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Development of a 3-Pronged Approach to Evaluation for the iCook-4H Project

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DEVELOPMENT OF A 3-PRONGED APPROACH TO EVALUATION FOR THE iCOOK-4H PROJECT

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DEVELOPMENT OF A 3-PRONGED APPROACH TO EVALUATION FOR THE iCOOK-4H PROJECT

By Douglas R. Mathews MS, RD

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An Abstract of the Thesis Presented
In Partial Fulfillment of the Requirements for the
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Most nutrition education programs are created without adequate forethought to planning evaluation strategies. The goal of this study was to develop and implement a comprehensive 3-pronged approach to evaluate iCook 4-H, a six-session, biweekly program for 9-10 year old youth and their adult main food preparer. It was used to evaluate the curriculum for the intervention of a 2-year childhood obesity prevention study. Forty iCook 4-H classes were implemented for 150 dyads by 16 leaders between September and December, 2013, in Maine, Nebraska, South Dakota, Tennessee, and West Virginia. The evaluation included measures of fidelity of implementation, process evaluation, and program outcomes. The Fidelity of Implementation instrument, composed of 6-tool, was developed to determine if the program was implemented as intended. Based on evaluation of 23% of 240 total sessions, evaluators reported session objectives were met 96% of the time; youth (3.86±0.34) and adults (3.75±0.33) were almost very engaged in the

sessions and leaders were almost very effective (3.70±0.69) (scale range, 1=not engaged/effective to 4=very engaged/effective). During process evaluation—a 5-minute online survey at the end of each session—youth consistently selected "preparing" and "tasting" new recipes as learning experiences for the day over each of the six sessions. They increased selecting "learning about new and fun ways of being physically active" from Session 1 to 6 ($p=0.01$). Through Word Cloud methodology, the importance of family meals was documented by both youth and adults. The strong positive trend in increasing family meals ($p=0.75$) and significant increase ($p=0.05$) in physical activity reported among youth were promising evidence of changing behavior among youth. The program outcome instruments, developed through confirmatory factor analyses, were internally consistent (youth $\alpha=0.80$; adult $\alpha=0.73$) and reliable (youth 0- to 4-month $r=0.81$, 0-to 12-month $r=0.75$; adult 0- 4-month $r=0.83$; 0- to 12-month $r=0.73$). A scoring mechanism was established, and results were reported as part of the intervention study findings. While incorporating a comprehensive evaluation into community-based programming can be time-intensive, measuring program evaluation in a manner that allows for reliable results and comparison across groups and over time can provide the types of data that are needed to demonstrate program effectiveness and receive recognition for program outcomes from administrators.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Over the last 20 years, childhood obesity has been a public health concern because of its acceleration across the United States.[1] Obesity has been identified in nearly 20% of children between the ages of 6 and 12 years old.[2] Contributing sociocultural factors include eating fewer meals at home, eating fewer meals as a family, parental lack of knowledge about food, nutrition, and cooking, along with increasingly sedentary lifestyles.[3-5] Satter[6,7] reported that parents struggle with meal planning, food preparation and creating positive family eating experiences. Lichtenstein and Ludwig called for reinstating Home Economics Education in the school system to teach youth basic culinary principles for feeding themselves and their families within the complex food environment.[8] The 2010 White House Task Force (White House Report) and First Lady, Michelle Obama's, *Let's Move* team (letsmove.org) recommended educating children on the importance of nutrition, and encouraging families to be active to solve the problem of childhood obesity within a generation.[9,10]

The iCook 4-H study was created in this environment. It was designed for 9-10-year-old youth and their main adult food preparer with the goal of cooking, eating and playing together. As a research model, it was developed, implemented and evaluated as a 2-year intervention study followed by a 4-month dissemination study. The goal of iCook 4-H was to develop a program available for widespread use. Therefore, it was important to have a strong evaluation component to accompany iCook 4-H once the research study was completed. In nutrition

education and behavior research, less focus appears to be on the program evaluation component, even to the point of being overlooked and undervalued. Process evaluation is often considered formative at the development stage for quality assurance and summative as data is analyzed for major outcomes.[11,12] However, it is rare to find a systematic process of evaluation from beginning to end of a project, with the goal of sustainability and broad dissemination of a program once the research is completed.[13-16]

This researcher focused on creating and implementing a comprehensive three-pronged approach to evaluation for the iCook 4-H program, the curriculum used for the 2-year childhood obesity prevention study. The first prong is evaluation of fidelity of implementation, to ensure that the program is implemented as intended. The second prong is process evaluation, defined in this study as formative and summative measures during program implementation. The third prong is program outcome evaluation, which is defined as a measure of change over time in designated program outcomes.

CHAPTER 2: LITERATURE REVIEW

General Program Evaluation

Researchers in the field of evaluation accept many definitions for different types of evaluation. A large majority of evaluation research is found in the education literature.[17-23] Program evaluation as a whole encompasses many distinct methods of assessment, all designed to determine the worth and question of the program. In the field of evaluation definitions vary for different types of evaluation.[12,13,24-28] The concept of program evaluation encompasses many distinct methods of evaluation. In her research report on school-based program evaluation, Protheroe and colleagues[19] reported that a simple definition of program evaluation is best. They believed that program evaluation is any method which allows a researcher/educator to answer critically important questions about a program. Through formative and summative evaluation methods, educators and researchers can identify where improvements to a program can be made to increase effectiveness. The ultimate goal for educators and researchers is to balance the need for information with the costs associated with data collection. To accomplish this, evaluators must plan evaluation methods from the beginning of a program.[19]

The process of evaluating programs is not a new topic. All evaluation methods should be well thought out prior to beginning a process.[11,29] Without adequate evaluation strategies, the impact and sustainability of a program cannot be determined. Although evaluation should be an inherent part of all programs, a thorough review of the literature revealed that the topic is seldom well planned in

nutrition research. One place where this is not true in nutrition research is within the Cooperative Extension community.[30-32] Cooperative Extension program leaders have stressed the idea of well-developed program evaluation since the 1983 call to action.[30] Thomson believed that if programs were going to make a difference, that difference had to be measured. Unfortunately, this call to action did not standardize the definition or methodology of evaluation processes. In 2007, West and colleagues reported that conducting the evaluation online was better than traditional pen-and-paper methods. The Internet allowed researchers to quickly gather, organize, and analyze evaluation results.[30]

Program Outcome Evaluation

Fitzpatrick and colleagues[29] reported on the history of the development in evaluation which interestingly began prior to the 1800's with judgments based on religious and political beliefs. The religious and political leaders would say something worked, and was true. This would be taken at face value by the population. From the 1800's until the mid-20th century evaluation existed mostly as a way to measure the beliefs of experts. Experts in a specific field would state what was accurate, and then the population evaluated their program on those beliefs. In 1975, the Joint Committee on Standards for Educational Evaluation developed the first standardized guidelines for evaluators to create quality evaluations. In 1982, the Evaluation Research Society revised these evaluation standards and began to implement ethical guidelines for evaluation. The standards and ethics were further refined in 1995 by the American Evaluation Society (AES).

According to the American Evaluation Association, there are five guiding principles that should always be followed when developing and conducting evaluations.[33] First, researchers must conduct systematic and data-driven inquiries. All questions asked during an evaluation should have merit and be directed at a specific part of a program. Second, the evaluators must report the performance to interested stakeholders. The type of stakeholder varies depending on the type of program being evaluated. The third guiding principal is that evaluators must ensure the "honesty and integrity" of the evaluation process. The fourth is that program participants and stakeholders must be respected. The final guiding principle is that diversity and values of the general public must be accounted for when designing and reporting on evaluation.[33]

In addition to following the aforementioned guidelines, the first step to developing evaluation models is to plan and design the tools to be used. A common method for developing the process of evaluation is to answer a set of questions used to determine the needs and resources available for the evaluation.[34] When planning an evaluation process, researchers need to know what changes are desired by a program, and how much time and energy can be put into determining these changes.

Determining program impact is the fundamental purpose of program outcome evaluation.[35] Questions that are often asked include, "was the program effective at influencing behavior" and "what changes could be seen due to the program". Even with this overarching purpose, researchers can have many different

objectives when evaluating a program. Researchers have used evaluation to improve teaching methods, answer questions that community members may have, and help funders and other key stake holders understand the reason a program should continue.[35]

Barker and Killian[32] used InterWrite Personal Response Systems (PRS) to evaluate a 4-H afterschool program for children aged 8-15 years. Researchers designed a retrospective questionnaire focusing on knowledge and behavior change. A sample pre-post retrospective question was: "Before the 4-H SET Camp, I knew _____ about the 4-H program" and "Because of this 4-H SET Camp, I know _____ about the 4H program". Researchers reported several positive aspects of using the PRS technology to complete the program evaluation. The response time was rapid, and participants were anxious to use the technology. The researchers believed that there was improved accuracy on the reporting and analyzing of the data. Online data were easy to export into statistical software programs for analysis. The instruments used were analyzed for internal consistency and the total instrument scale had a Cronbach's α of 0.72.[32]

In their 2012 paper, Guerra-Lopez and Toker[36] discussed a seven-step process to use in evaluating the impact of a program. The steps are to identify stakeholder and expectations, determine key decisions and objectives, derive measurable indicators, identify data sources, select data collection instruments, select data analysis tools, and communicate the results and recommendations. These steps gather data that are almost identical to the questions previously posed

by Bliss and Emshoff.[34,36] The researchers also discussed the need for organizing the steps in evaluation. These researchers used a hierarchy to delineate what and how items were being measured (as opposed to the logic model previously discussed).[36]

In their evaluation of a long running Australian nutrition education program, Pettigrew and colleagues[25] developed a way to provide a rigorous evaluation of the program to improve outcomes for low socioeconomic participants. The researchers created seven different pre- post- surveys designed to capture the designated program outcomes. They had longer in-person surveys for participants with higher literacy and more simplified versions for lower-literacy participants. An online survey was administered following program completion. These researchers were concerned about in-person, in-session evaluation. The concern was centered on the idea that this style of survey administration would influence the study outcomes. The researchers found that responses from in-person/in-session surveys were consistent with online survey results and thus indicated that this was not a concern to the final outcomes. Their surveys were not shown to have undergone psychometric testing; internal consistency and test-rest reliability were not available on the instruments used for evaluation.

Process Evaluation

The idea of process evaluation was first developed in the 1960's.[11] Suchman stated:

> *... However; an analysis of process can have both administrative and scientific significance, particularly when the evaluation indicates that a program is not working as expected. Locating the cause of the failure may result in modifying the program so it will work, instead of its being discarded as a complete failure.*[37]

More recently, the design and implementation of process evaluation has increased in complexity. Baranowski and Stables[38] identified eleven components when conceptualizing process evaluation procedures to increase the likelihood of developing successful process evaluation. Additionally, Contento[12] stipulated several question areas that a successful process evaluation should answer: How were recruitment strategies developed? How were participants involved in the data collection? What was the environment of the intervention? What were the materials necessary to attain project goals? How was the program implemented as related to design? What did the participants get out of the program? What problems were encountered by the group? How did the participants judge activities/components? When designing a process evaluation instrument, it is necessary to know what the important aspects of the program are.[24] Tracking these key program areas over time is a form of summative process evaluation and allows researchers to track change as a program progresses.[24,39,40] When feedback is provided in an attempt to improve a program as time progresses, this is known as formative process evaluation.[41,42] Some areas defined as process evaluation are

more properly associated with fidelity of implementation. These areas, such as implementation vs design need to be addressed as part of fidelity of implementation as a whole.

Kegler and colleagues[43,44] used process evaluation during on a multi-site teen pregnancy prevention project. The researchers reported four key lessons learned through the evaluation process. First, a close relationship between evaluators and stakeholders is important to success. Second, evaluation methods need to be flexible and able to adapt to changes in the program that will occur. Third, qualitative methods make valuable contributions to the evaluation, by allowing researchers to obtain stakeholder descriptions of facilitating and inhibiting factors of the intervention. Fourth, the use of qualitative evaluation can be labor-intensive.[43,44]

Process evaluation can act as a quality improvement tool. When used this way, the process evaluation takes a formative role.[42] Hulscher, Laurant and Grol[45] implemented a process evaluation instrument as part of quality improvement interventions. Information was gathered on the opinion of leaders and the thoughts of the target group. The researchers found that process evaluation makes desirable contributions to the development of interventions.

Glanz and colleagues[46-48] implemented process evaluation for the "Sun Safety Program". A monitoring form that consisted of eight collection variables (i.e. how many children attended this lesson and how interested were the children in this lesson) was used for each lesson. Interviews were also conducted with participants, site leaders, and trainers. The interviews consisted of both open- and closed-ended

questions. Specifically, respondents were asked to rate the usefulness of different study materials. The researchers reported that a key of process evaluation is that it can be used to help plan for a larger study. The process evaluation that occurred during the pilot project allowed for changes that improved the outcomes of the larger intervention.[46-48] McConnon and colleagues[49] collected process evaluation on website usage during a web-based intervention to reduce obesity. Participants were asked to report how they used the website and their frequency of use. Researchers found that the more frequently a person accessed the site, the better their weight outcomes. Using site-recorded statistics, it was found that increased use of the site message boards and chat room led to a reported increase in social support.[49] In contrast to this more quantitative approach, Naylor and colleagues[50] used interviews and focus groups as process evaluation tools during an intervention focused on physical activity and healthy eating in rural schools. The researchers asked both students and staff to describe the perceived impact of the program.[50]

During a diversity training series, Celik and colleagues[51] implemented a process evaluation strategy to determine increases in diversity skills (knowledge and attitude) as well as participant satisfaction with the program. To determine changes in diversity skills Celik and colleagues developed a quantitative questionnaire that focused on agreement with diversity sensitive statements, opinion about diversity in healthcare practices, self-assessments of knowledge and attitude, and reading of required literature. These questions were answered on a Likert scale ranging from 1-10 with varying response qualifiers. In addition to the quantitative measures, the researchers developed qualitative questions focusing on

program satisfaction. When the researchers implemented their questionnaires, some aspects were asked pre- and post-seminar while others were just asked after the seminar had been delivered. The benefit of using both qualitative and quantitative questions in evaluation was that the researchers were able to gather a more complete picture of their project than if they had used just one method of data collection.[51]

In 1999, Helitzer and colleagues[52] utilized an intensive process evaluation methodology to test an obesity prevention program in schoolchildren. The researchers measured a variety of measure to analyze intervention environment, curriculum, the family environment, physical education/recess, and school food service. To evaluate these core areas, the team utilized training, forms for feedback, checklists, interviews, and in person observations. The interviews and observations were reported to be the best at gathering information to help improve the program. However, these methods of evaluation were seen to be the most expensive and time consuming to implement. To develop these comprehensive process evaluation tools, the research team needed to work together and reach a consensus on what was important in the program.[52]

Schneider and colleagues[27] utilized the process developed by Helitzer and colleagues in 1999.[52] Dose, reach, and fidelity were measured through observations and checklists to try and reduce risk factors for Type 2 diabetes in middle school children participating in the HEALTHY Project. The process evaluation methods used allowed the researchers to add value to the analysis of their primary outcome

measures. The use of process evaluation provides a way to interpret the success or failure of a program. This ability is more important when a program is implanted across different sites and in different ways. Testing does, reach, and fidelity allowed researchers to fully elucidate the successes and failures of programs with many moving parts.[27]

Schneider and colleagues[53] reported the final findings of the HEALTHY Project. The researchers discussed how the early results of process evaluation allowed for improvements to program dispersal. The team modified the centralized control and distribution of program materials to be more localized. This allowed the sites the ability to make modifications to the program materials in order to meet site specific needs. Even with this flexibility to program materials, all sites were required to follow specific guidelines to implementation.[53]

Joesph and colleagues[26] used a process evaluation instrument as the primary outcome measure of the Childhood Obesity Research Demonstration project. The research team defined process evaluation as a way to view delivery and implementation of a project as well as if the intervention was delivered as intended. Three constructs were identified by the researchers: reach, which measured the extent the program attracted intended participants; dose delivered, covering the activities that were delivered to participants; fidelity, which measured how activities were delivered versus how they were planned to be delivered. The

researchers reported the need for process evaluation to help ensure standardized information gathering when a program is being implemented at different times across different sites.[26]

Fidelity of Implementation

When addressing the concept of fidelity of implementation, it is important to work from a consistent definition. Conceptually similar definitions have been provided by numerous researchers.[54-57] At the most primal level, fidelity measures the degree to which a program is implemented as intended by developers. Measuring fidelity allows researchers and practitioners to begin to understand the reasons for success or failure of a program.[58]

In order to develop a solid foundation for program fidelity of implementation, researchers must address a few challenges.[58-61] Researchers need an innate understanding of the curriculum components and outcome measures. It is important to define the desired outcome objectives prior to creating or implementing a fidelity testing instrument. Many researchers combine process evaluation (formative and summative) with fidelity of implementation.[62-64] Fidelity of implementation is part of process evaluation; however, when relegated to a piece of process evaluation, fidelity does not get the recognition it deserves.

In their discussion of an instrument for fidelity of implementation for a childhood obesity intervention, Branscum and colleagues[65] reiterated that fidelity, while essential, is often overlooked in interventions addressing health. Using a combination of qualitative and quantitative, including surveys, field notes, and

open-ended questions, the researchers assessed dose delivered, dose received, reach, recruitment, and context. Through analyzing fidelity, the researchers were able to determine that the program was implemented as designed, with all lessons being delivered in the intended order. To measure this item, researchers asked both the program facilitator and an assistant to record their thoughts on the percentage of the designed lesson that was delivered. Almost all lessons were rated at 100% in achieving the developed plans. Several lessons received lower percentages and the evaluators were consistent in their analysis. Children were allowed to attend a make-up session in the event of a missed session, and with this, all children received the desired dose. The people delivering the sessions were also asked to evaluate the length of each session and the program. These researchers did not address any changes in behavior through their evaluation.[65]

In a process evaluation of an intervention to prevent diabetes and cardiovascular disease, Lakerveld and Colleagues[66] developed questions that were asked of nurses and participants. For this study, the researchers educated nurses in motivational interviewing and in problem-solving treatment methods of delivering information. The researchers found no significant changes in behavior over the course of the study. Researchers reported that attendance at counseling sessions was low, and this could account for lack of behavioral changes.[66]

Law and Shek[67] used onsite evaluators to determine program adherence, implementation process checklist and process outcomes of a youth development program. To determine these items, program observers rated how well the actual

program and the delivered program corresponded. Observers used Likert scales to plot how well the designed program and the delivered program matched. The researchers completed inter-observer reliability to ensure the observers were recording similar outcomes. The observers used many items to score the implementation of the program. Items included things like interest, interaction, feedback, timing, and quality.[67]

Harn and colleagues[68] discuss the need to balance fidelity with flexibility. These two ideas may seem slightly incongruous. However, if there is no room for personal style and methods of education, a program will have limited ability to be widely distributed. Durlack[69] provided the basis for Harn[68] and colleagues. Durlack stated that programs with higher fidelity produced better outcomes. However, there is a movable threshold of fidelity above which no difference is noted. No researcher has been able to determine a comprehensive scale for fidelity across programs and the rigidity of fidelity of implementation varies across projects. Durlack tried to provide a fidelity scoring framework and identified that positive outcomes were seen between 40 and 60% of ideal implementation.[69]

Evaluation in Nutrition Education

Contento[12] believed that nutrition education can benefit from strong evaluation strategies. However, researchers do not report strong evaluation measures.[70,71] Bradford and colleagues report that this lack of reported research on evaluation is due the fact that there are no instruments available that can be used across programs. The researchers also believe that there is a paucity of standards

and references available relating to evaluating behavior change from a nutrition education program.[71] Bradford[71] created an instrument used to test nutrition, food safety and physical activity practices for low income adult programs. The researcher wanted to create a valid instrument to be used to address their focal areas nationwide.

In their study evaluating an intervention to promote healthy eating, Schmied and colleagues[72] only reported on process evaluation. The researchers viewed process evaluation as dose delivered vs received, and qualitative feedback during in-person interviews. Researchers reported their program was successful due to high attendance (dose received) and positive feedback from participants.[72]

Lee and colleagues[73] discussed process evaluation in their 2013 article about a middle school obesity risk reduction curriculum. The researchers qualitatively gathered participant feedback on the program. The feedback centered on what participants liked/disliked about the program and implementation barriers seen by leaders like adequate time and materials needed to complete program elements. In general, participants reported positive experiences relating to the program. This is in contrast to the leaders' report of barriers. Leaders reported a lack of time to prepare and implement the program.[73]

Researchers in Georgia also preformed process evaluation on their nutrition education program to help grade school children eat more fruit.[74] The researchers included dose, curriculum observation, self-reported teacher completion of objectives, and availability of fruits and vegetables in participants' homes. The

strategy used is a more thorough process of evaluation compared to most. Training of program teachers was performed so they would understand the purpose of their lessons. This training was seen to be important and useful with almost all the teachers attending the training and reporting that the information was presented in a useful way. The researchers did not have a program instrument to measure outcome change and relied on qualitative interviews and phone calls at the end of the education to determine change. The researchers found that some areas of the curriculum were implemented as designed, however, from the classroom observations, the researchers were able to determine that the teachers did not deliver the whole curriculum. The teachers were found to be under-implementing components that the researchers felt were needed for change. The researchers reported the need for further evaluation of the program to obtain a full understanding of the successes and failures.[74]

Lee and colleagues[64] reported using a systematic evaluation process in a middle school obesity risk-reduction curriculum. The researchers only reported on process evaluation which they included as faithfulness to the curriculum, student engagement, and implementation barriers. To measure faithfulness to the curriculum, researchers observed the classes. With a starting score of "5" for each class activity, they deducted a point if anything was altered, omitted, inserted, or replaced. Each alteration led to a deduction of one point from the total score. Student engagement was measured by observers on a scale of 1=uninterested to 4=all involved. Barriers to implementation were measured using open-ended questions. Overall the researchers reported that their program was well-

implemented. Even with their systematic approach, these researchers reported process evaluation as fidelity of implementation only.[64]

Barriers and Reasons for Evaluation

Mertz and colleagues[75] discussed program evaluation in out-of-school programs. She separated program evaluation into two branches. The first branch was process evaluation, which is defined as how an intervention or program was implemented as well as successful outcomes of implementation. The second branch is outcome evaluation which is used to determine changes in participant outcomes relating to the program. There are several concerns about implementing program evaluation measures. The first is that any evaluation process will divert resources from the program. The second is that evaluation can be complicated. If evaluation plans are not clearly delineated, they can be difficult to implement which leads to the next concern – that can be a burden on program staff. The final concern discussed by the author is that evaluation can produce negative results. There is no way to deny that negative results may be seen; however, being able to know what does not work, can be just as important as finding out what does work. This concern leads directly to the authors first reason for implementing program evaluation in after-school programs, and that is to find out what does and does not within a program. The second reason to implement evaluation strategies is that evaluation can showcase the effectiveness of a program. Evaluation also allows program staff to improve.

Assessing where staff members are succeeding and where they may need additional training allows researches the opportunity to address challenges and improve a program.[75]

In their article on evaluating afterschool programs, Little and colleagues[20] discusses the issue of "disappointing" results. The author states that it is important to align evaluation outcomes with program efforts. Program outcomes and impacts need to be designed and measured in relation to program activities. This may sound complex, but it is simply saying that researchers cannot expect to see change if the tool measuring change does not address the program-specific activities.[20] This idea is further seen when Zohrabi[21] describes course/program evaluation. Zohrabi and colleagues discussed the need to explore program outcomes while planning evaluation tools and elaborates upon this idea by saying that it is important to evaluate different types of program participants. It also is important to evaluate using a variety of strategies and not purely quantitative surveys.[21]

Instrument Development

The aforementioned program evaluation literature discussed the need for instruments designed to capture the important aspects of the program being evaluated. Some of the examples tested and reported internal consistency on their scales but none discussed further test-retest reliability or the testing of factor analysis to determine potential subscales.

When testing for internal consistency, Cronbach's alpha is used.[76] Cronbach's alpha is measured on a scale from 0 to 1. An alpha level of above 0.9 is

considered to be excellent, 0.8-0.9 indicates a good internal consistency, 0.7-0.8 is acceptable, and 0.6-0.7 is questionable. Any alpha less than 0.6 is considered poor or unacceptable. Test-retest reliability is a measure of consistency of an instrument over time. This measure is analyzed using simple correlations between two time points.[74,77]

Performing factor analysis on a set of questions allows the researcher to determine the cohesiveness of the questions and eliminate any questions that may be unneeded.[78-81] Tabachnick[82] and Comrey[83] stated that factors that load above 0.63 are seen as "very good" to "excellent" loading and should be kept in the scales. Any factor loading below 0.63 would indicate that a question should be reviewed and potentially removed.[84-86] Even though a question loads below 0.63, it is not required to be removed. Any question may be retained if the researcher views the question as asking something specific and important or if it has significant theoretical application.[82,86,87]

In summary, there is a lack of adequate forethought in planning evaluation strategies. How evaluation is defined and implemented varies across research projects. Even in the field of education, where evaluation is more commonly reported, consistency is lacking and a true systematic approach is not reported. This researcher worked to create a comprehensive strategy for evaluation that can be easily implemented and adapted to fit a wide array of nutrition education programs. Addressing the evaluation of fidelity of implementation, process, and

program outcomes builds upon the evaluation methods used by other nutrition educators, evaluators and school educators.

CHAPTER 3: GENERAL METHODOLOGY

Goal and Objectives

The goal of this research was to create a comprehensive, cohesive three-pronged approach to evaluation for the iCook 4-H program – a culinary and physical activity program for 9-10-year-old children and their main adult food preparer. The specific objectives were to develop and implement:

1. a Fidelity of Implementation instrument to measure whether the program was implemented as intended
2. a Process Evaluation instrument to measure participant and leader feedback across the iCook 4-H intervention
3. Program Outcome evaluation instruments to measure outcomes for youth and adult participants

Overview of iCook 4-H Study Design

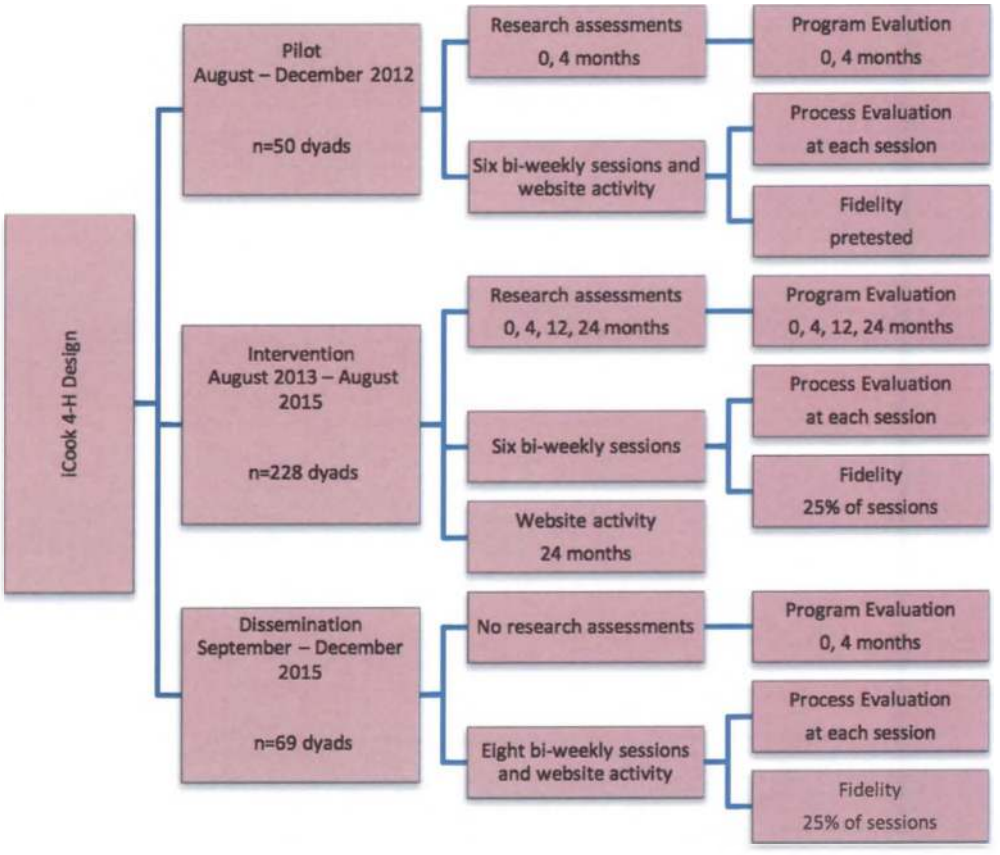
iCook 4-H was a control/treatment intervention study with assessments at 0, 4, 12, and 24 months. Included with the research assessments at each time point was the *program outcome evaluation*. Study participants (n=228 family dyads) were recruited from across the five states of Maine, Nebraska, South Dakota, Tennessee and West Virginia. Dyads were a child between the ages of 9-10 years and their parent or guardian. As they were recruited, every other dyad was assigned to either control or treatment on a state-by-state basis. As recruitment progressed and numbers recruited were less than planned, the protocol was changed to use a skip pattern for group assignment to allow two treatments to every one control dyad to enter the study to increase the number in the treatment group. Participants received

a ten-dollar stipend at each assessment time point. Treatment youth also received a video camera for intervention activities. Across the five states, between 0 and 4 months, 40 iCook 4-H classes, each with six sessions or 240 total sessions were implemented. Treatment family dyads participated in iCook curriculum which included 120-minute sessions with the focal areas of culinary skills, physical activity, family mealtime, and "healthy" goal setting. Sessions occurred every other week during the designated time period and at the end of each session, youth and adults completed *process evaluations,* designed to provide feedback about the session. Dyads received ten dollars at each session with the aim of providing support for the iCook activities of cooking, eating and playing together between the sessions. Sessions were taught by Cooperative Extension Nutrition Associates and student researchers and at the end of each session, they also completed *process evaluations.* At 25% (n=60) of all sessions, *fidelity of implementation* was assessed by a person trained by the researcher to determine if the curriculum was implemented as intended. The overall design of the iCook 4-H project can be seen in Figure 3.1

The iCook website was developed by the researcher in collaboration with Rainstorm Consulting, Orono, Maine. It served a variety of purposes including the site for collecting research data and the study educational site for interactive activities for the participants. The ultimate goal was that the website would become an online community for study participants. Treatment participants created videos focusing on cooking skills, family mealtime and physical activity. Access to the

website, which adhered to the standards of accessibility, including being Section 508 compatible, was available during the entire length of the 24-month study.

Figure 3.1. iCook 4-H Study Design



iCook 4-H Three-Prong Evaluation Instruments

The iCook 4-H evaluation strategy consisted of instruments designed to capture fidelity of implementation (Appendix A), youth (Appendix B), adult (Appendix C) and leader (Appendix D) process evaluation, and youth (Appendix E) and adult (Appendix F) program outcome evaluation. The program evaluation instrument underwent psychometric testing and final modified versions were created for youth (appendix G) and adult (appendix H). The program outcome

evaluation, designed to take 15 minutes, and the process evaluation, designed to be 5 minutes, were administered online using Qualtrics Survey software (http://www.qualtrics.com). To help provide consistent access to the Internet, all sites were to have access to wireless Internet. However, there was a location in Nebraska where hard copy instruments were used throughout the study due to lack of reliable Internet service. Complete methods relating to evaluation instruments can be found in Chapter 4 for fidelity of implementation, Chapter 5 for process evaluation, and Chapter 6 for program outcome evaluation.

CHAPTER 4: DEVELOPMENT AND IMPLEMENTATION OF AN INSTRUMENT TO EVALUATE FIDELITY OF IMPLEMENTATION

Introduction

iCook 4-H is a culinary, physical activity program for family dyads implemented in the five states of Maine, Nebraska, South Dakota, Tennessee and West Virginia as part of a 2-year intervention study to address the critical public health concern of childhood obesity. The curriculum, implemented in fall, 2013, included six direct contact sessions for 9-10-year-old children and their main adult preparer of food. iCook was designed for dyads to cook, eat and play together in a community-based program with the intent of translation to the home environment. The program was implemented primarily through Cooperative Extension 4-H programming.

The 2010 White House Task Force and, more recently, First Lady, Michelle Obama's, *Let's Move* team set forth the goal to end childhood obesity within a generation.[9,10] Researchers have determined that community-based programs, designed to target multiple factors, are the best way to address the obesity problem.[61,89-92] While the development of programs is an important step towards reaching the goal of ending childhood obesity in a generation, very little research has been done to assess how the fidelity of program implementation impacts community-based nutrition education interventions.[28]

When addressing the concept of fidelity testing, it is important to work from a consistent definition. Conceptually similar definitions have been provided by numerous researchers, and at the most primal level, the meaning is the degree to which a program is implemented as intended by developers.[54-57] Through analyzing program fidelity, researchers have been able to determine if a program has been implemented as designed, with all important components addressed.[61,93-97] As recent as 2015, Richards and colleagues[28] reported that they were the first to present information on the fidelity of a community-based obesity prevention program. They reported fidelity based on several key areas of the intervention. Percentages on implementation integrity about physical activity and healthy eating were reported. The researchers also reported implementation strategies that lacked fidelity.

Based on a review of the nutrition education research literature, researchers have mentioned components of fidelity without how the process occurred to test and ensure programs were implemented as intended.[13,26,27,52,70,72,98] In general, fidelity testing is not reported in a consistent manner, and in nutrition education research, as well as other fields, it is often included as part of process evaluation procedures..[27,52,92,99] Dose, a measure of the program participation, is the most frequently reported measure of fidelity.[26,52,100] It is generally reported as program attendance.

Century and colleagues[61] offered a framework for measuring fidelity with the goal of providing a common language base for fidelity measures. In their framework, fidelity of implementation is separated into two components, the structural critical, or essential, components and the instructional critical components. The structural critical components are composed of what they referred to as the procedural sub-component, which are the organizing "what to do" program elements, and educative critical subcomponents, which are what the program leaders should "know" to conduct the program. Structural components are not required to be measured during implementation, but are often represented in leader training. If measured during implementation, structural components are composed of items like session timing, attendance, and completion of objectives. Instructional components are only measured during implementation of a program and are composed of the pedagogical and the student engagement critical components. The pedagogical component consists of the leaders' behavior and interactions with program participants. The focus of the student engagement component is on how participants engage with the program materials.[61]

Challenges to consider when developing a solid foundation for program fidelity testing include having a firm understanding of the curriculum components and outcome measures, including defining the desired outcome objectives prior to creating or implementing the fidelity testing.[58-61] It may also be a challenge to train the fidelity evaluators since they must have an understanding of not only the instrument use to measure fidelity, but of the goals of the curriculum they are evaluating.

Thus, the goal of this study was to develop and conduct a fidelity of implementation evaluation of the iCook 4-H curriculum, which was delivered across five states by multiple leaders. Century and colleagues'[61] framework was used to develop the fidelity instrument. The objective was to determine if the curriculum was implemented as intended.

Methods

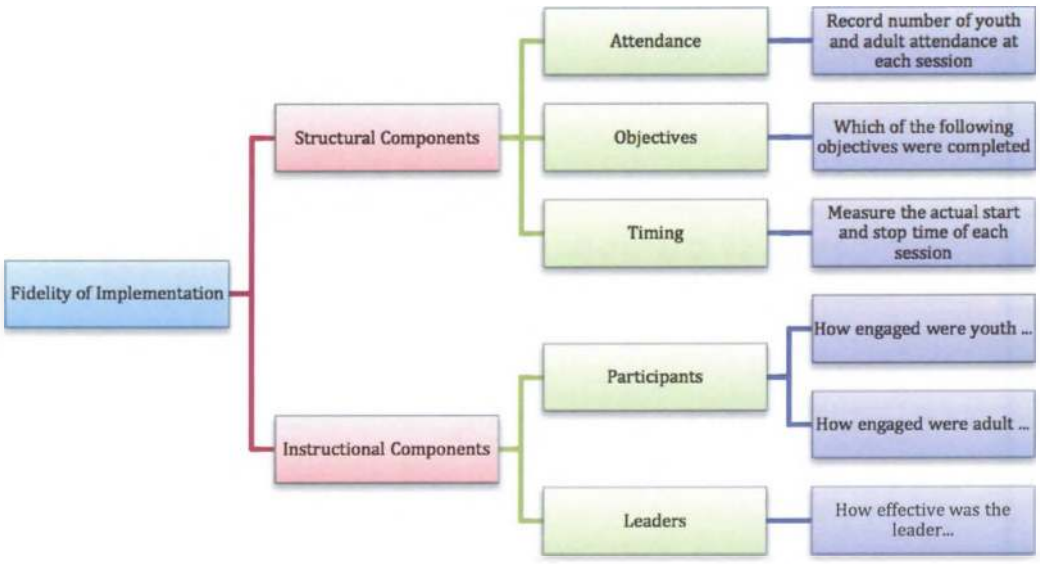
Overview of iCook 4-H Curriculum

The researcher had a thorough knowledge of the iCook 4-H study and the curriculum as he participated in its development and that provided the basis for designing the Fidelity of Implementation instrument used to assess curriculum implementation.[101-103] The curriculum was designed as six biweekly sessions with between-session and website activities. The biweekly sessions consisted of different activities used to educate the dyads on the iCook 4-H focal areas: culinary skills, physical activity, family interactions (family eating together and communicating) a nutrient focus, and goal setting.[102,104] Technology was integrated into each session, including laptops, the Internet, a study website and video cameras given to each youth participant. The Internet and laptops were used for completion of program elements and to show educational videos. Between the in-person sessions, participants were to cook, eat, and play together at least two times a week and to record and share these activities on the study website. Forty classes with 150 youth-adult dyad participants across the five states were held between September and December 2013. Most leaders were Cooperative Extension/4-H staff and most assistants were college students.

Fidelity of Implementation Instrument Development

The Fidelity of Implementation Instrument was designed using the framework by Century and colleagues.[61] To develop the instrument, the researcher conducted a careful curriculum review. A framework was created to show the different structural and instructional components that were identified as important (Figure 4.1). The basic structure of the questions was developed to capture components that were instructional (e.g. "How involved were the youth with...?") and structural (e.g. "Check which program elements were covered").

Figure 4.1. Framework for Creation of Fidelity of Implementation Instrument



The instrument was designed to capture:

- Structural Components
    - the number of participants scheduled to attend and the actual in attendance;
    - expected and actual start time of session;
    - allotted and actual of time scheduled for session activities, e.g., amount of time to make the recipe for the day;
    - check-off verification that session-specific objectives were achieved;
    - check-off verification that program elements were covered, e.g., culinary skills; and
    - check of whether adequate materials were available for leader to teach session
- Instructional
    - measure of how engaged youth were in the session;
    - measure of how engaged adults were in the session
    - measure of leader effectiveness; and
    - measure of how much the leader referred to curriculum guide;
- Evaluator Demographics.

The instrument was reviewed by the other iCook researchers. A statistician, Gail Tudor, and experts in evaluation, Dr. Jeffrey St John, at the University of Maine and Dr. David Diehl, at the University of Florida, served as reviewers of the design of the instrument and protocols for implementation.

The general format of the instrument was pretested during the iCook pilot test. Following the pilot test, the content and style of the questions were modified based on analysis of results and feedback from iCook 4-H pilot fidelity of implementation evaluators and the research team. The format was then modified to change open-ended questions to closed-ended due to comments provided by evaluators who pilot tested the instrument in the iCook 4-H pilot study. Clarity was added around the specific objectives/timing (e.g. objectives were reworded to exactly match curriculum wording), From the one instrument format, six session-specific tools were created to coincide with each of the six sessions of the curriculum (Appendix A). Measuring structural components of the session was done by recording start and stop time of the session, recording the number of actual versus scheduled dyads in attendance, and using a checklist format for whether session objectives were completed and focal areas (e.g., culinary skills) were covered. In appendix A, session-specific objectives can be seen by reviewing the tool for each session. For example, for Session 1, the objectives were to 1) participate in technology training, 2) make an introductory video, 3) upload and post an introduction video, 3) play the circle game to promote physical activity, 4) use knives safely when preparing fruit salsa, 5) participate in family communication discussions, and 6) describe and set SMART-R goals. For instructional components, a one-item rating for youth and for adult was used to measure engagement in the sessions, with the score range from 1=showed little engagement in the session to

4=were actively engaged throughout the session. Leader effectiveness was measured on a one-item rating, with a score range from 1=very ineffective to 4=very effective.

Training and Protocol for Implementation of Fidelity Testing

Principal investigators from each state identified fidelity evaluators. These evaluators were graduate students or Extension/4-H staff who were familiar with the iCook 4-H project, but not involved in program development, except in rare situations when an iCook researcher conducted the testing. The researcher trained the evaluators through two webinars in the summer of 2013 on how to follow the iCook 4-H curriculum and how to use the tool. The training focused on preparing for evaluation and utilizing the instrument. To prepare, the evaluators were asked to review the first iCook 4-H session prior to training. The session was discussed while evaluators followed both the curriculum and the fidelity instrument. Each of the questions on the instrument were discussed to ensure evaluators understood what to look for while they were at the session. Following the webinar, training occurred on an individual basis as needed.

Evaluators were assigned to certain sessions and provided with a session – specific FOI tool, which they completed by observing both leaders implementing and dyads participating in the 2-hour sessions. They were instructed to stay as an observer in the background of the session, then to scan and email the completed tool to the researcher.

Schedule for Fidelity Testing

To implement a fidelity schedule across multiple sites, a testing schedule was developed with the plan of testing FOI in 25% (n=60) of the 240 sessions (40 classes x 6 sessions/class=240±.25=60 sessions). This percentage was based on a consultation with evaluation experts, and the number that seemed feasible to expect for the project. To meet the 25% FOI evaluation rate, each session was scheduled to be evaluated ten times across the five states for a total of 60 evaluations as shown in Table 4.1. For example, to accomplish the goal of implementing fidelity in ten sessions of the forty Session 1 sessions across the five states, the schedule was for evaluators in Maine (ME) to evaluate four different Session 1 sessions, in Tennessee (TN) and South Dakota (SD) to each evaluate three different Session 1 sessions.

Table 4.1. Schedule for Testing Fidelity of Implementation[1,2,3,4]

Session 1[1]	Session 1[1]	Session 1[1]	Session 4[1]	Session 5[1]	Session 6[1]
ME[2] x 4[3]	TN x 4	ME x 4	ME x 4	ME x 4	TN x 4
TN x 3	WV x 3	WV x 3	TN x 3	WV x 3	WV x 3
SD x 3	NE x 3	SD x 3	NE x 3	SD x 3	NE x 3

[1]Planned schedule=25% of total sessions (240 total sessions x .25=60 sessions or 10 fidelity testings/session)
[2]Session number denotes the specific session in the iCook 4-H program
[3] State abbreviations are as follows ME=Maine; NE=Nebraska; SD=South Dakota; TN=Tennessee; WV=West Virginia,
[4]Each number indicates the number of times fidelity testing was to be measured in that state for the identified session, from Session 1 to Session 6 with the goal that each session would be tested 10 times.

Data Management and Analysis

Each FOI tool was coded and entered into a data base. Verification of correct data entry was performed by a researcher who did not enter the initial data. Descriptive statistics were computed for demographic data and for each tool by session. Fidelity findings were organized by structural and instructional

components and presented by mean±SD or percentages, across the six sessions, as appropriate. Comparisons were made between planned versus actual findings.

Results

Evaluator Demographics

All evaluators (n=16) were female, with a range of ages, and were primarily Extension/4-H personnel (43.8%) or student researchers (42.8%). (Table 4.2).

Table 4.2. Fidelity of Implementation Evaluator Demographics

Demographics	N	%
Gender		
Female	16	100
Age (years)		
18-24	7	43.8
25-35	3	18.7
36-45	2	12.5
46-55	2	12.5
>55	2	12.5
Position		
Principal Investigator	1	6.2
Student Researcher	7	43.8
4-H Staff/Volunteer	4	25.0
Cooperative Extension Staff	3	18.8
Research Consultant	1	6.2

Actual versus Planned Fidelity Testing Schedule

Based on the planned schedule for fidelity testing of 60 evaluations, the instrument was completed with an overall 95% completion rate (n=55 complete tools). The proposed testing schedule versus the actual completed number of fidelity evaluations is presented across Table 4.3. The high percent completion rate was due to WV evaluators completing more than the planned number, so they made

up for evaluators in three states (ME, SD, TN) who did not accomplish the planned assessments. Sessions were tested different number of times however; fidelity testing was evenly distributed across sessions (p=0.014).

Table 4.3. Planned versus Actual Fidelity of Implementation Evaluations[1,2,3,4]

Session 1[1]		Session 2[1]		Session 3[1]		Session 4[1]		Session 5[1]		Session 6[1]	
Plan	*Actual*	*Plan*	*Actual*	*Plan*	*Actual*	*Plan*	*Actual*	*Plan*	*Actual*	*Plan*	*Actual*
ME x 4	ME x 3	TN x 4	TN x 3	ME x 4	ME x 3	ME x 4	ME x 2	ME x 4	ME x 3	TN x 4	TN x 1
TN x 3	TN x 3	WV x 3	WV x 5	WV x 3	WV x 5	TN x 3	TN x 3	WV x 3	WV x 5	WV x 3	WV x 5
SD x 3	SD x 2	NE x 3	NE x 3	SD x 3	SD x 1	NE x 3	NE x 4	SD x 3	SD x 2	NE x 3	NE x 2
10[4]	8	10	11	10	9	10	9	10	10	10	8

[1]Session number denotes the specific session in the iCook 4-H program
[2]State abbreviations are as follows ME=Maine; NE=Nebraska; SD=South Dakota; TN=Tennessee; WV=West Virginia,
[3]Each "plan" number indicates the number of times fidelity testing was to be measured in that state for the identified session, from Session 1 to Session 6 with the goal that each session would be tested 10 times.
[4]Each "actual" number indicates the number of times fidelity testing was measured in that state for the identified session

The structural components measured for attendance and session-specific objectives achievement are in Table 4.4. Over the course of the program, the average attendance was 86% of participants, with above 90% in the first two sessions. Session-specific objectives were met 93.5% of the time over the course of the program. Of the six sessions, the evaluators identified a mean of 85.7% of the objectives were addressed in Session 1 compared to at least 95% for the other sessions. The objectives not met for Session 1 were varied. Technology training (n=4 evaluators reported missing) and goal setting (n=5 evaluators reported missing) were the most common objectives not met.

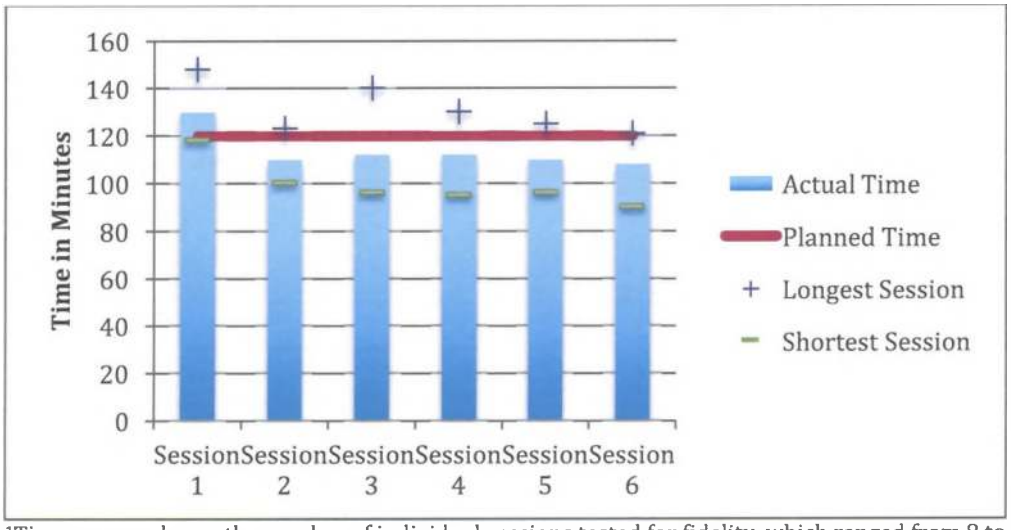
Table 4.4. Percent Attendance and Session-Specific Objectives Met as Assessed by Evaluators (n=16) of the iCook 4-H Curriculum[1]

	Session 1[1]	Session 2[1]	Session 3[1]	Session 4[1]	Session 5[1]	Session 6[1]
Average Percent Attendance	100%	91%	82%	82%	73%	86%
Average Percent of Objectives Met[2]	85.7%	95%	95%	100%	96%	100%

[1]23% were evaluated out of 240 total number of session days for the 40 classes implemented during the Intervention Study.
[2]Session-specific objectives are identified in the Fidelity of Implementation Instrument (Appendix A)

As can be seen in Figure 4.2, mean session length was 115±10 minutes, compared to the 120 minutes (2 hours) planned in the curriculum. On average, Session 1 took the most time to complete and Session 2 the least time to implement with very little variability across the 55 sessions that were evaluated. Based on results of Session 1, of these eight sessions that were evaluated, the average time was 130 minutes, ranging from 118 to 148 minutes.

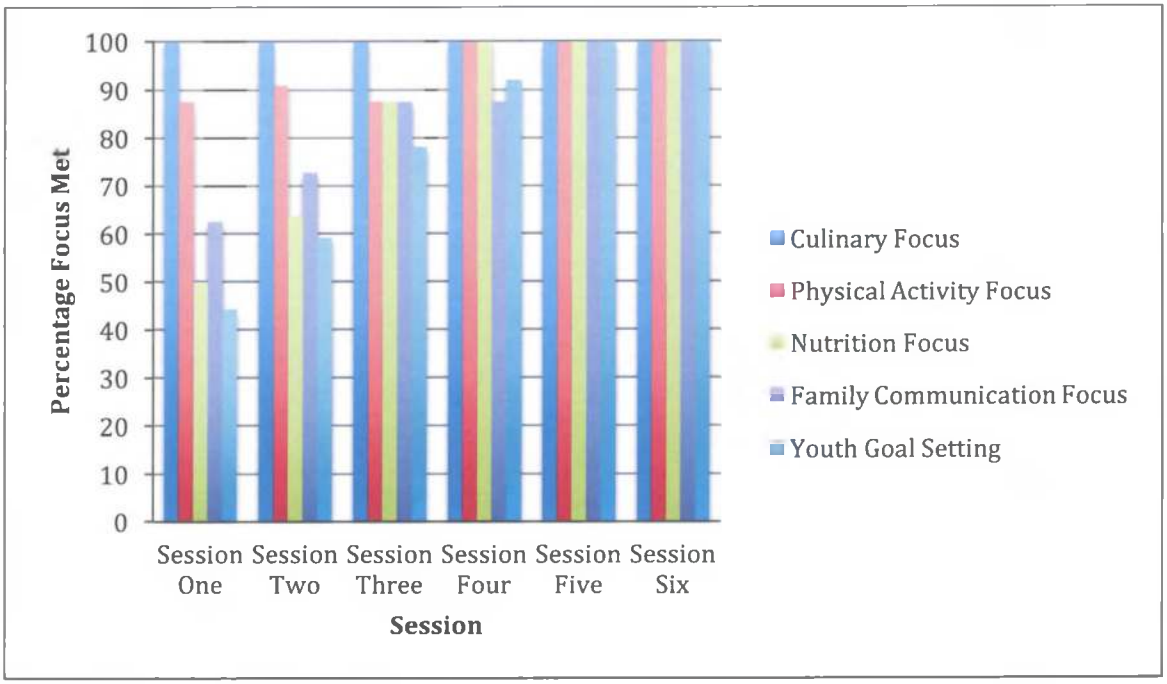
Figure 4.2. Actual[1] versus Planned Time Leaders Used to Complete Sessions[2] as Assessed by Fidelity Evaluators (n=16)



[1]Time averaged over the number of individual sessions tested for fidelity, which ranged from 8 to 11 sessions, i.e., Session 1 was taught 40 times and eight of them were tested for fidelity. See Table 3.3 for number of each session that was tested for fidelity.
[2]23% of total sessions were evaluated; total sessions=240.

The findings for the structural components of the five focal areas—culinary skills, physical activity, nutrition, family communication (engaged in communication discussions), and goal setting over the course of the sessions are in Figure 4.3. Evaluators assessed culinary skills as being addressed 100% of the time during each of the six sessions (Figure 4.3), but the focal areas of nutrition, family engagement/communication, and goal setting were only addressed an average of 68% and 78% of the time, respectively, until Session 5. By Session 5, all five focal areas were addressed 100% of the time at each session.

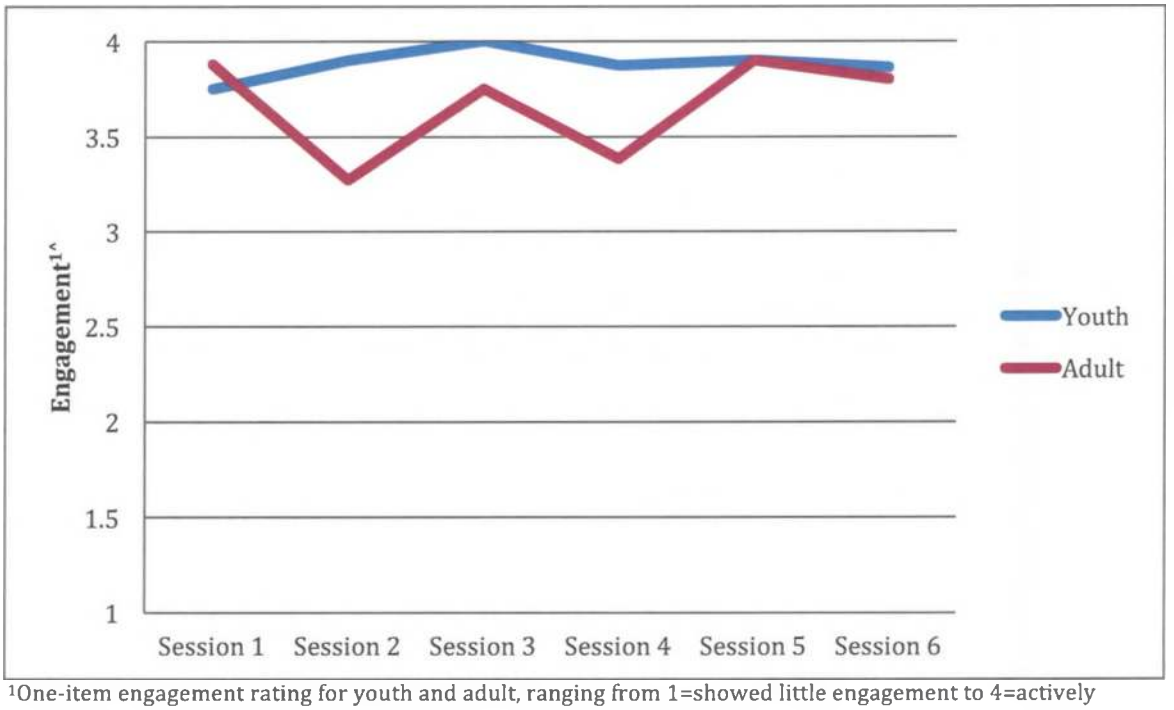
Figure 4.3. Mean Percentage of Focal Areas Addressed at Each Session as Assessed by Fidelity Evaluators (n=16)[1,2]



[1]23% of total sessions were evaluated.
[2]1Completed objectives as measured over individual sessions tested for fidelity, which ranged from 8 to 11 sessions, i.e., Session 1 was taught 40 times and eight sessions were tested for fidelity. See Table 4.1 for number of each session that was tested for fidelity.

The findings for the instructional component of engagement of youth and adults across the six sessions as assessed by the evaluators are in Figure 4.4. Youth were rated as "actively engaged" throughout the sessions with a mean score of 3.86±0.34, based on a 4.0 scale, with little variation in the range of scores from 3.75±0.33 at Session 1 to 4.0±0.00 at Session 3. Similarly, adults were rated as "engaged to actively engaged" with a mean score of 3.67±0.62, ranging from 3.27±0.47 at Session 2 and 3.88±0.56 at Session 1.

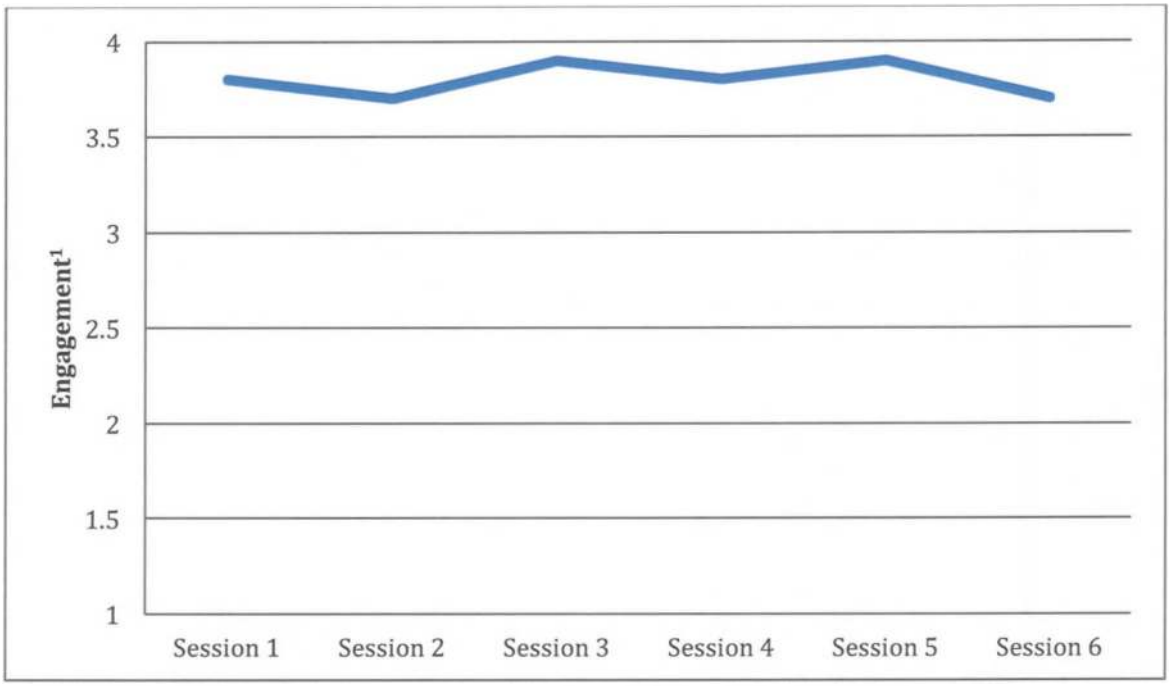
Figure 4.4. Mean Youth and Adult[1] Engagement[2] Across iCook Sessions[3] as Assessed by Fidelity Evaluators (n=16)[1,2]



[1]One-item engagement rating for youth and adult, ranging from 1=showed little engagement to 4=actively engaged throughout the session.
[2]Data from 55 sessions (23% of total sessions)

Across all sessions, evaluators rated leaders as effective at communicating and addressing objectives and focal areas with mean ratings from 3.70±0.69 to 3.90±.98 on a 4.0 scale, indicating they were engaged (Figure 4.5).

Figure 4.5. Leader Effectiveness[1] Across Sessions[2] as Rated by Fidelity Evaluators (n=16)[1,2]



[1] One-item engagement rating scale, ranging from 1=very ineffective to 4=very effective
[2]Data from 55 sessions (23% of total sessions)

Across the 55 sessions (23%) that were assessed, evaluators reported that 96% of the time all materials needed by leaders were available. Lack of adequate number of electronic devices (e.g., laptops, smart phones) to complete evaluation surveys was noted three times and lack of projectors to show educational videos was noted two times at different sites.

Discussion

This study was designed as one of the three prongs of the program evaluation of the iCook 4-H Research Study. iCook was evaluated to determine if it was implemented as intended through the use of a newly developed fidelity of implementation instrument. The 16 evaluators were selected by the research team in each state based on their being connected to the research teams or to 4-H

Extension. They were all female, with varying ages, with little variable in the collected demographics however no evidence is documented in the literature to suggest age or gender impacts the areas measured in the iCook 4-H FOI instrument.

Researchers have proposed that measuring FOI at every session is desirable however, they also acknowledge that such a task is not feasible.[54,58] While evaluation researchers have not set a percentage of sessions to target for fidelity testing to ensure that the measured sessions are a valid assessment, it was pleasing that with the goal of 25% of sessions, 23% were evaluated with very consistent findings. The high success rate of 95% was achieved even though not all state plans were followed because some state researchers were able to complete more than their planned evaluations. The states that were unable to complete the required testing schedule faced personnel barriers. It is encouraging that the completion success rate was high, but there could be concern in not following the testing schedule. Without following a designed schedule, too few sessions could be evaluated which would not provide an adequate sample to determine program fidelity.

Like Century and colleagues[61] set forth, the iCook 4-H fidelity of implementation instrument ensured that structural and instructional components were measured. This allows the research team to fully understand what occurred at each session. Interestingly, based on findings from the structural components assessed, as the sessions progressed there was an increase in the amount of objectives and focal areas met. The increase in objective completion and meeting of

the focal areas could indicate that as the program progressed, leaders felt more comfortable in the program and were able to complete more of the components. In addition to structural critical components, the iCook 4-H FOI instrument was developed to measure participant engagement. Century and colleagues[61] reported that engagement of participants was important to maintaining fidelity. Like the Century report, iCook 4-H participants were seen as engaged throughout the program. High engagement on the part of youth and adults indicates that they are more likely to be learning from program activities, and ultimately making desired changes. The same is true when viewing leader effectiveness. Century and colleagues also report that an effective leader is able to help ensure that participants are getting the most out of each session.

Average participant attendance varied across the sessions, but in general a decline was seen between the beginning and the end of the program. A decrease in program attendance affects the amount of a program to which participants are exposed (dose). Schmied[72] reports that a decrease in participant dose leads to decreased fidelity. This decrease is often seen in studies that occur over a period of time.[105] Although iCook 4-H sessions only required a 12-week commitment, many participants in research studies do not fully realize the impact programs have on their everyday schedules. This participant burden is well known.[105-108] When trying to ensure high fidelity of implementation, it is important to ensure that participants complete all aspects of a program. Decreasing participant burden is one method to help ensure completion of a program.[105]

A finding of concern was that although leaders were seen to have the materials needed the majority of the time, there were five reported incidences of sessions lacking the technology needed to complete session-specific objectives or the end of session process evaluation instruments. Researchers had extensive discussion prior to the start of the intervention study to ensure adequate technology would be available. The lack of technology reported indicates that additional training may be needed to ensure leaders know what materials they will require.

Conclusions and Implications

In general, the iCook 4-H curriculum was delivered as intended. The iCook 4-H team was able to use the high indicators of fidelity (e.g. objectives/focal areas being met, engagement of youth and adults, and effectiveness of the leaders) to understand that the leaders were well trained. This finding was exciting to the research team given that iCook 4-H occurred over 5 states with multiple leaders. Fidelity of implementation outcomes were considered when the iCook 4-H research team added two additional sessions. Session 1 was divided up into an introduction and technology session due to the extra time needed as reported by the fidelity evaluators. A final session was added to provide a time for a program wrap-up as requested by participants. Two additional fidelity instruments will be developed for future deliveries of the iCook 4-H curriculum for these new sessions.

Moving forward, the outcomes from this instrument could be organized into a scoring system that would allow researchers to quantitatively define the level of fidelity and compare disparate sessions. Additionally, like Richards and colleagues[28]

espoused, being able to define levels of fidelity would allow researchers to perform statistical tests comparing program outcomes based on the fidelity implementation level of sessions.

Since most researchers report fidelity as purely a construct of dose and included solely as a part of process evaluation, there is little available on true testing of fidelity. By creating a short, and easy to use, method of measuring fidelity, more research could be conducted on fidelity. This instrument was designed to be easy to use and analyze. Although the exact questions are specific, the method in which the instruments were developed for this project may provide a framework for other program modifications. If iCook 4-H specific objectives were substituted with information from other programs, the instructional critical components would be addressed as they relate to fidelity. This framework will allow researchers to fully account for fidelity testing from inception in the future.

CHAPTER 5: PROCESS EVALUATION

Introduction

Implementing process evaluation strategies allows researchers to identify clues to the successes and failures of a project's implementation.[12,24,38,45,52,92] The ability to analyze a program as it progresses allows for quality improvement based on documented results.[45] Evaluators first used process evaluation in the 1960's to gather information on the progression of educational programs.[11] Since then, the design and implementation of process evaluation has increased in complexity. Today, researchers can use process evaluation to determine information that can relate to not only what is learned during the program process, as a formative measure to keep a program on track, but also at program completion, in a summative manner to identify program outcomes.[24-27,52] Summerbell and colleagues[109] performed a Cochrane Review by systematically reviewing primary research in childhood obesity prevention, and found that process evaluation tools are missing in most interventions.

Contento[12] stated that process evaluation is the most routinely completed type of evaluation, although Story and colleagues[92] reported that with the emphasis on program outcomes in research, strong process evaluations are rarely reported. When it is reported, it is commonly presented as a measurement of reach, dose delivered and fidelity.[26,52] Since fidelity of implementation is used to measure how closely a program is delivered to how it was intended to be delivered[61], dose is often as the measure of fidelity.[98] However, with the more complex nature of

interventions, process evaluations should be developed to provide insight into ways to strengthen programs and to interpret and potentially influence program outcomes.[92] Therefore, the focus of fidelity and process should be different and specific tools are needed for measurement.

The need for a well-planned and developed process evaluation methodology is increased when a program is designed to be implemented across different sites – especially if the different sites have different leaders as was the case for the iCook 4-H program.[26,27,53] Important aspects of the program must be agreed upon by researchers when the instrument is created.[52] The purposes of this study were to monitor participant feedback related to iCook focal areas and to identify leader response to the curriculum and to the participants at the end of each session.

Methods

Study Design

iCook 4-H was a control/treatment 5-state multistate obesity prevention research project implemented in Maine, Nebraska, South Dakota, Tennessee and West Virginia. The participants were 9-10 youth and their main adult meal preparer. Across the five states, there were 25 leaders for 30 separate classes. Process evaluation was collected on the treatment participants, only, over the course of the intervention. There were six biweekly interactive sessions and between-session activities. Between sessions, they were asked to meet the iCook 4-H goals of cooking eating, and playing together at least four times (2 times/week). At the end of each of the six sessions, treatment dyads (and session leaders) completed online process evaluation surveys that were similar in style, but tailored for respondent groups.

Data were collected online through Qualtrics (qualtrics.com) and managed in SPSS (Version 22, Armonk, NY: IBM Corp.). The iCook 4-H study was approved by the Institutional Review Boards for the Protection of Human Subjects at all five universities associated with the project.

Instrument Development

Three process instruments were developed. Each online instrument was designed for a specific population with logic to direct the survey takers with direction to questions only to be asked once. For each respondent group, a basic process evaluation tool was created and then modified for each of the six sessions. Questions were developed through review of the iCook 4-H curriculum, researcher input from each of the five states, and input/review was provided by statistical and evaluation specialists. The process evaluation surveys were designed to be short and quick for participants to answer. Response items were either 5-point Likert scales or open-ended questions. An example of a Likert type question ask of both the youth and adult was, "How often did your family eat together over the last two weeks?" (1=never to 5=all of the time). An example of an open-ended question asked of the leaders was, "What do you feel was the most important aspect of the class for the child? "The survey tools were specific for adults (n=21 questions) (Appendix C), youth (n=12 questions) (Appendix B), and leaders (n=16 questions) (Appendix D). This researcher tested the process surveys during the iCook 4-H pilot project, and a couple of questions were removed because they did not generate meaningful data.

Data Analysis – Quantitative Data

These Likert scale questions were analyzed descriptively as quantitative data. Open-ended questions included "In one word, please describe your family meals." and "What was the most important thing you learned today?". These questions were thematically coded and the codes were used to create word clouds. The survey questions were Likert based with the exception two questions for youth and adults being open-ended.

All quantitative data were descriptively analyzed using SPSS (Version 22, Armonk, NY: IBM Corp). Descriptive statistics were determined for each session individually based on the responses gathered for that session. Student's *t*-tests compared responses from Session 1 and Session 6 with a set p-value of 0.05.

Data Analysis – Qualitative Data

All qualitative data were transformed into word clouds, using the online word cloud generator Wordle (http://www.wordle.net). Data by groups (youth, adults, leaders) were kept separate for initial analyses and ultimately responses from like-questions for youth and adults were combine for analyses because of high similarity in responses. To create word clouds, data reduction was accomplished through a systematic process. The first step was to code responses into categories by question and then the categories were labeled thematically coded. Thematic codes were collapsed as needed. This process was completed separately by two researchers and results were compared for verification. Dissimilar categorizations were discussed to make final decisions. Using Wordle, the themes were entered the number of times they were noted by researchers. When finished entering, a word

cloud is generated where bigger word size indicates more mentions of that theme by participants. Color and directionality of words in the cloud are able to be specified to meet personal preference.

Results

Treatment dyads (0-month n=150) consisted of youth (mean age=9.73±0.9 years) and their primary adult meal preparer (mean age=38.32±7.9 years). Reported treatment youth demographics were 47% male, 53% female and 64% white, 14% Hispanic, 10% black, and 12% other. Of the treatment adults, 55% had less than a college degree and 40% reported participating in food assistance programs, such as the Supplemental Nutrition Assistance Program.

Total response rates, including completion rates by dyads, were not consistent across the six sessions as seen in Table 5.1. While leaders (n=25) had very good response rates, lack of 100% attendance by dyads resulted in inconsistent response rates across sessions, and even within sessions, youth-adult dyads did not complete the evaluations consistently. Based on the dyads in attendance at each session (Table 5.1), percentage response for the evaluations ranged from 85-93% for the youth and 76-88% for the adults. The highest percentage response rate for the process evaluations occurred in Session 2 for youth (139; 93%) and in Session 4 for adults (98; 88%).

Table 5.1. Response Rates of Youth and Adults on Process Evaluations by Session.[1]

	Session 1[2] *n (%)*[9]	**Session 2**[3] *n (%)*[9]	**Session 3**[4] *n (%)*[9]	**Session 4**[5] *n (%)*[9]	**Session 5**[6] *n (%)*[9]	**Session 6**[7] *n (%)*[9]
Youth	124 (89)	139 (93)	106 (89)	97 (87)	106 (89)	104 (85)
Adult	105 (76)	115 (77)	98 (83)	98 (88)	90 (76)	94 (77)
Leader[8]	25 (100)	24 (96)	24 (96)	24 (96)	25 (100)	24 (100)

[1]Numbers (%) in each cell are response rates at each time point,
[2] n=139 dyads in attendance at Session 1
[3] n=148 dyads in attendance at Session 2
[4] n=118 dyads in attendance at Session 3
[5] n=111 dyads in attendance at Session 4
[6]n=118 dyads in attendance at Session 5
[7]n=121 dyads in attendance at Session 6
[8]n=25 possible leaders
[9]Percentage based on number of completed surveys and number of dyads in attendance

Quantitative Results

Youth Process Evaluation

In Table 5.2 and Table 5.3 are the youth responses to questions about the iCook between-session goals (process evaluation in Appendix B) Based on the scale ranging from 1=never to 5=all the time, youth reported over the six sessions that they ate with their families, either a mean of "often" 50% of the time or a mean representing "close to often" for 50% of the time. Youth reported a significant increase in being active at least 60 minutes a day between Session 1 (3.88±0.9) and Session 6 (4.26±0.9) ($P<0.05$). Youth participants reported an increase in making (27% to 69%) and posting (62% to 88%) videos between Sessions 2 and 6 ($P<0.05$) (Table 5.3).

Table 5.2. Youth (Mean±SD) Reporting of iCook 4-H Between-Session Goals: Eating Together and Being Physically Active

Question Asked	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
How often did your family eat together over the last two weeks?[1]	3.82±1.0	3.97±1.0	4.07±0.9	4.04±0.8	3.94±0.9	4.05±0.9[2]
How often were you physically active for at least 60 minutes a day over the last two weeks?[1]	3.88±0.9	3.91±0.9	4.08±0.8	4.07±0.8	4.22±0.8	4.26±0.9[3]

[1]Instrument in Appendix B; scale 1=never; 2=rarely; 3=sometimes; 4=often; 5=all of the time
[2]Positive trend between Session 1 and Session 6 (p=0.07)
[3]Significant difference between Session 1 and Session 6 (P<0.05)

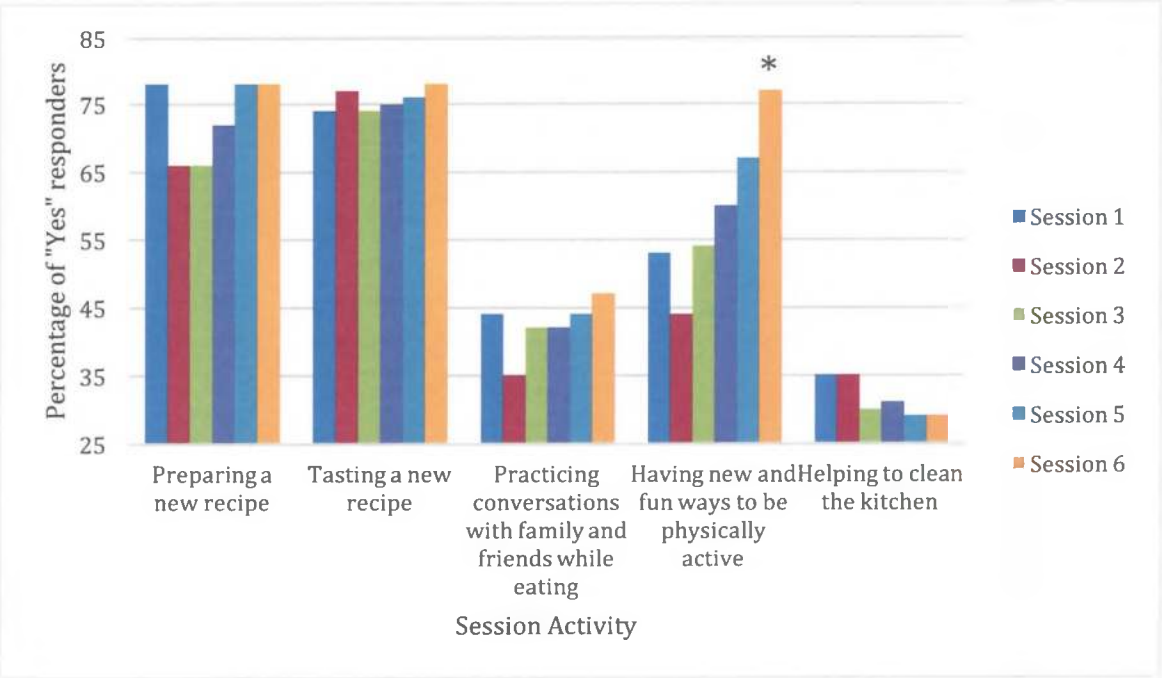
Table 5.3. Youth Percentage Reporting of iCook 4-H Between-Session Goals: Video Creation and Posting

Question Asked	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Did you make a video since the last class?[1]	Not Asked	27%	39%	56%	55%	69%[2]
Did you post a video since the last class?[1]	Not Asked	62%	72%	63%	78%	88%[2]

[11]Instrument in Appendix B; percentage reported is based on yes response
[2]Significant difference between Session 2 and Session 6 (P<0.05)

In Figure 5.1 is the percentage of youth who reported at each of the six sessions that the in-session activities of preparing a new recipe, tasting a new recipe, practicing conversations with family, having new and fun ways to be physically active, and helping to clean the kitchen were learning experiences. Reports by activity were consistent across the six sessions, except for the report for having new and fun ways to be physically, which increased between Session 1 (53%) and Session 6 (70%) (P<0.01). At most, only 35% of youth reported that helping to clean the kitchen was an important learning experience.

Figure 5.1. Youth Percentage Reporting of iCook 4-H In-Session Activities as Learning Experiences[1,2,3]



[1]Total number of youth in attendance at each session varied with total possible=150.
[2]Data based on mean from across the six iCook 4-H sessions
[3]Percent of youth selecting activity as learning experience at each of six sessions
*Significant increase from Session 1 to Session 6, based on *t*-test ($p<0.01$)

Adult Process Evaluation

Table 5.4 contains an overview of the adult process evaluation quantitative questions focused on meeting the iCook 4-H focal areas of cooking, eating, and playing together. Positive trends were seen from Session 1 to Session 5 in almost all responses. Across the questions, a slight decrease was seen between Session 5 and 6. When asked about making and posting videos, across the five sessions, adults reported posting videos more frequently than making videos.

Table 5.4. Adult Mean±SD Process Evaluation Scores about In-Session iCook 4-H Focal Areas of Cooking, Eating, and Playing.

Question Asked	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
My child has learned kitchen skills that will be used at home (i.e. food preparation, cooking, cleaning)[1]	4.34±0.7	4.25±0.9	4.41±0.8	4.29±0.8	4.37±0.8	4.48±0.8
How likely are you to prepare the recipe from this class at home?[2]	4.38±0.9	4.18±1.1	3.91±1.3	4.03±1.2	4.27±0.7	3.88±1.2
How often did you and your family eat together over the last two weeks?[3]	3.90±0.9	3.92±0.7	3.93±0.6	3.86±0.7	4.91±0.7	4.05±0.7
How often was your child physically active for at least 60 minutes a day over the last two weeks?[3]	3.85±0.8	4.02±0.7	3.98±0.6	3.99±0.8	3.98±0.8	3.89±0.8
How much does setting goals during the class help you to think about the iCook 4-H program activities between the classes.[3]	Not Asked	3.43±0.7	3.44±0.9	3.49±0.7	3.53±0.7	3.43±0.7

[1]Scale 1=strongly disagree; 2=disagree; 3=neither disagree or agree; 4=agree; 5=strongly agree
[2]Scale 1=very unlikely; 2=unlikely; 3=undecided; 4=likely; 5=very likely
[3]Scale 1=never; 2=rarely; 3=sometimes; 4=often; 5=all of the time

Adults were asked to meet the iCook 4-H between session goals of cooking, eating, and playing actively together at least four times between sessions. Over the course of the program there were positive trends in meeting these goals. (Table 5.5)

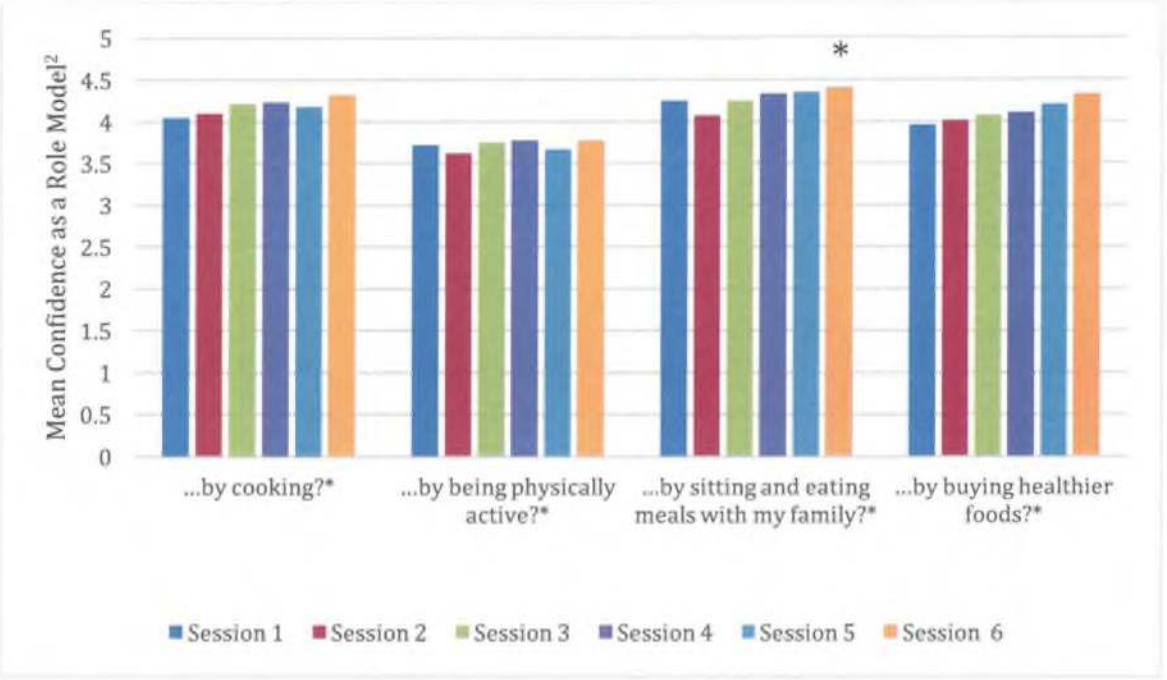
Table 5.5. Adult Mean±SD Process Evaluation Scores about Between-Session iCook 4-H goals[1]

Question Asked	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Did you meet the iCook 4-H study goal of eating together with your family at least two times a week (4 times) since the last class?[2,3]	3.48±1.9	3.77±1.3	3.70±1.1	3.66±4.3	3.60±1.1	3.68±1.0
Did you meet the iCook 4-H study goal of cooking together with your family at least two times a week (4 times) since the last class?[2,4]	1.91±2.9	2.94±2.8	3.11±2.8	3.36±2.7	3.73±2.7	3.77±2.7
Did you meet the iCook 4-H study goal of playing actively together with your family at least two times a week (4 times) since the last class?[2,5]	2.87±2.8	2.61±2.6	2.64±2.5	3.62±1.1	3.73±2.5	3.94±2.7

[1]Data based on mean from across the 6 iCook 4-H sessions
[2]Scale 1=1 time; 2=two times; 3=three times; 4= four times; 5= more than 4 times since the last class
[3]Positive trend seen between Session 1 and Session 6 (p=0.07)
[4]Positive trend seen between Session 1 and Session 6 (p=0.06)
[5]Positive trend seen between Session 1 and Session 6 (p=0.07)

Adults reported their confidence in being a role model for their children in cooking, being physically active, sitting and eating meals as a family, and buying healthier foods. Figure 5.2 contains the mean responses from adult participants across the six iCook 4-H sessions. Trending increases were seen in all four questions with a significant increase seen between Session 1 and Session 6 for sitting and eating meals as a family ($p<0.05$; Session 1=4.24±1.1, Session 6=4.40±0.9).

Figure 5.2. Adult Self-Identified Confidence Level (Mean±SD) in Being a Role Model for Youth[1]



[1]Data based on a mean from across the six iCook 4-H sessions
[2]Scale 1=very unconfident; 2=unconfident; 3=somewhat confident; 4 confident; 5=very confident
*Each question started with "How confident are you that you can be a good role model for your child..."

Adults reports of creating videos with their child increased between Session 2 and Session 6 with 28% reporting making videos at Session 2 and 50% reporting at Session 6. Posting of videos was higher than creating with 68% reporting posting at Session 2 and 78% at Session 6.

Leader Process Evaluation

Leaders reported that over the six sessions curriculum resources were adequate to complete the class 96% of the time. A low of 92% was seen in Session 3 with a high of 100% at Sessions 2, 4, 5, and 6. Across the six sessions the 1.5 hours allotted to prepare for each session was adequate only 56.5% of the time. On

average, leaders who reported that the preparation time was not adequate reported they needed an average of 4.5 hours. The low preparation time was 2.0 hours with a high preparation time of 6.0 hours.

When asked how effective the small group discussion time was, leaders reported that it was neither effective nor ineffective to almost very effective. The high score was seen in Session 2 with a mean score of 4.5±0.8 out of a potential score of 5. Table 5.6 contains the mean effectiveness of small group discussion time across the six sessions.

Table 5.6. Mean Effectiveness of Small Group Discussions

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Mean Score±SD[1]	3.2±0.6	4.5±0.7	4.2±0.3	4.2±0.7	3.9±0.4	4.1±0.5

[1]Score range 1=very ineffective to 5=very effective

Qualitative Results

Youth Feedback

When asked to describe their family meals, youth responded with very positive descriptions. Good, awesome, enjoyable, fun, and yummy were all very heavily coded themes. Some interesting themes like crazy and unexpected were seen. Figure 5.3 depicts all the themes from youth description of family meals.

Figure 5.3. Youth Description of Family Meals Word Cloud[1,2]

[1]Created using wordle.net
[2]Larger word indicates increased frequency

When asked what was the most important thing they learned in the sessions, the most frequent themes were cooking, safety, healthy, and recipe. Figure 5.4 depicts all the themes from the most important thing learned by the youth.

Figure 5.4. Youth Description of Most Important Thing Learned[1,2]

[1]Created using wordle.net
[2]Larger word indicates increased frequency

Adult Feedback

When asked for one word to describe their family meals, adults overwhelmingly described the meals as positive experiences with fun, together, and healthy being the most frequently seen themes. Figure 5.5 is a word cloud of all adult description of their family meals.

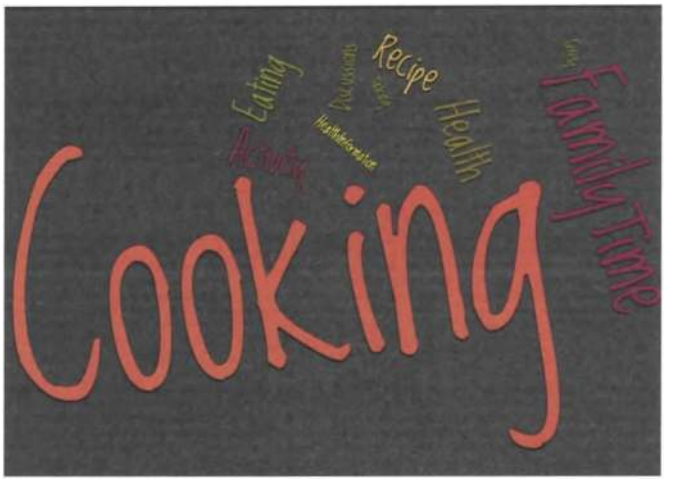
Figure 5.5. Adult Description of Family Meals Word Cloud[1,2]

[1]Created using wordle.net
[2]Larger word indicates increased frequency

Leader Feedback

When leaders reported what they felt the most important aspect of the sessions was to the dyads, cooking overwhelmingly was seen the most often. Family time, activity, health and eating also were seen to be important to the dyads. Figure 5.6 contains all coded responses to the leaders' responses.

Figure 5.6. Leader Description of Youth and Adult Most Important Thing Learned[1,2]



[1]Created using wordle.net
[2]Larger word indicates increased frequency

Discussion and Conclusions

Process evaluation in the iCook 4-H project was used to gather participant feedback about their family meals, physical activity, and meeting the iCook 4-H goals of cooking, eating, and playing together. In-session activity findings were overall positive with indications that the iCook 4-H participants were learning from and enjoying the program based on their reports that the in-session activities were learning experiences, with even kitchen cleaning noted as a learning experience by one-third of the youth. Adults concurred with youth that they were learning new kitchen skills and that they would prepare the program recipes at home. While the youth consistently reported that they were learning about cooking skills across the six sessions, it was interesting that the one activity that increased as a learning experience across the sessions was new and fun ways to be physically active. Probably the youth had not thought of simple games and doing chores (physical activities focused on during the sessions). at home as ways to be physically active

Adults' consistent reporting of their confidence in being role models for their children in cooking, being physically active, sitting and eating meals as a family, and buying healthier foods is an important finding since it supports the importance of the dyad model for maximizing opportunities for togetherness in behavior that can contribute to obesity prevention in youth. The significant increase between Session 1 and 6 seen in the adults' self-confidence in being role models by sitting and eating with their families is especially noteworthy due to the importance placed on family meals in the iCook program.

Based on the between-session findings, youth and adults reported cooking, eating, and playing together when they were at home. Although not reaching the iCook goals, there was a trend toward increased togetherness reported by the adults. The dyads also reported very positive family meal experiences, which could ultimately help improve family meal frequency and the greater benefits of having family meals.[110] The strong positive trend in increasing family meals and significant increase in physical activity reported among youth were promising evidence of changing behavior among participants.

Story[92] reported that researchers can use process evaluation to provide insight into interpreting programs. Like Saunders[24] and Baranowski[38], process evaluation was used in the current study to track participant responses about focal areas as the program progressed. Benefits of having process evaluation data such as documenting the learning and the enjoyment occurring

during the in-session activities and the continual tracking of what participants were doing between sessions may encourage leaders to actively support participants in completing the surveys.

It is interesting that youth reported significantly increasing their video making over the course of the program, yet they reported posting videos more frequently than creating them, which seems to be a physical impossibility to post a video without creating one first. It is possible that participants may have thought posting anything to the site counted for posting a video,. In the future, to clarify this finding, it would be desirable to add a question about video posting versus general posting on the iCook 4-H website.

While process evaluation data are typically reported in traditional ways[42,111] a rather unique method, word clouds, was used to present the qualitative data. While not a new methodology, until the iCook 4-H presentations, this researcher found no evidence of word clouds in peer-reviewed sources. Using word clouds provides researchers, stakeholders, and the public an easy to view and understand findings. Through the presentation of data as word clouds, it was dramatic to see how positively youth and adults viewed their family meals. In other images, it was clear that all aspects of iCook 4-H were identified at some level by the dyads when they were asked what was important about the sessions

Completion rates of the process surveys were all above 75%, but it was challenging for data management to address the inconsistent completion rate due to not having 100% attendance at every session and even missing data from those in

attendance. Even though iCook 4-H leaders were trained to have participants complete their surveys prior to leaving a session, not every participant in attendance completed every process evaluation. To facilitate adherence to participant completion, the surveys were designed to be short, easy and online. With higher rates of youth completion, it may be possible that the adults let their children take the surveys and then left before completing their own surveys. Limited access to online technology could continue to be a barrier to survey completion when the iCook 4-H program is disseminated. Since evaluation data are important to program administrators, it may be beneficial to add strong reasoning for process evaluation to the training materials as an additional step to continue adequate process evaluation completion rates.

Based on leader feedback, few revisions to the iCook 4-H program seem necessary in terms of provision of resources for dissemination. The greatest concern to be addressed was the amount of preparation time needed. While it is not unusual to expect that the first-time delivery of a program will be more time-intensive, the actual versus planned preparation time does need to be addressed since that could be a major barrier to the future use of the program. The mixed report from leaders on the effectiveness of small group discussions may mean that both more background resources and training may be needed for leaders to be effective in leading small group discussions.

Like Joseph and colleagues[26], the iCook 4-H project had a thorough and well thought-out process evaluation methodology. This intensive style of process evaluation was used effectively by researchers to monitor activities across states and multiple sites. In addition to the benefit of monitoring across sites, the iCook 4-H process evaluation was designed to allow for quick session feedback to leaders. During the intervention, leaders were not provided with feedback as sessions progressed to prevent influencing research outcomes. However, when the program is disseminated, leaders will be able to use the process evaluation surveys to receive immediate feedback from dyads about in-session and between-session activities. This feedback should allow them to make informed changes to their education strategies which will ultimately lead to improvement of program and participant outcomes.

CHAPTER 6: PROGRAM OUTCOME EVALUATION

Introduction

At its most simple definition, Isobel Contento[12] stated "evaluation is the process of determining the value or worth of an enterprise". With proper evaluation researchers can determine the impact of the resources invested in a project.[12,112] Evaluation can help to improve a program, improve teaching, measure changes in people lives, answer questions of community members, and to help others understand the reason for the implementation of a specific program.[35] Stakeholders are interested in this kind of information generated by evaluation and therefore, for both researchers and for those impacted by the research, providing evaluation outcomes is imperative.

iCook 4-H was tested as a 14-week nutrition education program designed for 9 and 10-year-old youth and their adult primary meal preparer to cook, eat, and play together. It was developed for out-of-school youth programming, primarily within 4-H/ Extension venues, and is adaptable for use in other youth programs. It was implemented at the five land-grant universities in Maine, Nebraska, South Dakota, Tennessee, and West Virginia as the educational curriculum of a two-year control-treatment intervention study for obesity prevention with the goal of developing a program for widespread distribution.

A reliable program evaluation instrument was desired by the research team to accompany the program at the completion of the research study. Developing an instrument to address the program specific goals allows for the most accurate

measure of change due to the program.[113] In order to create program-specific instruments, program goals must be clearly identified, as was done for the iCook 4-H program. The program was designed with the overall goal of improving culinary skills, family meals, physical activity, and setting goals for behavior change. In addition, session-specific objectives were developed for each of the six sessions of the program designed to accomplish the goal.

While few programs have been designed to fully measure the impact of nutrition education on participants[70,71,113], the aim of this study was to develop a reliable instrument to accompany the iCook curriculum that would provide program leaders with program-specific outcome measures. The objective was to develop an instrument to measure the focal areas of cooking, eating, physical activity, and goal setting of youth and adult dyads. The instrument includes a tool for youth and one for adults.

Methods

Study Design

Confirmatory factor analyses with test-retest reliability testing were conducted to develop the program outcome evaluation instruments, facilitated by the longitudinal nature of the 2-year iCook 4-H Intervention Study. Online program outcome evaluation instruments were administered to youth and adult participants, along with a battery of research questionnaires, over the first year of the study at 0, 4, 12 months. Survey items were developed to address the key constructs in the iCook program of cooking, eating and playing together (Initial Youth Instrument Appendix G; Initial Adult Instrument Appendix H).

The iCook 4-H study was approved by the Institutional Review Boards for the Protection of Human Subjects at all five universities associated with the project.

iCook 4-H Participants and Recruitment

Dyads (0-month n=228) consisted of youth (mean age=9.8±0.6 years) and their primary adult meal preparer (mean age=38.84±8.1 years). They were recruited to be in a 2-year treatment/control intervention study with assessments at 0,4,12, and 24 months. Reported youth demographics were 46% male, 54% female and 63% white, 13% Hispanic, 11% black, and 13% other. Of the adults, 54% had less than a college degree and 42% reported participating in food assistance programs, such as the Supplemental Nutrition Assistance Program. They were recruited between May and August, 2013 using standardized materials – such as flyers, a Facebook page with ads targeted at specific study cities, radio interviews, letters to local superintendents/elementary school principals, and direct targeting of 4-H youth. All materials included the purpose of the iCook 4-H study, time commitment, eligibility criteria, and participant incentive information, which was ten dollars for each participant at each assessment. Eligibility criteria included that the youth be between 9-10 years old, be free from food allergies and activity-related medical conditions, eat animal foods, and have a computer with Internet access at home. Consumption of animal protein was an eligibility requirement because cooking activities were based on the United States Department of Agriculture's MyPlate, which includes meat and dairy foods.

Instrument Development

The program evaluation instrument was developed as an online survey with a tool for youth and a tool for adults. It was designed to address specific iCook 4-H focal areas, or constructs, of increasing cooking together, eating together, physical activity and goal setting., Items were developed for both youth and adult through review of the iCook 4-H curriculum, other resources, and input from iCook researchers and statistical consultants, Dr. Christa Lily (West Virginia University) and Dr. Gail Tudor (Husson University). Items about culinary and technology skills were modified from an unpublished thesis. Other *de novo* items were created to address the remaining focal areas. Following the 4-month assessment period, iCook 4-H researchers determined the need for technology questions and, subsequently, 24 items were developed for the youth and 7 items for the adults to address use of technology by dyads through creation of digital videos and pictures. Response options for the youth were based on one of three 5-point Likert scales to test 1) skills, by asking, "Can you...." ranging from 1=never to 5=always 2) willingness to try new foods, by asking, "How willing are you...," ranging from 1=very unwilling to 5=very willing, and 3) self-efficacy. by asking, "I am sure...." This scale ranged from 1=strongly agree to 5=strongly disagree and was reversed coded for analysis. Response options for the adult were based on a Likert scale ranging from 1=never to 5=always. The instruments started with 37 items for the youth and 17 items for the adult; then, at 12 months the technology items were added for each instrument.

For instrument testing and development, only data from the 0-, 4- and 12-month assessments were used, as well as, only data from the control group to avoid participant bias from being in the treatment group. Factor analyses were conducted for instrument development under statistical consultants. Following the 0-month implementation of instruments, the youth instrument was tested by confirmatory factor analysis to determine if the items loaded on distinct factors that would measure the iCook 4-H constructs identified which were culinary skills, willingness to try to foods, self-efficacy, family mealtime, physical activity, and goal setting. A similar factor analysis was conducted on the adult instrument to confirm the constructs—cooking with child, shopping with child, family meals, and physical activity. For the youth instrument the analysis was limited to eight factors; for the adult, the analysis was limited to six factors. When items had a factor loading less than 0.60, they were considered for deletion.[82] However, they were retained in the instruments for the subsequent 4- and 12-month assessments to maintain consistency in the data collected over the study period. Confirmatory analyses were conducted at 4 and 12 months, following the same protocol at each time period.

Across the three time points there was consistency in how items loaded into specific factors. Therefore, the factors were considered to be scales/subscales. The multiple consistent factor loading on the youth instrument created subscales measuring the constructs of iCook 4-H. At 0- and 4- month, seven consistent subscales were seen on the youth instrument. Following the addition of technology questions at 12-month, two additional subscales loaded from the total instrument. The adult instrument had items loading on only one factor at 0- and 4-months. At

12-month, the technology questions added to the adult instrument formed a second factor leading to two distinct subscales for the final adult instrument. For both youth and adult, the total instruments and applicable subscales were tested for internal consistency using Cronbach's alpha, using the guide of optimal alpha values ranging from 0.6 to 0.8. Alpha values above 0 .9 were considered suspect because there may be too many, repetitive items, while values below 0.5 were considered unacceptable because there is a lack of internal consistency within the items of the instrument.[76]

Once the final instruments were determined, test-retest reliability comparing 0- to 4-month and 0- to 12-month occurred to test the stability of the instrument structure. Pearson's correlation tests were used to analyze scale and subscale test-retest reliability. Correlation values above 0.7 were considered to be optimal reliability. Since the technology items were only asked at the 12-month assessment, test-retest reliability testing was not able to be performed on those items. Missing values were handled using pairwise deletion to retain the largest sample size. The final adult and youth program evaluation instruments can be found in Appendices G and H.

To score the program evaluation instruments any questions where the "best" answer was coded as 1 were reverse coded (e.g. I am sure I can use a stovetop was coded on the instrument with "1" being the most desired answer) so that the best answer for every item was "5." Then each response code was summed to obtain a final instrument score. Individual subscales were summed to provide scores for

specific subscales. Youth total scores ranged from 34 to 170 at 0- and 4-month and 48 to 240 a 12-month. Adult scores ranged from 15 to 75 at 0- and 12-month and 22 to 110 at 24-month.

Data Analysis

Confirmatory factor analyses were used to determine item inclusion in finalized instruments and potential subscales using verimax rotation. Cronbach's Alpha was used to determine internal consistency of the instrument and all subscales. Correlations between subscales were tested at each of the three time points. Test-retest reliability was conducted using Pearson's correlation. (Baxter, 2015) Descriptive statistics were conducted for demographic data for the total iCook 4-H sample. Mean scores were calculated for both youth and adult instruments and all corresponding subscales. All statistical analyses were conducted using SPSS (Version 22, Armonk, NY: IBM Corp).

Results

Youth Program Evaluation Instrument

Both treatment and control participants (n=215) completed the youth instrument at 0-month, and control participants only completed at 4-month (n=54 dyads) and 12-month (n=49).

At 0- and 4- months, of the 37 questions asked of the youth iCook 4-H participants, 34 loaded above 0.60. At these time points, seven distinct components were noted. In Tables 6.1 through 6.7 the factor loadings of the seven components at 0- and 4- month assessments are depicted, factor-by-factor. At the 12-month

assessment point, when 14 additional items were added to the instrument, two additional components emerged (factors 8 and 9) as seen in Table 6.8.

Table 6.1. Youth Instrument Factor 1 Loading

Item	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
	Treatment and Control	Control	Control
(0/4-Month n=37; 12-Month n=51)	(n=215)	(n=54)	(n=49)
Can you use a knife to cut foods by yourself?	0.66	0.71	0.69
Can you use an oven for cooking by yourself?	0.79	0.73	0.75
Can you use a stovetop for cooking by yourself?	0.81	0.77	0.71
Can you use a blender by yourself?	0.66	0.69	0.72
Can you cook foods to the right temperature by yourself?	0.69	0.66	0.74
Can you store foods the right way by yourself?	0.87	0.76	0.81
Can you measure ingredients for a recipe by yourself?	0.71	0.74	0.69
Can you use herbs and spices when cooking by yourself?	0.81	0.78	0.76

Table 6.2. Youth Instrument Factor 2 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
	Treatment and Control	Control	Control
(0/4-Month n=37; 12-Month n=51)	(n=215)	(n=54)	(n=49)
Can you use a knife to cut foods by with help from someone else?	0.81	0.77	0.79
Can you use an oven for cooking help from someone else?	0.68	0.72	0.77
Can you use a stovetop for cooking help from someone else?	0.75	0.69	0.72
Can you use a blender help from someone else?	0.62	0.65	0.70
Can you cook foods to the right temperature help from someone else?	0.68	0.70	0.73
Can you store foods the right way help from someone else?	0.64	0.69	0.71
Can you measure ingredients for a recipe help from someone else?	0.72	0.68	0.68
Can you use herbs and spices when cooking help from someone else?	0.78	0.73	0.80

Table 6.3. Youth Instrument Factor 3 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
	Treatment and Control	Control	Control
(0/4-Month n=37; 12-Month n=51)	(n=215)	(n=54)	(n=49)
How willing are you to taste new foods you have not tried?	0.77	0.88	0.89
How willing are you to cook new foods that you have not tried	0.81	0.82	0.86
How willing are you to try foods and new and interesting ways?	0.88	0.83	0.84

Table 6.4. Youth Instrument Factor 4 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
	Treatment and Control	Control	Control
(0/4-Month n=37; 12-Month n=51)	(n=215)	(n=54)	(n=49)
I am sure I can cook.	0.79	0.75	0.69
I am sure I can follow a recipe	0.72	0.73	0.78
I am sure I can use a knife safely.	0.64	0.68	0.71
I am sure I can use an oven	0.63	0.66	0.64
I am sure I can use a stovetop.	0.73	0.69	0.74
I am sure I can make food safely to avoid getting sick.	0.81	0.79	0.80

Table 6.5. Youth Instrument Factor 5 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
	Treatment and Control	Control	Control
(0-Month/4-Month n=37; 12-Month n=51)	(n=215)	(n=54)	(n=49)
How often do you help your parents shop for groceries	0.76	0.69	0.77
How often does your family eat together?	0.78	0.73	0.71
How often do you eat with your family at a table without distractions? (TV, Cellphones)	0.74	0.71	0.73
How often do you help cook meals for your family?	0.69	0.72	0.73

Table 6.6. Youth Instrument Factor 6 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
(0/4-Month n=37; 12-Month n=51)	Treatment and Control (n=215)	Control (n=54)	Control (n=49)
When you think about each day of the week, how often are you physically active for at least 60 minutes each day?	0.71	0.68	0.65
When you think about each day of the week, how often does your heart pump hard and you sweat when you are being physically active?	0.69	0.73	0.68
How often does your family play actively together?	0.77	0.72	0.73

Table 6.7. Youth Instrument Factor 7 Loading

Question Asked	0-Month Factor Loading	4-Month Factor Loading	12-Month Factor Loading
(0/4-Month n=37; 12-Month n=51)	Treatment and Control (n=215)	Control (n=54)	Control (n=49)
How often do you set healthy goals for yourself?	0.81	0.76	0.75
How often do you meet your healthy goals	0.79	0.81	0.78

Table 6.8. Youth Instrument Factor 8 and 9 Loading[1]

Question Asked	12-Month Factor Loading	12-Month Factor Loading
(0/4-Month n=37; 12-Month n=51)	Control (n=54)	Control (n=49)
	Component 8	Component 9
I can access the Internet by myself.+	0.86	
I can take digital pictures by myself.+	0.89	
I can download digital pictures to the computer by myself.+	0.86	
I can take digital videos by myself.+	0.88	
I can download digital videos to the computer by myself.+	0.87	
I can upload a video to YouTube by myself.+	0.90	
I can link videos to the iCook 4-H website by myself.+	0.88	
I can access the Internet with help from someone else.+		0.82
I can take digital pictures with help from someone else.+		0.85
I can download digital pictures to the computer with help from+ someone else.		0.87
I can take digital videos with help from someone else.+		0.84
I can download digital videos to the computer with help from someone else.+		0.89
I can upload a video to YouTube with help from someone else.		0.86
I can link videos to the iCook 4-H website with help from someone else.		0.79

[1]These questions were only asked at the 12-Month Assessment Point

At each of the three time points, the total youth program instrument and each of the subscales had Cronbach's α greater than 0.60 as can been seen in Table 6.9. After the 12-month assessments, each of the subscales had weak, yet significant correlations. The exceptions to this were the strong correlations between Cooking Skills – alone and Cooking Skills – with help (r=0.78, p<0.01) and Technology Skills – alone and Technology Skills – with help (r=0.87, p<0.01).

Table 6.9. Youth Instrument Scale/Subscale Reliability and Score

Scale/ Subscale	Number of Items	0-Month*		4-Month		12-Month	
		α	Mean Score Mean ± SD	α	Mean Score Mean ± SD	α	Mean Score Mean ± SD
Total Instrument[1]	34 48	0.8	117.36±18.9	0.86	124.71±20.1	0.92	168.2±29.3
Cooking Skills – By Myself[2]	8	0.80	22.77±7.2	0.84	25.55±7.6	0.85	27.72±7.8
Cooking Skills – With Help[2]	8	0.88	28.14±7.9	0.91	30.80±8.2	0.92	31.04±8.2
Willingness[3]	3	0.78	11.57±3.1	0.80	12.02±2.9	0.85	11.16±3.3
Culinary Self Efficacy[4]	6	0.84	22.88±4.7	0.85	23.55±5.0	0.85	24.5±4.4
Family Mealtimes and Preparation[5]	4	0.72	14.14±2.5	0.69	14.31±2.8	0.71	14.59±2.7
Physical Activity[6]	3	0.69	10.62±2.1	0.70	10.72±2.3	0.66	11.02±2.2
Goal Setting[7]	2	0.76	6.44±1.9	0.72	6.93±1.8	0.76	6.43±2.1
Technology Skills – By Myself[8+]	7					0.75	23.42±6.0
Technology Skills – With Help[8+]	7					0.86	24.28±7.1

*0-month was analyzed on treatment and control; 4- and 12-month were analyzed using only control participants
[1]Score range from 34 – 170 at 0- and 4-month; range from 48 – 240 at 12-month
[2]Subscale score range from 8 – 40, Likert scale 5-point frequency ranging from never to always.
[3]Subscale score range from 3 – 15
[4]Subscale score range from 6 – 30
[5]Subscale score range from 4 – 20
[6]Subscale score range from 3 – 15
[7]Subscale score range from 2 – 10
[8]Subscale score range from 7 – 35
+These questions were only asked at the 12-month assessment period

Test-retest reliability coefficients and their corresponding p-values are contained in Table 6.10. Correlations for the total instrument and all subscales are significant (P<0.05). The Pearson's *r* for all subscales fall above 0.6 with the majority of reliability values above 0.70.

Table 6.10. Test-Retest Pearson's *r* and P-Values of Youth Total Instrument and Subscales

	Test-Retest Correlation: 0- to 4-Month Pearson *r* (P-Value)	Test-Retest Correlation: 0- to 12-Month Pearson *r* (P-Value)
Youth Total Instrument	0.81 (<0.001)	0.75 (<0.001)
Youth Cooking Alone Subscale	0.82 (<0.001)	0.73 (<0.001)
Youth Cooking With Help Subscale	0.70 (<0.001)	0.77 (<0.001)
Youth Willingness Subscale	0.74 (<0.001)	0.77 (<0.001)
Youth Self-Efficacy Subscale	0.68 (<0.001)	0.73 (<0.001)
Youth Family Meals Subscale	0.74 (0.002)	0.70 (0.02)
Youth Physical Activity Subscale	0.73 (0.008)	0.64 (0.006)
Youth Goal Setting Subscale	0.70 (0.003)	0.72 (0.03)

Adult Program Evaluation Instrument

The sample size for the development of the adult instrument was 215 at 0 month, and dropped to 54 at 4 months and 49 at 12 months due to only using data from the control sample. The factor structure of the online program evaluation measured on adults at the three time points is shown in Table 6.11.

Table 6.11. Adult Program Evaluation Instrument Factor Structure of the Online Survey Measured at 0, 4 and 12 months

Item (0/4-Month n=17; 12-Month n=22	0-Month Factor Loading Treatment and Control (n=215) Component 1	4-Month Factor Loading Control Only (n=54) Component 1	12-Month Factor Loading Control Only (n=49) Component 1	Component 2
How often do you shop with a grocery list?	0.69	0.70	0.71	
When you think about each day of the week, how often is your child physically active for at least 60 minutes each day?	0.69	0.75	0.69	
How often do you plan your weekly meals?	0.75	0.64	0.64	
How often does your child help you cook meals?	0.68	0.69	0.69	
When you think about each day of the week, how often are you physically active for at least 30 minutes each day?	0.77	0.73	0.63	
How often does your family eat together each week?	0.70	0.69	0.65	
How often do you enjoy making meals with your child?	0.65	0.88	0.64	
How often does your child help in meal planning?	0.62	0.64	0.67	
How often do you enjoy making meals?	0.65	0.69	0.64	
How often do you make eating together as a family a priority?	0.71	0.65	0.66	
How often do the topics of conversation at mealtimes include all family members?	0.64	0.79	0.72	
How often does your child help you shop for groceries?	0.73	0.87	0.67	
How often would you rather eat out than make the evening meal?	0.64	0.63	0.67	
How often does your family actively play together?	0.63	0.64	0.76	
How often do you feel confident in your kitchen skills?	0.65	0.65	0.65	
I am comfortable accessing the Internet.+				0.78
I am comfortable taking digital pictures.+				0.78
I am comfortable downloading pictures to the computer.+				0.80
I am comfortable putting pictures on the iCook 4-H website.+				0.68
I am comfortable taking digital videos.+				0.80
I am comfortable downloading digital videos to the computer. +				0.73
I am comfortable uploading videos to YouTube.+				0.87

+These questions were only asked at the 12-month assessment period
*Did not load above 0.60 and are not included in the final Adult Program Evaluation Instrument

Of the initial 17 items, only two did not load above the 0.60 loading factor. The items that did not load were "How often do you need to manage your grocery budget carefully to ensure balanced meals for your family toward the end of the pay period?" and "How often is it stressful to eat together as a family?" The remaining 15 questions formed one component, consistently at 0, 4, 12 months, with good reliability, 0.75, 0.72, 0.77, respectively. At the 12-month assessment, items with the addition of seven technology emerged.

The two adult components were named the Cooking, Eating and Playing Together subscale (n=15 items) with a Cronbach's α of 0.69 and Technology subscale (n=7 items), with a Cronbach's α of 0.84. The two subscales had a small, but significant positive correlation (r=0.28, p=0.031). Instrument results (mean±SD) for the 49 control participants that completed the 12-month assessment are 53.73±5.18 for the Cooking, Eating, and Playing Together subscale and 27.73±6.23 for the Technology subscale. No changes were seen in the mean of the Cooking, Eating, and Playing Together subscale across the three time points.

The Pearson's r and P-value for the test-retest analysis of the Cooking, Eating, and Playing Together subscale are in Table 6.12. Adult test-retest reliability was 0.83 for 0 to 4-month and 0.73 for 0 to 12-month.

Table 6.12. Test-Retest Reliability of Adult Cooking, Eating, and Playing Together Subscale

	Test-Retest Correlation: 0 to 4-Month Pearson *r* (P-Value)	Test-Retest Correlation: 0 to 12-Month Pearson *r* (P-Value)
Cooking Eating and Playing Together Subscale	0.83 (<0.001)	0.73 (<0.001)

Discussion

The iCook 4-H adult and youth instruments showed high internal test-retest reliability, and provide a way to determine change in behavior as desired by the developers of the iCook 4-H curriculum. The instruments were developed to test change in cooking, eating and playing together as a family both during the intervention study but later as evidenced-based instruments to accompany the program when disseminated. The adult instrument is a cohesive instrument to measure change through two subscales: the iCook 4-H focal areas of cooking, eating and playing together, and technology skills. The youth instrument has nine distinct subscales measuring change through cooking skills "by myself" and "with help", "willingness" as it relates to trying new foods, physical activity, culinary skills, self efficacy, family mealtimes and preparation, goal setting, and technology skills "by myself" and "with help".

The iCook 4-H adaptation for culinary and technology kept the two different question qualifiers of "by myself" and "with help". During analysis, the high degree of correlation between the two types of questions, led to the removal of the qualifiers in the instrument moving forward. Additionally, during assessments, many iCook 4-H participants questioned the distinction. iCook 4-H researchers

were able to see that participants saw these two qualifiers as similar with the high and significant correlation between "by myself" and "with help" subscales.

As recommended by Tabachnick[82] and Comrey[83], factors that loaded above 0.63 were seen as "very good" to "excellent" loading and were kept in the scales. Like other studies, factors that loaded below that threshold were reviewed and ultimately removed from the instrument.[84-86] These questions that were removed could have been retained if they had significant theoretical application.[82,86,87] In the end, two questions were removed from the adult instrument and none were removed from the youth instrument. One of the adult questions that was removed from the instrument was "How often do you need to manage your grocery budget carefully to ensure balanced meals for your family toward the end of the pay period". Interestingly, researchers believed this question would be indicative of both socioeconomic status and diet quality. This question may have been worded in a manner that confused participants. Even with the low factor loading, this question could have been retained or reworded because researchers found it an important topic. However, the demographic question asking adults if they participated in government assistance programs like SNAP, free/reduced school lunch, and Medicaid addressed what researchers wanted from the removed program outcome evaluation question. The removal of this question allowed for a stronger instrument without eliminating any information deemed important to the researchers.

Field[116] reported that Cronbach's alpha values below 0.7 are suspect, but acceptable while values over 0.90 may indicate that there are too many questions.

Alpha values below 0.5 are considered unacceptable. The reliability of both adult and youth instruments and their associated subscales was consistent with other instruments for a variety of populations.[85,86,117-119]

Interestingly, both youth and adult instruments were very consistent over time. Most studies report test-retest across two separate measures.[74,77] A strength of this study was the ability to develop the instruments using a test-retest reliability design since the consistency of the instruments held over the three time points. These three time points did not only allow researchers to view the reliability of the instrument over time, but the factor loading and internal consistency of the adult and youth instruments appeared stable across the measurement times.

Implications

The iCook 4-H research instruments will be implemented in upcoming disseminations across the five main states with slight modifications for streamlining. Qualifiers on cooking and technology skills questions will be removed. The hope of this is to address the high correlation and further reduce the number of questions. Factor analysis and reliability testing will be completed to ensure this change does not negatively affect the instrument. As the instrument stands, scoring is not standardized. Moving forward, the scoring needs to be standardized so that a consistent range for score categories can be developed.

Although the instrument has been designed specifically for the iCook 4-H curriculum, the questions as written are easily adaptable to fit a variety of programs addressing similar content areas. With slight modification to cooking and

technology skills to address program specific outcomes this instrument can be used for other programs designed to impact cooking, eating, physical activity, and goal setting.

CHAPTER 7: CONCLUSIONS

Many nutrition education programs are created without adequate forethought to the planning of evaluation strategies. Creating a comprehensive approach to evaluation ensured that the iCook 4-H program was implemented according to plan, participant feedback was gathered, and a method to measure program outcomes for youth and adults was created using a three-pronged approach to evaluation. The three prongs measured were fidelity of implementation, process evaluation, and program outcome evaluation.

Fidelity of implementation is a method of evaluation that researchers can use to understand how closely a program is delivered to how it was intended to be delivered. The fidelity instrument for iCook 4-H was developed as session-specific tools. In general, iCook 4-H was delivered as intended. Researchers used percentage of objectives met, engagement of both youth and adults, as well as effectiveness of the leader to make this determination. The fact that this five-state project was implemented with multiple leaders over a varied time frame was exciting to the iCook 4-H research team. The session leaders were able to use the training resources to accurately understand how to implement the project.

iCook 4-H researchers used process evaluation to gather participant feedback at each session from youth, adults, and leaders. The quantitative feedback was used by researchers to monitor participant views of family meal and physical activity frequency as well as confidence as a role model as the program progressed. Quantitative data can easily be presented in a clean and concise way however,

qualitative data are often hard to manage for analysis and are typically presented by lists of themes with descriptive quotations.[120] For the iCook 4-H study, word clouds were used to present qualitative data in easily interpretable results, through comprehensive images that formed stories. Based on the word clouds, the program was a positive experience for participants. The important aspects of the program as viewed by the research team were mirrored when youth and adults reported their most important thing learned. Additionally, both youth and adults reported family meals being fun and enjoyable times for their families.

While developing a program-specific instrument is difficult and time-consuming, it was important to develop program outcome instruments that were internally consistent and reliable over time. The final youth instrument included a total instrument (α=0.80) and seven subscales – Cooking Skills (α=0.85), Willingness (α=0.85), Culinary Self Efficacy (α=0.85), Family Mealtimes and Preparation (α=0.71), Physical Activity (α=0.66), Goal Setting (α=0.76), and Technology Skills (α=0.75). The final adult instrument included a total instrument scale (α=0.73) and two distinct subscales – Cooking, Eating, and Playing Together (α 0.69) and Technology (α=0.84). The scoring system was developed to measure change over time for the program outcome instruments, and those results are part of the research findings of the intervention study.

Based on this researcher's review, a comprehensive 3-pronged approach to evaluation, as was completed for the iCook 4-H program, has not been previously reported in the literature. A thorough evaluation requires committed personnel for

implementation, data computation, and results presentation. While it can be time-intensive and costly, measuring program evaluation for community-based programs in a manner that allows for reliable results and comparison across groups and over time can provide the types of data that are needed to demonstrate program effectiveness and receive recognition from program administrators.

These program instruments will become part of the iCook 4-H program. They can be adapted for other community-based programs or research studies to provide the basis for an evidence-based set of evaluation instruments.

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APPENDIX A: Fidelity of Implementation Instruments

Fidelity of Implementation: Session 1

iCook 4-H Fidelity
Class 1 – Tools of the Trade

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

Tennessee: Kelsey Shanklin (kelseyshanklin@gmail.com)

South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction	3	
iAllie Clip	2	
Technology Training	30	
Physical Activity: Getting to know you "Circle Game"	15	
Cooking Skills and Recipe for the Day	20	
Family Communications: Focus on Family Mealtime & Taste Testing	30	
Goal Setting: Setting SMART-R Goals	15	
Wrap up and Take Home Message	5	
Participant Evaluation	10	
Leader Evaluation	10	

2. Did the participants achieve the following objectives? (Yes or No)

Participate in technology training?	
Make an introduction video?	
Upload and Post an introduction video?	
Play the circle game to promote physical activity?	
Use knives safely when preparing fruit salsa?	
Participate in family communication discussions?	
Describe and set SMART-R goals?	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

iCook 4-H Fidelity
Class 2 – Keeping it Cook in the Kitchen

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

Tennessee: Kelsey Shanklin (kelseyshanklin@gmail.com)

South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction/Session Overview	5	
Set Activity: All Washed Up	5	
Physical Activity:	15	
Food Safety and Facilitated Discussion	30	
Cooking Skills and Recipe for the Day	20	
Family Communications: Focus on Family Mealtime & Taste Testing	10	
Goal Setting: Setting SMART-R Goals	10	
Wrap up and Take Home Message	5	
Participant Evaluation	10	
Leader Evaluation	10	

2. Did the participants achieve the following objectives? (Yes or No)

Participate in Set Activity: All Washed Up	
Assess their heart rate at different levels of physical activity	
Identify the importance of food safety principles	
Use proper food safety skills when preparing fruit smoothies	
Watch the food safety video presentation (youth only)	
Describe the divisions of feeding responsibilities (adults only)	
Participate in family communication discussions?	
Set SMART-R goals?	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

iCook 4-H Fidelity
Class 3 – The Art of Meal Planning

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

Tennessee: Kelsey Shanklin (kelseyshanklin@gmail.com)

South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction	5	
Session Overview	5	
Set Activity: MyPlate Floor Model	5	
Cooking Skills and Recipe for the Day	45	
Physical Activity: Activity Charades	15	
Family Communications: Focus on Family Mealtime & Taste Testing	15	
Goal Setting: Setting SMART-R Goals	10	
Wrap up and Take Home Message	5	
Participant Evaluation	10	
Leader Evaluation	10	

2. Did the participants achieve the following objectives? (Yes or No)

Participate in Set Activity: MyPlate Floor Model	
Use knives safely to cut root vegetables	
Discuss Components of meal planning	
Identify the importance of different food colors	
Participate in meal planning game	
Participate in physical activity: Activity Charades	
Participate in family communication discussions?	
Set SMART-R goals?	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

iCook 4-H Fidelity
Session 4 – Supermarket Smarts

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

Tennessee: Kelsey Shanklin (kelseyshanklin@gmail.com)

South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction	5	
Session Overview	5	
Set Activity: Using Food Labels	5	
Cooking Skills and Recipe for the Day: Fruit Salad	50	
Physical Activity: Stretching	15	
Family Communications: Focus on Family Mealtime & Taste Testing	10	
Goal Setting: Setting SMART-R Goals	10	
Wrap up and Take Home Message	5	
Participant Evaluation	10	
Leader Evaluation	10	

2. Did the participants achieve the following objectives? (Yes or No)

Participate in Set Activity: Using Food Labels	
Use safe habits when opening cans	
Discuss parts of the Nutrition Facts Label	
Participate in physical activity: Stretching	
Participate in family communication discussions?	
Set SMART-R goals?	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

iCook 4-H Fidelity
Session 5 – Family Meals – Eating Together

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

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South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction	5	
Session Overview	5	
Set Activity: MyPlate for Stir Fry	5	
Cooking Skills and Recipe for the Day: Beef Stir Fry	50	
Physical Activity: iCook Shuffle	15	
Family Communications: Focus on Family Mealtime & Taste Testing	10	
Goal Setting: Setting SMART-R Goals	10	
Wrap up and Take Home Message	5	
Participant Evaluation	10	
Leader Evaluation	10	

2. Did the participants achieve the following objectives? (Yes or No)

Participate in Set Activity: MyPlate for Stir Fry	
Use safe knife skills when preparing Stir Fry	
Use proper food safety techniques when handling beef	
Participate in physical activity: iCook Shuffle	
Participate in family communication discussions?	
Set SMART-R goals?	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson.

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

iCook 4-H Fidelity
Class 6 – Packing the Power: Protein and Spices

Instructions for Use

Hello iCook 4-H Evaluator! The following evaluation tool is to be used only for the class specified. You will complete this evaluation throughout the class to determine fidelity of the class leader to the iCook 4-H Curriculum.

Within a week of completing the form, please return the hard copy of this form to the following person for your state.

Maine: Meaghan Brown (Meaghan.r.brown@maine.edu)

Nebraska: Lisa Franzen-Castle (lfranzen2@unl.edu)

Tennessee: Kelsey Shanklin (kelseyshanklin@gmail.com)

South Dakota: Celine Kabala (cmkabala@jacks.sdstate.edu)

West Virginia: Amy Wells (awells7@mix.wvu.edu)

To complete this evaluation you will need:

- The class specific leader guide (The PI or Campus Coordinator in your state will provide)
- The class specific participant guide (The PI or Campus Coordinator in your state will provide)
- A way to time different class activities (e.g. cell phone, stopwatch, wristwatch, clock)

General Information

Evaluator Name:

State: Site Location: Class Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Present:

Expected Class Start Time: Actual Class Start Time:

Expected Class End Time: Actual Class End Time:

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Welcome and Introduction	5	
Lesson Overview	5	
Set Activity: Herbs and Spices Poster and Handouts with Chicken	5	
Cooking Skills, Recipe for the Day and Taste Testing: Identify non-meat sources of protein and demonstrate ways to make dishes more interesting and add flavor by using different combinations of herbs and spices without adding salt or fat.	50	
Physical Activity: Active Play through Cup Stacking	15	
Family Communications: How to Avoid the Power Play at Dinner	10	
Goal Setting	10	
Take Home Message	5	
Wrap-Up	5	
Participant Evaluation	10	

2. Did the participant achieve the following objectives? (Yes or No)

Identify non-meat sources of protein.	
Demonstrate ways to make dishes more interesting and add flavor by using different combinations of herbs and spices without adding salt of fat.	
Understand what active play is and be able to identify examples of active play.	
Demonstrate the ability to deter potential conflicts during meal time by utilizing positive family communications.	
Set SMART-R goals to continue making positive changes.	

3. In general, how interested were the adults in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

4. In general, how interested were the youth in the class?

Showed little engagement in the lesson

Were somewhat engaged in the lesson

Were engaged in the lesson

Were actively engaged throughout the lesson

5. In general, how effective was the leader in the class?

Very ineffective

Ineffective

Effective

Very Effective

6. How much did the leader refer to the leader guide/materials throughout the lesson?

Unobserved Rarely Often

7. Check the program elements that were covered.

Culinary Skills

Activity Skills

Nutrient Focus

Family Engagement Focus

Youth goal setting on the tear sheet

8. Were there adequate materials for the leader to teach the class?

Yes No

9. If Question 28 is no, what materials were missing?

Evaluator Demographics

10. Age: 18-24 25-35 36-45 46-55 >55

11. Gender: Male Female

12. Position: PI

Campus Coordinator

Student Researcher

4-H Staff/Volunteer

Cooperative Extension Staff

Undergraduate Student

Other _____

Appendix B: Youth Process Evaluation Questionnaire

Which session did you just complete?

- ❍ 1 (Fruit Salsa)
- ❍ 2 (Smoothies)
- ❍ 3 (Oven Roasted Vegetables)
- ❍ 4 (Baked Apples and Fruit Salad)
- ❍ 5 (Stir Fry)
- ❍ 6 (Lentils)

If 1 Is Selected, Then Skip To How often did your family eat together...

What was the most fun iCook 4-H activity you did at home during the last two weeks.

How often did your family eat together during the last two weeks?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How often were you physically active for at least 60 minutes each day during the last two weeks?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the time

Answer If Which session did you just complete? 1 Is Not Selected

Did you make a video since the last class?

- ❍ Yes
- ❍ No
- ❍ This is my first class

Answer If Which session did you just complete? 1 Is Not Selected

Did you post a video on the website since the last class?

- ○ Yes
- ○ No
- ○ This is my first class

Which of the following are true? (Select all that apply)

- ☐ I will go to the iCook 4-H website and set a goal about eating fruits and vegetables
- ☐ I will go to the iCook 4-H website and set a goal about being physically active
- ☐ I will work with my family to plan healthy and balanced meals
- ☐ I will work with my family to shop for healthy and balanced meals

What activities were learning experiences for you today? (Select all that apply)

- ☐ Preparing a new recipe
- ☐ Tasting a new recipe
- ☐ Practicing conversations with family and friends while eating
- ☐ New and fun ways to be physically active
- ☐ Helping to clean the kitchen

What is the best word to describe your family meals?

Copy the goals you wrote on your Goal sheet.

What was the most important thing you learned today?

What state are you from?

- ○ Maine
- ○ Tennessee
- ○ South Dakota
- ○ West Virginia
- ○ Nebraska

What is your iCook 4-H Subject ID?ASK A iCOOK PERSON FOR THIS INFORMATION.

Appendix C: Adult Process Evaluation Questionnaire

What session did you just complete?

- 1 (Fruit Salsa)
- 2 (Smoothies)
- 3 (Oven Roasted Vegetables)
- 4 (Baked Apples and Fruit Salsa)
- 5 (Stir Fry)
- 6 (Lentils)

How often did you and your family eat together over the last two weeks?

- Never
- Rarely
- Sometimes
- Often
- All of the Time

How often was your child physically active for at least 60 minutes a day over the last two weeks?

- Never
- Rarely
- Sometimes
- Often
- All of the Time

Answer If What session did you just complete? 1 Is Not Selected

How much does setting goals during the class help you to think about the iCook 4-H program activities between the classes?

- Never
- Rarely
- Sometimes
- Often
- All of the Time

Answer If What session did you just complete? 1 Is Not Selected

What are some things that keep you from helping your child meet his/her healthy week goals?

Answer If What session did you just complete? 1 Is Not Selected

Did you and your child make a video on cooking, eating, shopping, or playing together since the last class?

- Yes
- No

Answer If What session did you just complete? 1 Is Not Selected

Did you and your child post a video on the website since the last class?

- Yes
- No

Answer If What session did you just complete? 1 Is Not Selected

If you did not make or post video, what is the main reason?

My child has learned kitchen skills that will be used at home (i.e. food preparation, cooking, cleaning)

- Strongly Disagree
- Disagree
- Neither Disagree or Agree
- Agree
- Strongly Agree

Did you meet the iCook 4-H study goal of eating together with your family AT LEAST two times a week (4 times) since the last class?

- More than 4 times since the last class
- Four times since the last class
- Three times since the last class
- Two times since the last class
- One time since the last class
- None

Did you meet the iCook 4-H study goal of cooking together with your child AT LEAST two times a week (4 times) since the last class?

- More than 4 times since the last class
- Four times since the last class
- Three times since the last class
- Two times since the last class
- One time since the last class
- None

Did you meet the iCook 4-H study goal of playing together actively as a family AT LEAST two times a week (4 times) since the last class?

- More than 4 times since the last class
- Four times since the last class
- Three times since the last class
- Two times since the last class
- One time since the last class
- None

How confident are you that you can be a good role model for your child by...

	Very Unconfident	Unconfident	Somewhat confident	Confident	Very confident
Cooking	•	•	•	•	•
Being Physically Active	•	•	•	•	•
Sitting and eating meals with my family	•	•	•	•	•
Buying healthier Foods	•	•	•	•	•

How likely are you to prepare the recipe from this class at home?

- Very Unlikely
- Unlikely
- Undecided
- Likely
- Very Likely

What was the most important part of this class for you?

What did you think was the most important part of this class for your child?

What would have made this class better?

What is the best word to describe your family meals?

Completing this evaluation helped to bring together the different parts of the iCook 4H project?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Answer If What session did you just complete? 1 Is Selected

What was it that made you and your child want to participate in the iCook program. (Select all that apply)

1. The opportunity to spend time with my child
2. The opportunity to cook with my child
3. The opportunity to learn how to grocery shop
4. The opportunity to learn how to be more active with my child
5. The opportunity to learn how to have better and more family meals
6. Other _____

Answer If What session did you just complete? 1 (Fruit Salsa) Is Selected

Please tell us how you found out about the iCook program. (Select all that apply)

7. 4-H Program Leaders / Cooperative Extension Staff
8. School Mailings
9. Fliers
10. From a Friend or Family Member
11. An iCook 4-H Researcher
12. Other _____

Answer If What session did you just complete? 4 (Baked Apples and Fruit Salsa) Is Selected Or What session did you just complete? 5 (Stir Fry) Is Selected Or What session did you just complete? 6 (Lentils) Is Selected

What are some things that would help you and your child to stay involved with the iCook 4-H project until it is over in August of 2015 (continuing to cook together, eat together, play together, and participating in website activities)?

Answer If What session did you just complete? 4 (Baked Apples and Fruit Salsa) Is Selected Or What session did you just complete? 5 (Stir Fry) Is Selected Or What session did you just complete? 6 (Lentils) Is Selected

One of the things the iCook 4-H team is thinking of doing, is having some get-togethers after the classes are over. What do you think would be good ideas for things to do or places to go during these get-togethers?

What state are you from?

- Maine
- Tennessee
- South Dakota
- West Virginia
- Nebraska

What is your iCook 4-H Subject ID?PLEASE ASK AN ICOOK TEAM MEMBER FOR THIS NUMBER!

Appendix D: Leader Process Evaluation Questionnaire

Which session did you just complete?

- 1 (Fruit Salsa)
- 2 (Smoothies)
- 3 (Oven Roasted Vegetables)
- 4 (Baked Apples and Fruit Salad)
- 5 (Stir Fry)
- 6 (Lentils)

How many participants were in the class today?

	How many participants were you expecting	How many participants showed up?
Youth Participants		
Adult Participants		

Were the curriculum resources provided adequate to complete the class?

- Yes
- No

Answer If Were the curriculum resources provided adequate to comple... No Is Selected

If No, what resources would you need to teach this class again?

Was the time allowed for class preparation adequate?

- Yes
- No

Answer If Was the time allowed for class preparation adequate? No Is Selected

How much time was needed for class preparation?

Answer If Which session did you just complete? 1 Is Selected

Which of the following class objectives did you meet? (select all that apply) 1

13. Dyads participate in technology training
14. Dyads make an introduction video
15. Dyads upload and post an introduction video
16. Dyads play the circle game to promote physical activity
17. Use knives safely when preparing fruit salsa
18. Dyads participate in family communication discussions
19. Dyads describe SMART-R Goals
20. Dyads set SMART-R Goals

Answer If Which session did you just complete? 2 Is Selected

Which of the following class objectives did you meet? (select all that apply) 2

21. Dyads participate in Set Activity: All Washed Up
22. Dyads Assess their heart rate at different levels of physical Activity
23. Youth identify importance of food safety principles
24. Adults watch feeding responsibilities video
25. Adults discuss feeding responsibilities
26. Dyads use proper food safety skills when preparing fruit smoothies
27. Dyads set SMART-R Goals

Answer If Which session did you just complete? 3 Is Selected

Which of the following class objectives did you meet? (select all that apply) 3

28. Dyads Participate in Set Activity
29. Dyads use knives safely to cut root vegetables
30. Dyads discuss components of meal planning
31. Dyads identify the importance of different food colors
32. Dyads participate in meal planning game
33. Dyads participate in physical activity
34. Dayds participate in family communication discussions
35. Dyads set SMART-R goals

Answer If Which session did you just complete? 4 Is Selected

Which of the following class objectives did you meet? (select all that apply) 4

36. Participate in set activity (Using Food Labels)
37. Use safe habits when opening cans
38. Discuss parts of the Nutrition Facts Label
39. Participate in physical activity (stretching)
40. Participate in family communication discussions
41. Set SMART-R Goals

Answer If Which session did you just complete? 5 Is Selected

Which of the following class objectives did you meet? (select all that apply)

42. Participate in Set activity (MyPlate for StirFry)
43. Use safe knife skills when preparing stirfry
44. Use proper food safety techniques when handling beef?
45. Participate in physical activity (iCook Shuffle)
46. Participate in family communication discussions
47. Set SMART-R Goals

Answer If Which session did you just complete? 6 Is Selected

Which of the following class objectives did you meet? (select all that apply) 6

48. Dyads identify non-meat sources of protein
49. Dyads demonstrate ways to make dishes more interesting and add flavor by using different combinations of herbs and spices without adding salt or fat
50. Dyads are able to identify examples of active play
51. Dyads set SMART-R goals

What comments do you have about the objectives?

What do you feel was the most important aspect of the class for the child?

What do you feel was the most important aspect of the class for the adult?

Name any activities that you felt were less well received by the child or the parent.

How effective was the small group discussion time?

- Very Ineffective
- Ineffective
- Neither Effective nor Ineffective
- Effective
- Very Effective
- Give detail if desired _____

What other thoughts would you like to share about the class?

What state are you from?

- Maine
- South Dakota
- Tennessee
- West Virginia
- Nebraska

What is your iCook 4-H Subject ID?

Appendix E: Initial Youth Initial Program Evaluation Questionnaire

Answer the following questions by thinking about if you KNOW HOW TO do what is asked. If you can do what is asked, then you agree with the statement. If you can NOT do what is asked, then you never can do the statement.

Can you use a knife to cut foods by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use a knife to cut foods with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use an oven for cooking by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use an oven for cooking with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use a stovetop for cooking by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use a stovetop for cooking with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use a blender by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use a blender with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you cook foods to the right temperature by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you cook foods to the right temperature with help from someone else?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

Can you store foods the right way by yourself?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

Can you store foods the right way with help from someone else?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

Can you measure ingredients for a recipe by yourself?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

Can you measure ingredients for a recipe with help from someone else?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

Can you plan a meal using all the food groups (MyPlate) by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you plan a meal using all the food groups (MyPlate) with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use herbs and spices when cooking by yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Can you use herbs and spices when cooking with help from someone else?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Answer the following questions by thinking about how willing you are to do what is asked.

When you think about each day of the week, how often are you physically active for at least 60 minutes each day?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How willing are you to taste new foods you have not tried?

- ❍ Very unwIlling
- ❍ Somewhat unwilling
- ❍ Neither unwilling nor willing
- ❍ Somewhat willing
- ❍ Very Willing

How willing are you to cook new foods that you have not tried?

- ❍ Very unwIlling
- ❍ Somewhat unwilling
- ❍ Neither unwilling nor willing
- ❍ Somewhat willing
- ❍ Very Willing

How willing are you to try foods in new and interesting ways?

- ❍ Very unwIlling
- ❍ Somewhat unwilling
- ❍ Neither unwilling nor willing
- ❍ Somewhat willing
- ❍ Very Willing

Answer the following questions by thinking about the DOUBT you have that you can do what is asked. If you have no doubt you can do what is asked, then you agree with the statement. If you doubt you can do what is asked, then you disagree with the statement.

I am sure I can cook.

- ❍ Strongly Agree
- ❍ Agreee
- ❍ Neither Agree nor Disagree
- ❍ Disagree
- ❍ Strongly Disagree

I am sure I can follow a recipe.

- ❍ Strongly Agree
- ❍ Agree
- ❍ Neither Agree nor Disagree
- ❍ Disagree
- ❍ Strongly Disagree

I am sure I can use a knife safely.

- ❍ Strongly Agree
- ❍ Agree
- ❍ Neither Agree nor Disagree
- ❍ Disagree
- ❍ Strongly Disagree

I am sure I can use an oven.

- ❍ Strongly Agree
- ❍ Agree
- ❍ Neither Agree nor Disagree
- ❍ Disagree
- ❍ Strongly Disagree

I am sure I can use a stovetop.

- ❍ Strongly Agree
- ❍ Agree
- ❍ Neither Agree nor Disagree
- ❍ Disagree
- ❍ Strongly Disagree

I am sure I can make food safely to avoid getting sick.

- ○ Strongly Agree
- ○ Agree
- ○ Neither Agree nor Disagree
- ○ Disagree
- ○ Strongly Disagree

Answer the following questions, by thinking about how OFTEN you do the what is asked.

How often is it stressful to eat together as a family?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

How often do you help your parents shop for groceries?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

How often does your family eat together?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ All of the Time

How often do you help cook meals for your family?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How often do you eat with your family at a table without distractions? (TV, cell phones)

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

When you think about each day of the week, how often does your heart pump hard and you sweat when you are being physically active?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How often does your family play actively together?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How often do you set healthy goals for yourself?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

How often do you meet your healthy goals?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Appendix F: Initial Adult Initial Program Evaluation Questionnaire

How often do you shop with a grocery list?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

When you think about each day of the week, how often is your child physically active for at least 60 minutes each day?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do you plan your weekly meals?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often does your child help you cook meals?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

When you think about each day of the week, how often are you physically active for at least 30 minutes each day?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often does your family eat together each week?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do you enjoy making meals with your child?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often does your child help in meal planning?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do you enjoy making meals?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do you need to manage your grocery budget carefully to ensure balanced meals for your family toward the end of the pay period?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do you make eating together as a family a priority?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often do the topics of conversations at mealtimes include all family members?

- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the time
- ❍ Always

How often does your child help you shop for groceries?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Most of the time
- ○ Always

How often would you rather eat out than make the evening meal?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Most of the time
- ○ Always

How often is it stressful to eat together as a family?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Most of the time
- ○ Always

How often does your family actively play together?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Most of the time
- ○ Always

How often do you feel confident with your kitchen skills?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Most of the time
- ○ Always

Appendix G: Final Adult Program Evaluation Subscales, Questions, and Scoring

Subscale	Question	Responses and Scoring
iCook Program Outcomes: *Cooking, Eating and Playing Together*	Can you... ...Do you shop with a grocery list? ...Do you plan your weekly meals? ...Does your child help you cook meals? ...Does your family eat together each week? ...Does your child help in meal planning? ...Do you enjoy making meals? ... Do you make eating together as a family a priority? ... Do the topics of conversation at mealtimes include all family members? ...Does your child help you shop for groceries? ... Would you rather eat out than make the evening meal? ... does your family actively play together? ... do you feel confident in your kitchen skills? When you think about each day of the week, how often... ...is your child physically active for at least 60 minutes each day? ...Are you physically active for at least 30 minutes each day?	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5
Technology Skills	I am comfortable... ...Accessing the Internet. ...Taking digital videos ...Downloading pictures to the computer. ...Putting pictures on the iCook 4-H website. ...Taking digital videos ...Downloading digital videos to the computer. ...Uploading videos to YouTube.	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5

Appendix H: Final Youth Program Evaluation Subscales, Questions, and Scoring

Subscale	Question	Responses and Scoring
Cooking Skills	Can you... ...Use a knife to cut foods? ...Use an oven for cooking? ...Use a stovetop for cooking? ...Use a blender? ...Cook foods to the right temperature? ...Store foods the right way? ...Measure ingredients for a recipe? ...Use herbs and spices when cooking?	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5
Willingness	How willing are you to... ...Taste new foods you have not tried? ...Cook new foods you have not tried? ...Try foods in new and interesting ways?	Very Unwilling = 1 Somewhat unwilling = 2 Neither unwilling nor willing = 3 Somewhat willing = 4 Very Willing = 5
Culinary Self Efficacy *This subscale needs to be reverse coded before score	I am sure I can... ...Cook. ...Follow a recipe. ...Use a knife safely. ...Use an oven. ...Use a stovetop. ...Make food safely to avoid getting sick.	Strongly Agree = 1 Agree = 2 Neither agree nor disagree = 3 Disagree = 4 Strongly Disagree = 5
Family Mealtimes and Preparation	How often... ...Do you help your parents shop for groceries? ...Does your family eat together? ...Do you help cook meals for your family? ...Do you eat with your family at a table without distractions? (i.e. TV, Cell Phones)	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5
Physical Activity	When you think about each day of the week ...how often does your heart pump hard and you sweat when you are being physically active? ...how often are you physically active for at least 60 minutes a day? ...how often does your family play	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5

	actively together?	
Goal Setting	How often do you... ...Set healthy goals for yourself? ...Meet your healthy goals?	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5
Technology Skills	I can... ...Access the Internet. ...Take digital pictures. ...Download digital pictures to the computer. ...Take digital videos. ...Download digital videos to the computer. ...Upload a video to YouTube. ...Link videos to the iCook 4-H Website.	Never = 1 Rarely = 2 Sometimes = 3 Most of the Time = 4 Always = 5

BIOGRAPHY OF THE AUTHOR

Douglas Mathews was born in Rochester, NH on March 30, 1982. He graduated from Sanford High School in 2000. He received his Associate of Science in Culinary arts in 2003, and an Associate of Science in Dietetic Technology in 2005. He received his Bachelor of Science (2008) and Master of Science (2010) degrees in Food Science and Human Nutrition at the University of Maine. His journey through life has been a long and winding road with a diverse set of interests including food culture, knitting, and technology. For the past several years, he has been the advisor to the Senior Skull Society. The time he has spent watching these senior men grow, spread their wings and excel in their professional and personal lives has been an amazing gift. As he continues to move forward in life he is looking to continue working within the field of nutrition education and evaluation. He is a candidate for the Doctor of Philosophy degree in Food and Nutrition Sciences from the University of Maine in December 2015.