 - 40 años _____ 51 - 60 años
 _____ 18 - 30 años _____ 41 - 50 años _____ más de 60 años

¿Cuanto dinero gana Ud. cada año? _____ less than \$10,000 _____ \$20,001 to 30,000
 _____ \$10,000 to \$20,000 _____ más que \$30,000

¿Que hace Ud. para trabajo? _____

¿Cuantos niños tiene Ud.? _____ ¿Qué son las edades de sus niños? _____

Favor de preguntar a la participante las siguientes preguntas y marcar el cuadrado correcto.

Que tan seguido...	Nunca	Casi Nunca	A Veces	Muchas Veces	Casi Siempre
1. come Ud. la comida menos en la grasa en cambio de la comida "regular"?					
2. añade Ud. la sal a su comida?					

3. ¿Marque la comida que es la mejor bocada ("snacks") cuando considera Ud. la vitamina "A"?

- a. el leche
- b. el carne
- c. las tortillas
- d. las zanahorias
- e. No sé

4. ¿Marque la comida que es la mejor bocada cuando considera Ud. la vitamina "C"?

- a. las naranjas y las pimientas
- b. el queso y el leche
- c. arroz con frijoles
- d. el pescado y el carne
- e. No sé

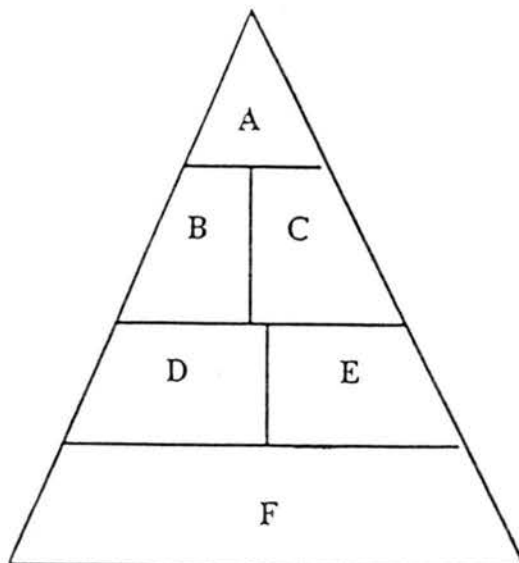
5. Marque las comidas en la siguiente lista que tiene mucha fibra:

- | | |
|--|---|
| ☐ frijoles secados | ☐ los granos íntegros |
| ☐ la fruta | ☐ el atún |
| ☐ el yogurt | ☐ los vegetales / las verdaduras |
| ☐ el queso | ☐ el pollo con el pellejo |
| ☐ el pan trigo | ☐ el carne |
| ☐ los huevos | ☐ el maíz |
| ☐ las tortillas de maíz | ☐ las patatas / las papas |

6. Esa es la Pirámide Guía de Comidas.

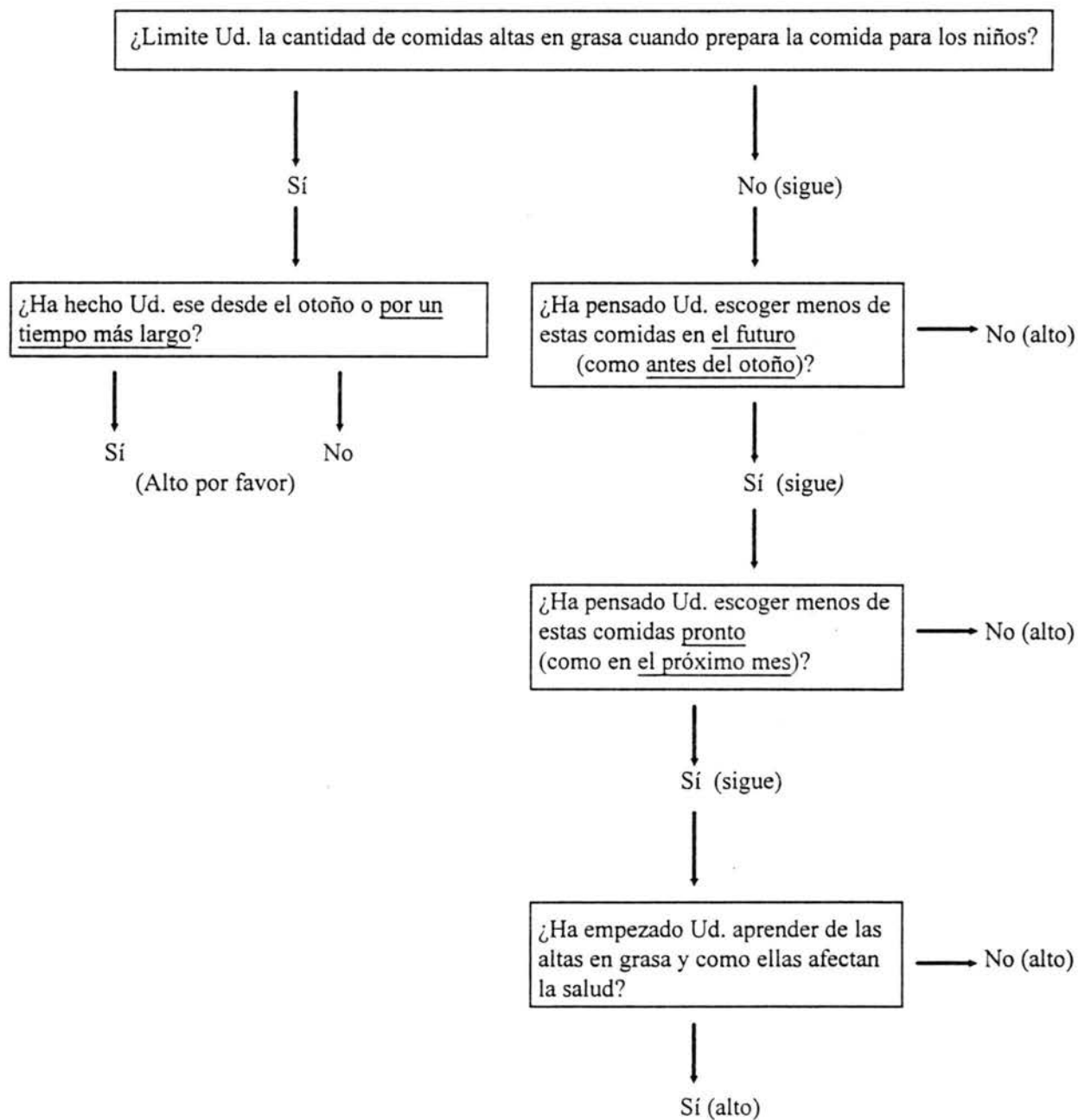
1. ¿Qué son los grupos (secciones) principales de las comidas en la Guía Pirámide? Haga una lista de los grupos de las comidas abajo de la columna " Grupos de comida de la guía".
2. ¿Cuántos porciones/servidas son recomendadas por cada grupo? Haga una lista con el número de las porciones/servidas recomendadas abajo de la columna "porciones recomendadas".

Aquí es la Pirámide para referencia.

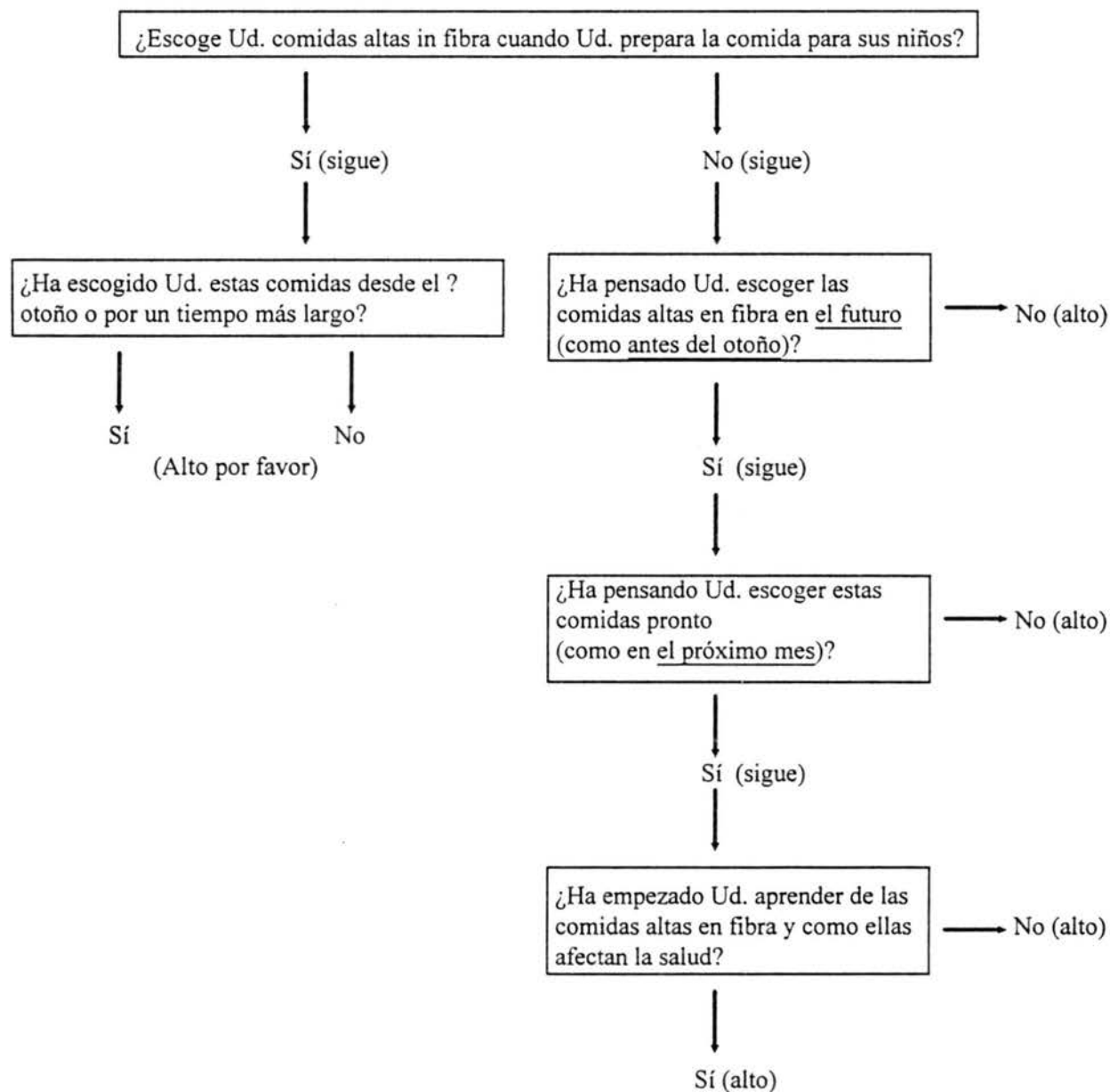


Sección de La Pirámide	Grupos de comida de la guía	Porciones recomendadas
A		
B		
C		
D		
E		
F		

7. Las comidas altas en grasa incluyen: leche ("regular") manteca (de cerdo) chicharrones
carne gordo queso de nata crema
helado las comidas fritas mayonesa



8. Las comidas altas en fibra incluyen:
- | | | |
|-------|----------------------|-------------------|
| arroz | cereales | avena |
| pasta | fideos | granos integrales |
| fruta | vegetales / verduras | frijoles |



COLORADO STATE UNIVERSITY

Please circle the face that shows how you feel about the *La Cocina Saludable* program.

Was the touch screen easy to use?



Did you like using the touch screen?



Did the pictures make sense to you?



Was the program easy for you to use?



How did you like the program speed?



What things about nutrition do you remember the most?

What would you change?

Any other comments?

Thank you very much for your time and your help!

LA UNIVERSIDAD DEL ESTADO COLORADO
Colorado State University

Marque la cara (expresión) que representa como Ud. sienta sobre el programa *La Cocina Saludable*.

¿Fue la pantalla (de tacto sensible) fácil usar?   

¿Le gustó usar este tipo de pantalla?   

¿Entendí los fotos?   

¿Le encontró el programa fácil seguir?   

¿Como le gustó la velocidad del programa?   

¿Cuales cosas sobre nutrición y comida recuerdan las más?

¿Cuales cosas cambiarían?

¿Otros sugerencias o ideas?

¡Gracias para su tiempo y ayuda!

Appendix J:

Project II:

Consent Forms

COLORADO STATE UNIVERSITY
INFORMED CONSENT FOR PARTICIPATION IN RESEARCH PROJECT
(S)

PROJECT TITLE: Using Distance Learning and Abuelas to Teach Low-Income Hispanics and Migrants

PRINCIPAL INVESTIGATOR: Jennifer Anderson, Ph.D., R.D. and Pat Kendall, Ph.D., R.D.

CO-INVESTIGATOR: Susan Martin Gould, M.S., R.D.

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:

Jennifer Anderson, Ph.D., R.D. (970)491-7334
Department of Food Science and Human Nutrition

SPONSOR OF PROJECT: United States Department of Agriculture

PURPOSE OF RESEARCH: The overall goal of this project is to develop a nutrition education program that targets low-income Hispanic women and children with special emphasis on migrant farm worker families in specific areas of Southern Colorado.

PROCEDURES TO BE FOLLOWED: You will be asked to complete a survey after receiving nutrition education information. Your answers will assist us in modifying a nutrition education program for Hispanic mothers of pre-school children. The survey will take about twenty (20) minutes to complete. A Spanish or English version will be available for your convenience.

RISKS: This project is for educational research only. There are no known risks. It is not possible to identify all potential risks in an experimental procedure, but the researchers have taken reasonable safeguards to minimize all known and potential, but unknown, risks.

BENEFITS: This project will help in the development of nutrition education materials and delivery methods which consider the customs, norms, beliefs, and values of the Hispanic people. In doing so, knowledge, attitudes, skills, and behaviors will be acquired that contribute to nutritionally sound diets and a healthy lifestyle for Hispanic women and children in this area.

CONFIDENTIALITY SAFEGUARDS: All information given by you will be confidential and used for research purposes only. No one will have access to any identifying information, such as name or address, except the investigators and the educators, and your name will not be used in any data analysis. Final reporting for the project will not disclose any names or other identifying information in order to maintain confidentiality.

page 1 of 2 Subject initials _____ Date _____

LIABILITY: The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of injury.

Questions about subjects' rights may be directed to Celia S. Walker at (970)491-1563.

PARTICIPATION: I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.

I have read and understand the information stated and willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing 2 pages.

Participant name (printed)

Participant signature

Date

Investigator or co-investigator signature

Date

PARENTAL SIGNATURE FOR MINOR SUBJECT

I authorize _____ (print name) to become a subject for the described research. The nature and general purpose of the project has been satisfactorily explained to me by _____ and I am satisfied that proper precautions are to be observed.

Minor's date of birth

Parent/Guardian name (printed)

Parent/Guardian signature

Date

UNIVERSIDAD DEL ESTADO DE COLORADO (COLORADO STATE UNIVERSITY)
CONSENTIMIENTO INFORMADO PARA PARTICIPACIÓN EN UN PROYECTO DE
INVESTIGACIÓN
(S)

TITULO DEL PROYECTO: Utilizando distancia conocimientos y Abuelas para enseñar Hispanos y familias Hispanas de los migrantes.

INVESTIGADORES PRINCIPALES: Jennifer Anderson, Ph.D., R.D. y Pat Kendall, Ph.D., R.D.

CO-INVESTIGADORA: Susan Martin Gould, M.S., R.D.

NOMBRE Y NUMERO DE TELÉFONO PARA INFORMACIÓN Y PREGUNTAS:

Jennifer Anderson, Ph.D., R.D. (970)491-7334
Departamento de Ciencia de los Alimentos y Nutrición Humana
(Department of Food Science & Human Nutrition)

PATROCINADOR DEL PROYECTO: Departamento de Agricultura de los EE.UU. (U.S. Department of Agriculture)

OBJETIVOS DEL PROYECTO: El propósito de este proyecto es desarrollar un programa de educación nutricional para mujeres y niños Hispanos de bajos ingresos con énfasis especial en las familias que trabajan en los campos (los migrantes/los braceros), específicamente en el Sur de Colorado.

PROCEDIMIENTOS: Individuos tendrán que completar un cuestionario después de recibir información nutricional. Sus respuestas nos ayudarán en desarrollar mejores programas para que madres Hispanas de niños preescolares aprenderán más sobre la nutrición. El cuestionario se puede llenar en casi veinte (20) minutos. El cuestionario está escrito en inglés o español para su conveniencia.

RIESGOS: Este programa es una investigación educacional solamente. No esperamos ningún riesgo a Ud.

No es posible identificar todos los riesgos en un procedimiento experimental, pero los investigadoras han establecido medidas de seguridad razonables para disminuir ambos los riesgos conocidos y los riesgos potenciales.

BENEFICIOS: Este proyecto ayudará en el desarrollo de materiales educativos de nutrición, y métodos de enseñar que toman consideración de las costumbres, normas, creencias y valores del pueblo Hispano. En participar en esta investigación, Ud. recibirá más conocimiento y habilidad y mejores actitudes, y hábitos. Entonces, estos cambios contribuirán a dietas que son más sanas y hábitos de salud mejores en las mujeres y niños de la área.

CONFIDENCIALIDAD: Solamente los investigadores y educadores tendrán acceso a cualquier información que identifica al participante como nombre, o domicilio. Su nombre no se usará en el análisis de la investigación. Para mantener la confidencialidad, el reporte final del proyecto no revelará ningunos nombres u otra información que los identifican.

LIMITACIÓN DE RESPONSABILIDAD: La Acta Gubernamental de Inmunidad (the Colorado Governmental Immunity Act) dirige y limita la responsabilidad legal de la Universidad de Colorado si resulta un accidente de esta investigación. Tendrá que hacer reclamaciones entre 180 días del accidente. Preguntas en relación a los derechos de los participantes se deben ser dirigidos a Celia S. Walker, (970)491-1563.

PARTICIPACIÓN: Yo entiendo que mi participación en esta investigación es voluntario. Si yo decido participar en la investigación, yo puedo retirar mi consentimiento y dejar de participar sin pena o pérdida de beneficios. He leído y entiendo la información exponida y firmo voluntariamente. Mi firma también reconoce que recibí, en la fecha firmada, una copia de este documento que contiene 2 páginas.

NOMBRE DEL PARTICIPANTE (Letra de Molde)

FIRMA DEL PARTICIPANTE

Fecha

FIRMA DE LA INVESTIGADORA/CO-INVESTIGADORA

Fecha

FIRMA DE UNO DE LOS PADRES DE UN(A) PARTICIPANTE DE MENOR EDAD

Yo autorizo a _____ (Nombre y apellido en letra de molde) a participar en la investigación descrita Sr.(a) _____ me ha explicado el propósito general y la tema de la investigación y estoy satisfecha por las precauciones observadas.

Fecha de Nacimiento de Menor de Edad

Nombre de Padre/Guardián (Letra de Molde)

Firma de Padre/Guardián

Fecha

Appendix K:

Project II:

**Graph of “Make A Change” (MAC) Means
by Instruction Method and Area**

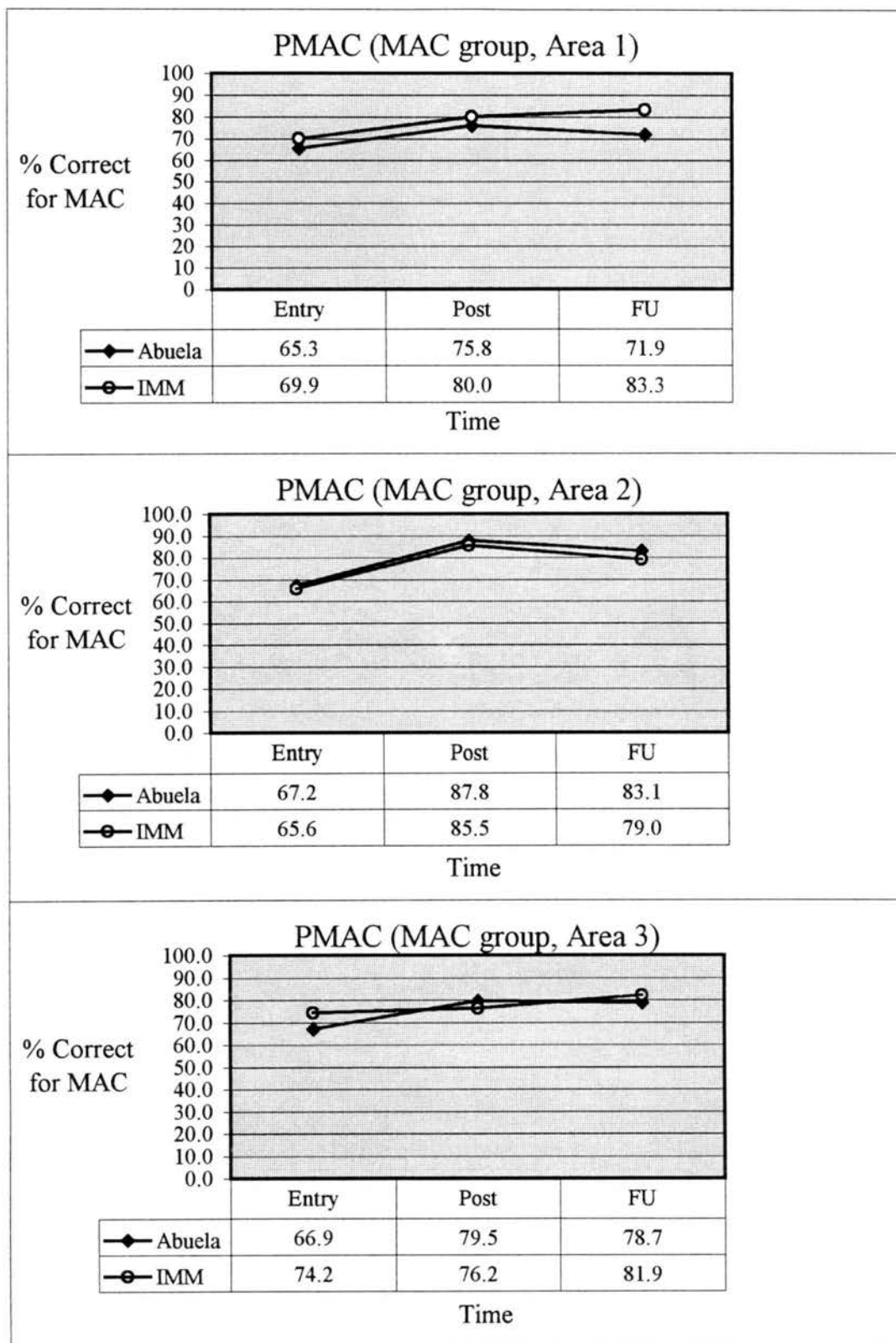


Figure K1: Plots of Means for Percent Correct for Make A Change (MAC) Knowledge Indicator at Three Times for Three Areas

Appendix L:

Project II:

Alpha Testing (Level 2) Results

**Table L1: Summary of Survey Responses (Alpha Testing)
for La Cocina Saludable (2/28/97)**

		Individual Responses						Mean	SD
1 What is your opinion of the program overall?									
Messages	Effective / Not effective	2	3	2	3	1	3	2.33	0.82
	Understandable / Not understandable	1	4	2	2	2	2	2.17	0.98
Graphics	Effective / Not effective	2	3	2	2	3	4	2.67	0.82
	Understandable / Not understandable	2	4	4	3	2	2	2.83	0.98
	High Quality / Low Quality	2	3	1	2	2	1	1.83	0.75
Flow	Smooth / Not smooth	2	4	3	2	3	2	2.67	0.82
	Understandable / Not understandable	2	4	3	1	3	NA	2.60	1.14
	1 = Too slow / (3 = OK) / 5 = Too fast	3	2	3	3	NA	3	2.80	0.45
Moving through program	Easy / Difficult	NA	4	2	2	4	2	2.80	1.10
2 The activities reflect assessment of knowledge									
	Easy / Difficult	4	4	2	2	1	1	2.33	1.37
3 What do you remember most?									
	Pyramid (4)								
	pyramid activity								
	dishes representative of the nutritional choices								
4 What do you like?									
	Chili pepper (2)								
	stages, color variation								
	Screen saver								
	Go to kitchen for menu								
	children								
	Color variation of fruit basket (2)								
	Healthy minds, bodies, teeth, weights, money checkups (Very good)								
	Pyramid								
5 What do you dislike?									
	At first, needed more instruction of how to continue								
	More prompting: flashing buttons								
	Hotspots need more prompting to move into								
	"Next" must flash every time								
	Prompt must start to flash as soon as voice								
	Fats and added sugars -- after introduction -- more "why is the base large -- why are top groups 'animal foods' placed where they are"								
	Malnourished picture								
	Fats and sugars -- symbols need words -- [pyramid] needs pictures of foods								

**Table L1^(cont): Summary of Survey Responses (Alpha Testing)
for La Cocina Saludable (2/28/97)**

6 What would you change?	
	Instruction page -- buttons come up one at a time (2)
	Page 2.2 -- no flash [needs flash] (2)
	NEXT button needs to flash
	Need more instructions on hot spots -- prompting by voice
	Abuela -- smaller on kitchen page (2)
	"more emphasis on the word <u>malnourishment</u> . I thought she said <u>Now</u> nourishment"
	instruction -- red button needs to flash
	(only correct one they did wrong placing foods in pyramid)
7 Any other comments?	
	Introduction good, [narrator's] voice great
	Make sure next flashes each time with arrow

**Table L2^(cont): Summary of Survey Responses (Alpha Testing)
for La Cocina Saludable (4/3/97)**

6 What would you change?

Main menu - MIH only choice
Main menu - brighter colors
Chili pepper question mark
More audio cues for next
"breathing problems" instead of "respiratory problems"
More items to go with popouts

7 Any other comments?

FGP activity
trouble dragging
message does not state at wrong place
message cuts off short
Good for children's museum
Food pictures in pyramid are not explicit
Voice does not match picture (2)
Voice good, pleasant, clear, easy to listen to
Hard to tell what some things are
What is bowl with steam under vegetable servings?
Kitchen (2)
Make a "little" more modern
Needs more stuff on counter and magnets on fridge
Less sterile
More diversity in people -- eg. African Americans and Asians
Directions/information - long
Confusing choices
What? box for repeating
Need to introduce Abuela and her connection
Graphics
Food group pictures need to be larger and less of them
Face on Abuela too dark
Upper right corner of MIH -- fades out, hard to read
Sound goes up and down
Slow at times
"NEXT" touchy
Can't speed up or bi-step verbage
Gliche with meat section of FGP (dairy comes up)
Very good pictures

**Table L2^(cont): Summary of Survey Responses (Alpha Testing)
for La Cocina Saludable (4/3/97)**

6 What would you change?

Main menu - MIH only choice
Main menu - brighter colors
Chili pepper question mark
More audio cues for next
"breathing problems" instead of "respiratory problems"
More items to go with popouts

7 Any other comments?

FGP activity
trouble dragging
message does not state at wrong place
message cuts off short
Good for children's museum
Food pictures in pyramid are not explicit
Voice does not match picture (2)
Voice good, pleasant, clear, easy to listen to
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Food group pictures need to be larger and less of them
Face on Abuela too dark
Upper right corner of MIH -- fades out, hard to read
Sound goes up and down
Slow at times
"NEXT" touchy
Can't speed up or bi-step verbage
Gliche with meat section of FGP (dairy comes up)
Very good pictures

Appendix M:

Project II:

Costs Worksheets

Number educated	1 Kiosk System		2 Systems	3 Systems	4 Systems
	Abuelas	IMM (1 kiosk)	MM (2 kiosks)	MM (3 kiosks)	MM (4 kiosks)
600	\$ 16.06	\$ 15.57	\$ 31.14	\$ 46.71	\$ 62.28
800	\$ 14.16	\$ 11.68	\$ 23.36	\$ 35.04	\$ 46.71
1,000	\$ 13.70	\$ 9.34	\$ 18.69	\$ 28.03	\$ 37.37
1,200	\$ 13.39	\$ 7.79	\$ 15.57	\$ 23.36	\$ 31.14
1,400	\$ 13.17	\$ 6.67	\$ 13.35	\$ 20.02	\$ 26.69
1,600	\$ 13.00	\$ 5.84	\$ 11.68	\$ 17.52	\$ 23.36
1,800	\$ 12.87	\$ 5.19	\$ 10.38	\$ 15.57	\$ 20.76
2,000	\$ 12.77	\$ 4.67	\$ 9.34	\$ 14.01	\$ 18.69
2,200	\$ 12.69	\$ 4.25	\$ 8.49	\$ 12.74	\$ 16.99
2,400	\$ 12.62	\$ 3.89	\$ 7.79	\$ 11.68	\$ 15.57
2,600	\$ 12.56	\$ 3.59	\$ 7.19	\$ 10.78	\$ 14.37
2,800	\$ 12.51	\$ 3.34	\$ 6.67	\$ 10.01	\$ 13.35
3,000	\$ 12.46	\$ 3.11	\$ 6.23	\$ 9.34	\$ 12.46
3,200	\$ 12.42	\$ 2.92	\$ 5.84	\$ 8.76	\$ 11.68
3,400	\$ 12.39	\$ 2.75	\$ 5.50	\$ 8.24	\$ 10.99
3,600	\$ 12.36	\$ 2.60	\$ 5.19	\$ 7.79	\$ 10.38
3,800	\$ 12.33	\$ 2.46	\$ 4.92	\$ 7.38	\$ 9.83
4,000	\$ 12.31	\$ 2.34	\$ 4.67	\$ 7.01	\$ 9.34
5,000	\$ 12.22	\$ 1.87	\$ 3.74	\$ 5.61	\$ 7.47
7,500	\$ 12.09	\$ 1.25	\$ 2.49	\$ 3.74	\$ 9.97
10,000	\$ 12.03	\$ 0.93	\$ 1.87	\$ 2.80	\$ 7.47
630	\$ 15.2943	\$ 14.8298			
657	\$ 14.6658	\$ 14.2203			
1,420	\$ 13.1505		\$ 13.1588		
1,421	\$ 13.1495		\$ 13.1495		
1,422	\$ 13.1486		\$ 13.1403		
2,209	\$ 12.6844			\$ 12.6882	
2,210	\$ 12.6840			\$ 12.6825	
2,998	\$ 12.4637				\$ 12.4653
2,999	\$ 12.4635				\$ 12.4612

1 Kiosk System				
# educated	Abuela	MM (Fixed)	Abuela	IMM (Fixed)
500	78	100	\$ 7,332.88	\$ 9,342.75
600	94	100	\$ 8,799.46	\$ 9,342.75
700	110	100	\$ 10,266.04	\$ 9,342.75
800	126	100	\$ 11,732.61	\$ 9,342.75
900	141	100	\$ 13,199.19	\$ 9,342.75
1,000	157	100	\$ 14,665.77	\$ 9,342.75
1,100	173	100	\$ 16,132.34	\$ 9,342.75
1,200	188	100	\$ 17,598.92	\$ 9,342.75
1,300	204	100	\$ 19,065.50	\$ 9,342.75
1,400	220	100	\$ 20,532.07	\$ 9,342.75
1,500	235	100	\$ 21,998.65	\$ 9,342.75
1,600	251	100	\$ 23,465.22	\$ 9,342.75
1,700	267	100	\$ 24,931.80	\$ 9,342.75
1,800	283	100	\$ 26,398.38	\$ 9,342.75
1,900	298	100	\$ 27,864.95	\$ 9,342.75
2,000	314	100	\$ 29,331.53	\$ 9,342.75
630	99.71%	100	\$ 9,315.58	\$ 9,342.75
632	99.96%	100	\$ 9,339.27	\$ 9,342.75
633	100.09%	100	\$ 9,351.11	\$ 9,342.75
635	100.34%	100	\$ 9,374.80	\$ 9,342.75

Appendix N:

Project II:

Histograms of MIH Indicator Outcome by Instruction Method

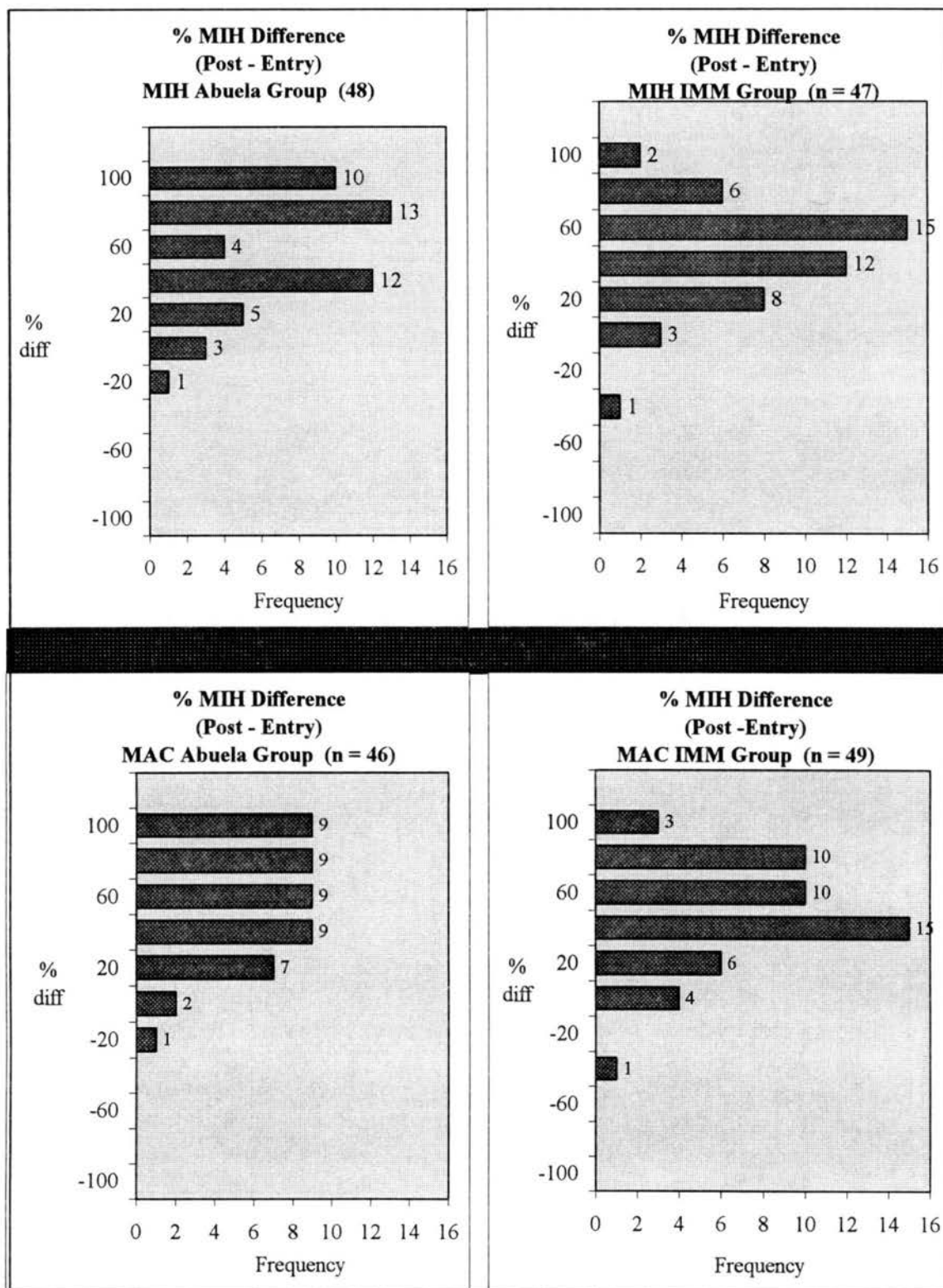


Figure L1: Histograms to compare distribution of Make It Healthy (MIH) percentage differences by MIH instruction method (top) and MAC instruction method (bottom)

Appendix O

Project II:

Sample of On-line Tracking

La Cocina Saludable Tracking (Otero County)

1: Book opened at 10:24:52 AM on June/2/1997
2: Hit on Button logo of page lcs0.1 at 10:25:09
3: Hit on Page lcs0.2 of page lcs0.2 at 10:25:31
4: Hit on Button English of page lcs0.2 at 10:25:32
5: Hit on Button enHelp of page lcs0.2a at 10:26:04
6: Hit on Button enNext of page lcs0.3 at 10:27:09
7: Hit on PaintObject of page lcs0.4 at 10:27:17
8: Hit on PaintObject jenny of page lcs0.4 at 10:27:51
9: Hit on Button enMenu of page lcs0.4 at 10:28:15
10: Hit on PaintObject of page lcs1.1a at 10:28:52
11: Hit on Button mihnnext of page mih2.1a at 10:29:06
12: Hit on PaintObject ennnext of page mih2.1b at 10:29:30
13: Hit on Button mihnnext of page mih2.1b at 10:29:35
14: Hit on Button mihnnext of page mih2.2 at 10:29:49
15: Hit on PaintObject hweight of page mih2.3 at 10:30:17
16: Hit on PaintObject hbodies of page mih2.3 at 10:30:38
17: Hit on PaintObject hteeth of page mih2.3 at 10:30:52
18: Hit on PaintObject hminds of page mih2.3 at 10:31:08
19: Hit on Button mihnnext of page mih2.3 at 10:31:26
20: Hit on Button mihnnext of page mih2.4 at 10:31:36
21: Hit on Button mihnnext of page mih2.5a at 10:31:56
22: Hit on PaintObject elena2 of page mih2.5b at 10:33:49
23: Hit on Button of page mih2.5b at 10:34:05
24: Hit on Button mihnnext of page mih2.5b at 10:35:09
25: Hit on Button mihnnext of page mih2.5c at 10:36:00
26: Hit on Button mihnnext of page mih2.6 at 10:36:18
27: Hit on PaintObject red of page mih2.7a at 10:36:42
28: Hit on PaintObject red of page mih2.6a at 10:36:55
29: Hit on Button mihnnext of page mih2.12a at 10:37:21
30: Hit on Button mihnnext of page mih2.12b at 10:37:54
31: Hit on PaintObject green of page mih2.13 at 10:38:19
32: Hit on Button mihback of page mih2.13 at 10:38:23
33: Hit on PaintObject of page mih2.12b at 10:38:56
34: Hit on PaintObject pyrtbc of page mih2.6a at 10:39:02
35: Hit on PaintObject smallpyr of page mih2.7a at 10:39:28
36: Hit on PaintObject of page mih2.6a at 10:39:34
37: Hit on Button enexit of page mih2.9a at 10:39:50
38: Program stopped at: 10:39:50
1: Hit on Page lcs0.1 of page lcs0.1 at 10:40:44
1: Screen Saver activated at: 10:44:21
1: Screen Saver activated at: 10:44:22
1: Hit on Button logo of page lcs0.1 at 11:19:18
2: Hit on Field Espanol of page lcs0.2 at 11:20:03
3: Hit on PaintObject of page lcs0.2a at 11:20:47
4: Hit on Field spNext of page lcs0.3 at 11:22:16
5: Hit on Field spNext of page lcs0.3 at 11:22:23
6: Hit on PaintObject of page lcs0.4 at 11:22:35
7: Hit on PaintObject celine of page lcs0.4 at 11:23:24
8: Hit on Button spMenu of page lcs0.4 at 11:24:00
9: Hit on PaintObject of page lcs1.1a at 11:24:24
10: Hit on Button spnext of page mih2.1a at 11:24:43
11: Hit on Field spNext of page mih2.1b at 11:25:19
12: Hit on Field spNext of page mih2.2 at 11:25:37

MILK

Fluid:

(size is authorized on WIC check)

Whole
Lowfat
Skim
Buttermilk
Acidophilus
Lactose-reduced



Powdered: Nonfat
(3 or 8 quart boxes)

Evaporated: (12 oz cans)

Whole
Lowfat
Skim



UHT Long Life Milk
(only if specified on WIC check)

DO NOT BUY: Flavored milk
Raw milk
Calcium-added milk
Organic labeled milk
Soy milk

PEANUT BUTTER

Smooth or Crunchy (18 oz jar)

Also Approved:

"All Natural" 16 oz jar
"Whipped" 14 oz jar



DO NOT BUY: Lowfat peanut butter
Peanut butter with jelly

CHEESE

Any size allowed
(8 oz to 16 oz)

Only Domestic Cheese
is Approved



American	Monterey Jack
Brick	Mozzarella
Cheddar	Muenster
Colby	Provolone
Longhorn	Swiss
Kraft Brand Reduced-Fat Cheese (any type above)	

DO NOT BUY:

Imported cheeses	Deli cheeses
Shredded cheese	Individually wrapped
Cheese spreads	Flavored cheese
Cream cheese	Cottage cheese
String cheese	Raw milk cheese
Organic cheese	
Individually sliced cheese (except American)	
"Cheese food" or "cheese product" on label	

EGGS



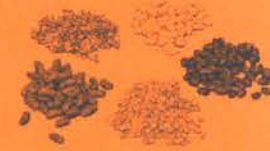
Grade AA, White or Brown
(large or smaller size)
Generic or store brand only
(when available)

DO NOT BUY: Free range eggs
Organic eggs
Nest laid eggs
Nest fresh eggs

DRIED BEANS and PEAS

Size allowed = 16 oz

Black Beans
Black-eyed Peas
Garbanzo Beans
Kidney Beans
Lentils
Pinto Beans
Other similar types



Lima Beans
Split Peas

TUNA

Water Packed



 +  +  = 26 oz

DO NOT BUY: Albacore
Chunk white tuna
Solid white tuna

CARROTS

(any combination equal to or less than
2 pounds)

Fresh
Frozen
Canned



DO NOT BUY: any size less than 8 ounces

Colorado State
University
Cooperative
Extension

This material is based upon
work supported by the
Extension Service U.S.
Department of Agriculture,
under special project
number 93-0507 (1996)

and has been developed by Colorado State University (S.M. Gould, MS, RD,
Department of Food Science and Human Nutrition) in collaboration with the
Colorado WIC Program. ©1996 Susan M. Gould / Jennifer Anderson, Colorado
State University



COLORADO WIC PROGRAM

ALLOWABLE FOODS LIST

AS OF JANUARY 1997



CEREAL

Any combination of hot and cold cereals less than or equal to WIC shopper's allotment (usually 28 oz. or 36 oz.)

$$\square + \square + \square = 28 \text{ oz. or } 36 \text{ oz.}$$

Cold Cereal



Hot Cereal



(Unflavored) (Unflavored) (Maple Flavored)

DO NOT BUY: Individual packets

INFANT FOODS

Infant Dry Cereal (8 ounce box)



Barley, Oatmeal, Rice, or Mixed

DO NOT BUY: Cereal in jars
Cereal with fruit added
Cereal with formula added

100% Infant Juice

Size: 4 or 4.2 ounce
(as listed on the WIC check)

Brands Allowed



Beechnut
Gerber
Heinz

All flavors

DO NOT BUY: Juice with yogurt
Vegetable combinations

FORMULA



See WIC check for brand, type, and amount.

JUICE

Frozen 100% Juice (12 oz. cans)



Single Strength 100% Juice

46 oz cans



Seneca® only Del Monte® only Campbell's V-8® only
-- any flavor

6 oz cans (only if specified on WIC check)



orange
grapefruit
orange-grapefruit
orange-pineapple

DO NOT BUY: Calcium-added juice
Granny Smith apple juice

LECHE (MILK)

Líquida:

(Los tamaños están en los cheques)

Completa

Desnatada de 2%/1%

Descremada (Skim)

Leche Agria (Buttermilk)

Acidophilus

Leche baja en lactosa



En Polvo:

Descremada

(cajas de 3 o 8 onzas)



Evaporada: (botes de 12 onzas)

Completa

Desnatada

Descremada



UHT Leche de "Long Life" Milk

(solamente si está escrito en su cheque/cupón de WIC)

NO COMPRE:

Leche con sabores
Leche cruda
Leche con calcio agregado
Leche etiqueta organico
Leche de soja

CREMA DE CACAHUATE (PEANUT BUTTER)

Suave o con Pedazitos (18 onzas)



También es aprobada:

"Toda Natural" 16 onzas

Batida (Whipped) 14 onzas

NO COMPRE: con menos grasa ("Lowfat")
con mermelada / confitura

QUESO (CHEESE)



Cualquier tamaño de
paquete de 8 a 16 onzas

Americano

Brick

Cheddar

Colby

Longhorn

Kraft quesos reducidos de grasa
(en cualquier tipo como los de arriba)

Monterey Jack

Mozzarella

Muenster

Provolone

Swiss

NO COMPRE:

Quesos importados
Rallado
Quesos suaves
Quesos con sabores
Requesón
Queso organico
Individual (menos Americanos)
Quesos que diga "cheese food"

Quesos del deli
Cada rebanada envuelta
Productos de queso
Queso crema
Queso en hilo (string)
Queso de leche cruda

HUEVOS / BLANQUILLOS (EGGS)



Grado AA, Blanco o Cafés
(de tamaño grande o pequeño)
Genérico o marca de la tienda
(cuando lo hay)

NO COMPRE: Huevos "Free range"
Huevos orgánicos
Huevos frescos de la neta

FRIJOLE Y CHICHAROS

(DRIED BEANS and PEAS)

Tamaño = 16 onzas (secos)

Frijoles Negros

Garbanzos

Lentejas

Frijoles Rojos

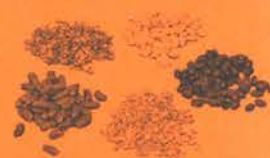
Frijoles Limas

Frijoles Pintos (Habichuelas)

Chicharos

Alverjas de Punto Negro

Otras variedades similares



ATÚN (TUNA)

Empacada en agua



 +  +  = 26 onzas

NO COMPRE:

Albacore
Atún blanco en pedazos o sólido

ZANAHORIAS (CARROTS)

(Cualquier combinación menos o igual
a total de 2 libras)

Fresca

Conjelada

en Lata



NO COMPRE: Tamaños menos de 8 onzas

Colorado
State
University
Cooperative
Extension

Esta material es apoyado por
el Servicio Extensión, del
Departamento de Agricultura
de los E.E.U.U., el número
del proyecto 93-0507 (1996) y
desarrollado por la Universidad del Estado de Colorado (S.M. Gould,
MS, RD, del Departamento de la Ciencia de Comidas y Alimentación
Humana) y con la colaboración del programa WIC de Colorado. ©1996
Susan M. Gould / Jennifer Anderson, Colorado State University



COMIDAS

PERMITIDAS POR

COLORADO WIC

DESDE ENERO 1997



CEREÁL (CEREAL)

Cualquier combinación de cereales calientes y fríos que es menos o igual a la cantidad permitida (usualmente 28 o 36 onzas)

$$\square + \square + \square = 28 \text{ o } 36 \text{ onzas}$$

Cereál Frío



(sin pasas)

(Regular, nada más)

(Regular, nada más)

(de la marca Malt-o-Meal)

Cereál Caliente



(sin sabor añadido)

(del sabor arroz)

COMIDAS DE INFANTES

(INFANT FOODS)

Cereál Seco de Infantes (caja de 8 oz)



Beechnut

Gerber

Heinz

Cebada, Avena, Arroz, o Mezclado

NO COMPRE: Cereál en frascos
Cereál con fruta añadida
Cereál con formula añadida

100% Jugo de Infantes

Tamaños permitidos:
botellas de 4 o 4.2 onzas
(listo para tomar solamente si está
marcado en su cheque/cupón de WIC)



Solamente
Beechnut
Gerber
Heinz

Todos sabores

NO COMPRE: Jugo con yogurt
Combinaciones de verduras/
vegetales

FORMULA



La marca y tipo de formula que puede
comprar está escrita en su cheque/cupón
de WIC.

JUGOS (JUICE)

100% Jugo Conjelados (Latas de 12 oz)



Jugos Listos Para Tomar

Latas de 46 onzas



solamente Seneca®
solamente Del Monte®
solamente Campbell's V-8®
-- cualquier tipo

Latas de 6 onzas

(solamente si está marcado en su
cheque de WIC)

solamente
naranja/china
toronja
naranja-toronja
naranja-piña

NO COMPRE: Jugo marcado "con calcio"
o jugo de manzana marcado "Granny Smith"