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**EVALUATING THE DISSEMINATION OF THE iCOOK 4-H PROGRAM
USING OUTCOME, PROCESS, AND FIDELITY MEASURES.**

By

Tara Anna Gould

B.S. University of Maine, 2015

A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

(in Food Science and Human Nutrition)

The Graduate School

The University of Maine

August 2017

Advisory Committee:

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By Tara A. Gould

Thesis Advisor: Dr. Adrienne A White

An Abstract of the Thesis Presented
in Partial Fulfillment of the Requirements for the
Degree of Master of Science
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August 2017

The iCook 4-H Dissemination Study, conducted in five states, was a control-treatment design to test whether a newly developed program for obesity prevention for youth could be successfully implemented by community leaders with minimal researcher involvement. Community leaders were primarily Cooperative Extension educators. A dyad model was used for youth (control=9.6±0.9 years of age; treatment=9.9±0.6 years of age) and their adult main food preparers (control=38.8±5.7 years of age; treatment=39.4±7.8 years of age). A three-pronged approach to evaluation developed previously for the program was used to measure outcomes, process, and fidelity of the program. The control group, youth (n=63) and adults (n=71), and treatment group youth (n=76) and adults (n=75) completed pre- and post-program surveys. Treatment dyads completed the intervention, eight bi-weekly sessions on program focal areas of cooking, eating, and playing together. Treatment youth significantly increased outcome subscales of cooking skills (P<0.001) and goal setting (P<0.01), changes in goal setting held when compared to

control youth ($P < 0.05$). When compared to controls, treatment adults increased in the program outcome subscale with a total instrument mean score difference of $+2.1 \pm 4.7$ ($P \leq 0.01$). Based on information collected on process evaluations for youth, almost 70% of the cumulative responses over the sessions on a forced-choice checklist were that tasting and cooking new foods were learning experiences for them. On average, 64.7% reported they often/all the time ate together as a family over the previous two-weeks, and the main words they used to describe family meals were fun, good, and awesome. At each session, at least 60% of the youth reported they were often/all the time physically active. Low percentages of both youth (19.7%) and adults (22.1%) reported making and posting videos on the private study website. Adults reported confidence (5=very confident) in being role models for cooking (4.00) and eating/preparing family meals (3.90), but reported less confidence in being role models for physical activity (3.33). They reported meeting or exceeding goals of cooking, eating, and playing together at least twice per week. Trained leaders ($n=12$) led twelve total programs (96 individual sessions) and reported that 88% of the time resources were adequate, and most (60%) were able to prepare for sessions in the prescribed 90 minutes. Fidelity of implementation was conducted by trained evaluators ($n=18$; mean age= 43.2 ± 17.8) on 28 (29.2%) sessions, above the goal of evaluating 25% of sessions. Evaluators reported that 97% of the time leaders were effective/very effective, that a total of 91% of planned objectives were met, and that materials were adequate 88% of the time. Actual versus planned length of sessions was 118.9 versus 120 minutes. They reported that youth were engaged in the sessions a mean of 88% of the time and

that adults were engaged a mean of 91% of the time. Based on results from the outcome, process and fidelity measures, there is strong potential for the iCook 4-H program to be disseminated beyond the current five states and to be sustainable in practice settings, primarily due to Extension partnerships.

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CHAPTER 1: INTRODUCTION

As obesity rates rise in the United States, researchers, healthcare professionals, parents, and countless others are working to prevent and reverse this escalating trend.¹ Obesity is not only a problem for adults; childhood obesity has increased steadily over the past four decades.² In the United States, 17.7% of children age 6-11 years old are obese, and the percent increases to 20.5% in adolescents between ages 12-19.^{3,4} Although obesity prevention programs currently exist, there is a need for effective multicomponent out-of-school models.⁵⁻⁷ Exhaustive development of programs in the past has resulted in failure to disseminate to a real-world setting successfully.⁸ The iCook 4-H study was designed to include a dissemination phase. For purposes of the current study, the definition of dissemination was the implementation of the iCook 4-H program by community leaders with minimal researcher involvement. Through testing the dissemination, the researchers had the opportunity to make changes to ensure success and sustainability for transitioning to a real-world setting. iCook 4-H is an out-of-school program that combines Social Cognitive Theory (SCT)⁹ and Community Based Participatory Research (CPBR) principles¹⁰ as frameworks for development, with the goal of preventing childhood obesity through nurturing culinary self-efficacy, promoting familial interactions, and focusing on increasing physical activity. Youth age 9-10 and their adult primary meal preparer participated in eight bi-weekly sessions from September to December 2015.

The aim of the program is to provide resources to children and their families that are separate from efforts in place during the school day. Based on extensive research on behavior change in adolescents, constructive health behavior developed and ingrained at a young age can lead to long-term healthy habits and behavior maintenance over a lifetime.^{1,11-13}

In addition to targeting behavior change in youth, another method to bolster the ultimate impact is to incorporate more than one primary target within a program. Single-component interventions are less sustainable, while programs that involve multiple foci have been found to be most successful in eliciting significant long-term changes¹. Multi-component obesity prevention programs are frequently designed to focus on cooking, eating, mealtime, and exercise. Programs that integrate both the home and the community are most beneficial for producing healthy changes in a youth population.¹

The iCook 4-H Dissemination Study employed the three-pronged evaluation method¹⁴ to test the feasibility and effectiveness of the developed multi-component curriculum in a researcher-distanced environment. The study assessment procedure includes program outcome, process feedback, and fidelity measures. The built-in dissemination and implementation portion of the study allows the researchers to complete final changes to ensure success and sustainability when transitioning into a real-world setting.

In previous work, Randall¹⁵ explored methods of sustainable dissemination and implementation including the Quality Implementation Framework (QIF).¹⁶

The QIF, used by Randall when she piloted the Dissemination Study, was addressed in the current study.¹⁵ This study focused on building upon these recommendations and enacting proposed strategies.

The objective of the study was to use the three-pronged approach to evaluation designed by Mathews¹⁷ to test the feasibility and effectiveness of disseminating the iCook 4-H program. The outcome, process, and fidelity of implementation (FOI) were measured.

CHAPTER 2: REVIEW OF LITERATURE

2.1 Dissemination: Translating Research into Practice

In recent years, translational research, or moving programs from the research laboratory setting to the community setting, has become an important focus of researchers. Identified dissemination plans are often a required component, in funding opportunities.^{16,18} When the iCook team wrote the grant application for iCook: A 4-H Program to Promote Culinary Skills and Family Meals for Obesity Prevention (National Institute of Food and Agriculture, U.S. Department of Agriculture, award number 2014-67001-21851), it included a dissemination plan because of their dedication that a program created through community-based participatory research (CBPR),^{10,19} should be developed and tested in such a way as to facilitate access and use of that program once the grant funding was complete and the researchers had moved to other projects.

Researchers have called for framework for integration to be included in grant applications to plan for the translation of research-based programming into real-world settings⁵ since it is common that little or no use of such programs occurs at the end of research funding.²⁰ The National Institutes of Health (NIH) released a Strategic Plan for Obesity Research²¹ in 2011, explaining the importance of what they called “bench to bedside” research. When submitting a grant proposal, researchers seeking NIH funding are asked to include a plan and methods for further research into the sustainability of program use, and future dissemination.

Obesity prevention programs are primarily developed using evidence-based methods and designed to produce significant intended results. However, when disseminated into a real-world setting, many programs do not have a framework for sustainability built in and often fall out of use. In order to avoid the program falling out of use, programs should include a plan for future sustainability of implementation.⁵

Harris and colleagues⁷ presented a theoretical framework for successful delivery of evidence-based health promotion programs. They emphasized the importance of close collaboration and relationship development between researchers and personnel in an organization tasked with dissemination. They identified seven critical roles for researchers:

- sorting through evidence using needs assessments and literature reviews,
- conducting formation research,
- assessing the readiness of the organizations to continue with the program,
- balancing fidelity and reinvention to adapt program for dissemination,
- monitoring and evaluating,
- influencing the outer context, and
- testing dissemination approaches.

As with any new program, developing and finalizing are important steps in assuring program feasibility and sustainability in the future.

Nigg and colleagues⁶ used the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework to develop an evidence-based curriculum in an after-school nutrition and physical activity study.

They included components to assess sustainability and overall effectiveness during their four-year study implemented from 2004 through 2008. They reported lessons learned in disseminating the program using six points:

- interactive and entertaining program preparation,
- staff enthusiasm and ease of program implementation,
- identify program champions early on in development,
- cultivating relationships between partner organizations, community stakeholders, and program champions,
- build local capacity, identify ambassadors, and
- the program should be effective to produce intended results.

Ensuring that these points are taken into account in future research will build upon these lessons learned and make progress in developing a maintainable intervention program.

The transition from research to real-world is complex because of the many factors involved in the sustainability of a program. Altman²² presented a series of five phases, that when addressed, adequately lead to successful relationships between researchers and stakeholders who share the combined goal of sustaining a community intervention. He called the phases “The sustainability process” and considered each phase to be fluid, occurring simultaneously in a forward and backward movement to allow for lessons to be learned and changes to be implemented to create a more successful outcome. Through the process, ongoing communication, collaboration, feedback, and exchange occurred.

The five phases are:

1. research- Developing interventions with the intent of achieving change,
2. transfer-Plans made for the sustainability of moving the program from a research to a community setting,
3. transition-Replication, adaptation, innovation of the program with the outcome being the primary goal,
4. regeneration-Insight gained from experience is exchanged between community and research partners, and
5. empowerment-Emphasizing collaboration within partnerships, community ownership, and empowering future program participation.

Meyers and colleagues¹⁶ developed a Quality Implementation Framework (OIF) that includes a 14-step system in a series of four phases. Phase one includes considering the setting of the program host and how to assess the program, phase two provides structure for implementation, phase three is the structure of ongoing program execution, and the final fourth phase, includes a plan for improving future applications. Also included in this framework are the benefits of a hierarchical approach to management presented as three tiers. The first tier is the top level of program developers and organizers, a second tier of leaders/stakeholders involved in disseminating a program, and the third tier which is made up of individuals who are on the “front-line” of implementation working directly with program participants. This infrastructure provides a system for success throughout program implementation.

The review of the literature includes a variety of different frameworks for translational research. However, all exhibit marked similarities and as is true of each, researcher/stakeholder relationships are pivotal to long-term success.

Imperative to the process, is identifying and empowering community champions that support the program goals and objectives, which is invaluable to translational success.

2.2 iCook 4-H

The iCook 4-H program was a collaborative study to promote cooking, eating, and playing together for youth/adult dyads implemented in out-of-school settings between 2012-2015. Testing of the program for dissemination was conducted in fall, 2015.²³ A three-pronged approach to evaluation¹⁴ was conducted using program, process, and fidelity evaluations to provide measures of successful implementation, the impact of the intervention, and the feasibility of dissemination.

2.3 Childhood Obesity

Fryar and colleagues³ reported the prevalence of childhood obesity in 6-11-year-old youth in the United States between 1963 and 2012. Researchers used measurements from the National Health and Nutrition Examination Survey² (NHANES) including height and weight. Between 1966 and 1970, 4% of youth were classified as obese, but when compared to the more recent 2011-12 data, the percentage of obese youth increased to 16.4%. That equates to a 12.4% growth in childhood obesity over approximately 40 years. Correspondingly, the average weight of a child has increased by approximately five kg.^{1,24}

Researchers have investigated the relationship between age and lifelong health behavior.^{1,12,25} When people become obese during childhood, they are predisposed to a lifetime of poor health,¹³ due to the many obesity-related

comorbidities that can result.^{26,27} Lindsay and Colleagues²⁵ identified factors related to obesity in youth. As youth age, their daily environments change drastically. Their social group expands, and they become vulnerable to endorsements of obesity-promoting products and foods. In addition, youth decrease their physical activity due to increased screen time, technology use, and homework. It is during this period that parental influences become pivotal in the development of children's lifelong health behavior patterns. Providing health-promoting meals and snacks, while fostering youth culinary and health-related self-efficacy encourage the development of healthy habits.

Childhood obesity is a complex problem requiring a complex solution. Pratt and colleagues²⁸ compiled a report based on recommendations from a working group of academic and medical institutional leaders that, together, represented a variety of health-related fields. The working group completed literature reviews and participated in discussions of the causes, the past and current programs for obesity prevention, and data on the success of those programs. The result was a summary of recommendations for future research in the area of child obesity prevention and treatment. To develop a program designed to prevent or reverse childhood obesity, the study design should incorporate a child's diet, physical activity level, and social environment. Combining all of these areas into a cohesive program was cited as the most successful method of intervention. Researchers also reported that these multicomponent programs should include a plan for implementation, dissemination, evaluation, and translation from the research setting into a real-world application,

with a strong focus on overall feasibility and sustainability. The iCook 4-H research study was designed consistent with these recommendations.²⁹⁻³²

2.4 Youth/Adult Dyad Model

When considering the health of the nation's youth, the influences of the parents must be taken into account. The role of parents is multifaceted; children observe behavior and choices made by their parents,³³ including health behavior, ranging from food choices, partaking in physical activity, and self-regulation. When children perceive these behaviors in a healthy manner, they are more likely to develop the same beneficial habits.^{34,35}

Researchers at Duke University Medical Center conducted a randomized controlled study to investigate this youth/adult relationship regarding physical health and nutrition.³³ Dyads (n=400) consisting of a mother and child completed the Kids and Adults Now! Defeat Obesity (KAN-DO) study. The intervention was designed to achieve a healthy weight through diet, decreased sedentary behavior, and increasing physical activity time. Eight interactive kits were distributed to the treatment families over the course of eight months, comprised of modules to target and modify behavior. Researchers found that mothers in the control group decreased the behavior of using food as a reward (-0.24 treatment, 0.01 control: $p < 0.001$). The researchers also found that mothers who completed the intervention had a greater BMI change (-0.85 treatment, -0.07 control; $p = 0.04$). When compared to the paired youth, there was a positive trend in dietary intake. The researchers conclude that a youth/adult dyad model is an effective method when applied to

child obesity prevention interventions. Noting that their study provided evidence that health behavior is more easily influenced before unhealthy habits are formed, the researchers determined that an enhanced effect on preventing rather than reversing unwanted behavior is needed.

Robson and colleagues³⁶ investigated the use of an youth/adult dyad model and the frequency of non-home prepared foods. In their pilot study, six dyads completed the 10-week cooking program. The study intervention included weekly 60-90-minute cooking classes, first targeting only the parents, but at session seven the children were asked to participate. Parents were encouraged to use the information taught to them from the previous sessions when interacting with their children, including cooking skills, and child behavior-management strategies. Pre- and post-treatment assessments were used to evaluate dietary quality and intake. At the completion of the study, dyads decreased consumption of away-from-home prepared meals from 56% to 25% ($p < 0.05$). The researchers established that the dyad model was an innovative method to produce intended results in nutrition interventions in youth of approximately nine years of age. While this study only had a sample size of six dyads, studies like this provide a basis for future research using an youth/adult dyad model.

Cornelius and colleagues³⁷ discussed a cluster relationship within weight-related behaviors. A person who interacts most often with those who are overweight or obese is more likely to develop and maintain the same destructive behavior. This cluster relationship can be applied to a dyad model; if parents foster

an environment of health, youth will ultimately benefit. The researchers explain that for this reason, targeting dyads for nutrition interventions is an effective method of actuating change. In their study, 201 youth/adult dyads were assessed over a period of 18 months. Data collection occurred at 0, 6, 12, and 18 months. The researchers used a dyadic growth curve model to determine BMI trajectory for the pairs. The researchers found that dyads with a heavier partner at baseline experienced less weight loss over the duration of the study ($r=.51$; $p<.001$), and reported that partner trajectories were similar over time. The researcher's conclusion supports the cluster effect previously mentioned, and verifies the hypothesis regarding the influences of personal social environment on individual health.

2.5 Youth Self-Efficacy and Culinary Competency

Self-efficacy can be affected by how a child perceives themselves. In 2009, Tsiros and colleagues³⁸ investigated youth health-related quality of life (HRQOL) in children who were both obese and of a healthy weight. In their literature review, they analyzed 13 studies in which the Pediatric Quality of Life Inventory (PedsQL) was used to assess HRQOL. In 12 of the 13 studies, there was an observed inverse relationship between HRQOL and weight status. Researchers described that youth who were overweight or obese experienced lower HRQOL when compared to youth that were of a healthy weight.

Improving a child's self-efficacy through culinary skills and confidence in the kitchen can lead to healthier eating habits later in life.¹¹ According to researchers^{11,39}, a child's self-efficacy in the area of diet and nutrition can cause positive increases in dietary preferences, behavior, and attitude regarding food. When youth are involved in the growing of food and/or preparation of their meals, they are more likely to consume healthier foods.⁴⁰ By partaking in all aspects of their nutrition, children understand the importance of a healthy diet,⁴⁰ and should progress in culinary skills, prepare foods safely, and increase in culinary self-efficacy. Nelson and colleagues⁴¹ highlighted the role of culinary skills for all ages and the link to reducing obesity rates. The unique benefit of combining both culinary and nutrition education together at a young age can have a positive effect on health-related attitude and diet quality, which may result in an increase in long-term beneficial health behavior.⁴² It is through multi-component programs that these skills can be fostered.

2.6 Family Mealtimes

Although the connection between parents and their children has been investigated extensively, there remains a need to develop interventions that increase the frequency and quality of family mealtimes for obesity prevention.^{12,43} As previously noted, interventions using a youth/adult, often child/parent, dyad model result in greater effectiveness of developed programs.³⁷

Neumark-Sztainer and colleagues⁴² examined the association between family meal patterns and youth dietary intake. The cross-sectional study included 4,746

youth participants who completed the Project EAT survey in addition to food frequency questionnaires. Of all youth responses, 74% reported that eating family meals was enjoyable, but far less reported actually eating together; 14%, never, 19%, 1 or 2 times, 21.5% 3 or 4 times, 18.6% 5 or 6 times, and only 18% reported eating with their family seven days per week. Researchers compared these values to dietary intake at meals. Significant positive associations were found between eating as a family and youth energy intake of protein ($p < 0.001$), calcium ($p < 0.001$), iron ($p < 0.001$), fiber ($p > 0.001$), vitamins A, C, E, B-6, and folate ($p < 0.001$). Based on the results, it was concluded that diet quality and health perceptions improved as family meal frequency increased.

In 2015, a study was completed relating family meal frequency to child weight and dietary outcomes.⁴⁴ A total of nine measures were used, and associations between frequencies were determined, 160 youth/adult (8-12 years) dyads were considered in the study. Family meal frequency was 78% significantly associated with child BMI z-score and 100% associated with the child's fruit and vegetable intake. These data show clearly that family meals have a significant impact on diet patterns, fruit and vegetable intake, and physical measures of health, including BMI.

2.7 Physical Activity

According to the most recent Physical Activity Guidelines for Americans released in 2008,⁴⁵ children and adolescents require 60 minutes or more of physical activity per day, which should include aerobic, muscle, and bone strengthening exercises. Excessive sedentary time was also to be avoided. Currently only 40% of female and 57% of male American children are meeting this guideline,⁴⁶ leaving them susceptible to weight gain and obesity-related diseases. Physical activity has a substantial effect on both reaching and maintaining a healthy weight, and produces on average more weight loss in youth than interventions providing solely nutrition education.⁴⁷ To capitalize on the multidimensional approach, incorporating a physical activity component is a more effective method of developing an obesity prevention program.

Interventions seeking changes in physical activity in participants often follow a similar framework to nutrition interventions. However, more research needs to be conducted on the success of these programs. Dzewaltowski and colleagues⁴⁸ emphasized the need for future practical interventions that focus on using the RE-AIM framework to promote physical activity in a real world setting. Doing so increases the likelihood of a lasting translation from research to the real-world.

Limperg and colleagues⁴⁹ compared physical activity levels to health status in youth. Using the Pediatric Quality of Life Inventory (PedsQL), a valid and reliable instrument to measure physical activity in a youth population, data on gender, age, and health status (n=649) were collected. When comparing physical activity to

health status, they found that the mean instrument score for the healthy population was 85.88 ± 11.45 , while in the population with chronic health conditions the mean was lower at 76.65 ± 15.92 , indicating the healthier population was more physically active ($p < 0.001$, effect sizes 0.35 to 0.90). The PedsQL scale was found to be an accurate method to measure physical activity and identified between group differences within a youth population.

In a meta-analysis of the effectiveness of physical activity interventions, Biddle, Braithwaite, and Pearson⁵⁰ reported a significant effect of physical activity interventions when compared to groups that did not participate in treatment ($k=22$, $g=0.314$; $p=0.001$). Interventions aiming to increase physical activity in girls aged 5-11 were included. A total of 22 studies were considered in the analysis, for a total sample size of 1641 treatment participants, and 2045 control. When comparing the increase over the control group, the difference equated to a 12.17% increase in physical activity in the treatment group. While physical activity interventions have been found to be effective methods of promoting physical activity in a youth population, there remains a need for more effective programs and development of methods to measure produced changes.

2.8 Lifelong Health Impact of Nutrition Intervention

Todd and colleagues¹³ claimed that “adolescence is a critical period to modify risk.” Due to the complex physiological and behavioral changes that occur during this time, behavior established simultaneously is found to be maintained in the individual throughout a lifetime. Researchers discussed that not only does behavior

play a significant role, but the existence of overweight and obesity during this time leads to an increased risk of being an obese adult, later life insulin insensitivity, and poor personal body image.¹³ Those factors combined contribute to increased sedentary time and decreased physical activity, becoming a vicious cycle and damaging overall wellness. In proposing strategies to combat these effects, the researchers suggested that an intervention targeting adolescents, with an emphasis on effectiveness, feasibility, and sustainability is the most beneficial approach to preventing adverse lifelong health impacts.

2.9 Evaluation

The intent of evaluation in Community-Based Participatory Research (CBPR) is to quantify the outcome of an intervention. Outcome measures are a method of providing evidence for stakeholders to defend the necessity and intended impact of the program.⁵¹ There are varying approaches to measuring program results. In his dissertation, Douglas Mathews¹⁴ describes the evaluation instruments as they are applied to the iCook 4-H program. The three-pronged approach to evaluation is comprised of the program, process, and fidelity evaluations specifically designed and specialized as an evaluation tool for the iCook 4-H program.

2.9.1 Program Evaluation

There is a lack of reliable, validated tools to assess programs designed to impact cooking, dietary intake, and obesity outcomes.⁵² The success of obesity prevention programs is often measured using data collected before and after an intervention is delivered. This method of evaluating results is important in

producing evidence-based interventions. The iCook 4-H research team previously developed and tested the reliability and validity of a three-pronged approach to evaluation.²³ To develop the first prong, program outcome survey instruments were assessed for validity and test-retest reliability after undergoing factor analysis to select the most useful and relevant questions. The youth program survey is made up of demographic questions and seven subscales: cooking skills, physical activity, goal-setting, open to new foods, togetherness with food, technology skills, and culinary self-efficacy. The adult program survey consists of demographic questions, the Cooperative Extensions behavioral checklist, and two subscales: technology skills, and program outcome of cooking, eating, and playing together.

Program evaluation is a measure of the overall picture, meaning the ultimate outcome, and impact of the program. Collected at the first and last session, it permits researchers to quantify changes in participants from pre- to post-intervention. Using the unique program-specific survey instrument, researchers evaluate youth and adult, both control and treatment groups. Questions included within the instrument provide demographic and socioeconomic data along with data from each of the identified subscales. Results can be considered a measure of accountability, efficacy, and documentation for the intervention.

2.9.2 Process Evaluation

Process evaluations traditionally have been used as additional evidence that an intervention study produces the intended results in the manner envisioned by program developers.⁵³

In a research setting, process surveys are used to monitor and document implementation, and when the outcomes are analyzed, these data also help researchers further understand the in-depth reasoning behind the results.⁵⁴ The second prong of iCook 4-H's evaluation is the youth, adult, and leader process instruments.¹⁴ The three different surveys were developed during the previous iCook 4-H studies, and finalized to be applied to each of the eight sessions. Surveys consisted of 5-point Likert scales and open-ended questions. These responses can be analyzed as qualitative data that is used to report participant experience to the leaders following each session, but also quantitatively from coding the 5-point Likert scale questions to provide a summed score for each question that can be compared over time throughout the iCook 4-H program. Process evaluation is essential to tailoring the participant experience. If a system is in place that allows for real-time data collection, process surveys may be used to make changes mid-program to increase participant engagement, enjoyment, and participation, improving overall delivery.⁵⁵

2.9.3 Fidelity Evaluation

A crucial component of an overall evaluation is to measure what researchers call fidelity, measuring the fidelity of implementation (FOI) is critical to translational research.⁵⁶ These evaluations often include a quantification of adherence by those delivering the information, and qualitative assessments of successful conveyance.⁵⁷ What fidelity evaluations are designed to capture is a measure of the internal validity of an intervention, and the quality of the in-person delivery.

In addition, a high rate of fidelity furthers evidence that the changes observed in the program are in fact a result of the intervention itself.

As is sometimes done during intervention evaluations, Shek and Sun⁵⁸ included their measurement of program fidelity as a component of program process evaluation. In 2012, researchers assessed a seventh-grade drug prevention intervention. A series of educational lectures (14 in all) were observed by outside evaluators who assessed each lecture based on four categories - curriculum integration, program fidelity, background information, and integrity of program delivery. Each category included detailed subcategories to be considered within the rating. The result was a validated 13-item process evaluation scale providing a mean process rating. In their study, evaluators rated the curriculum adherence as 85.71% as a quantification of program fidelity. The program evaluation successfully assessed the delivery of a developed curriculum using a valid and reliable assessment tool developed by the researchers.

As part of the completion of the Children's Healthy Living (CHL) Program, Butel and colleagues⁵⁹ describe their approach to monitoring implementation fidelity. A five-step fidelity assessment was completed halfway through their 24-month program:

- developing a rubric,
- randomly select interviewees,
- conducting two separate interviews, first with a CHL researcher and secondly with an independent reviewer,
- qualitative comparison between team and independent reviewer, and
- interpreting results with intent to improve the program mid-way through completion.

Two subsets of FOI evaluations were completed by the researchers, and separately by independent evaluators. When comparing the two groups, a strong correlation between them was observed ($r=0.78$, $Kappa=0.50$, $p<0.001$). This method of collecting fidelity data provided adequate monitoring, and identified areas for improvement during the CHL program, and their methods can be adapted to a multi-site intervention.

The iCook 4-H Fidelity evaluations, the third and final evaluation prong, were designed to measure the degree of implementation as intended by the researchers, compared to actual program delivery by the session leaders.¹⁴ The fidelity evaluations included structural and instructional program features⁶⁰. Structural components included such items as the number of actual versus expected participants in attendance, intended versus actual session start and end time, session-specific objective achievement, coverage of program focal areas: cooking, eating, and playing together. Instructional components include participant engagement during session, leader effectiveness, and adequacy of materials provided to the leaders.

2.10 Summary

Childhood obesity is a wide-ranging problem within the United States. Because of its complexity, prevention will require inputs from many areas. Increasing youth culinary competency and self-efficacy impact diet and health behavior positively.^{11,39}

There is a national call for out-of-school obesity programs that include parental involvement and aspects of cooking, eating, and physical activity.⁴⁶ To measure the effectiveness of these programs, a valid and reliable evaluation needs to take place to provide researchers evidence for the outcomes and success of a program. An equally important factor is not only the development and testing of child obesity prevention programs, but the sustainability of dissemination and feasibility of implementation.

Effective programs can be developed, but if those programs are not able to be successfully disseminated after the research has concluded, then the possible benefits will not be fully realized. The frameworks for dissemination presented^{6,7,16,22} include details of lessons learned, and suggestions for future program implementation that will improve this logistical transition. Each framework, while unique, has similar themes within. Themes including a designed plan of action as the program transitions from a research setting into community use, building relationships with stakeholders and empowering them as champions of the program, and the feasibility of implementing the program in a variety of community settings and the pivotal theme of future program sustainability. Ensuring that a developed childhood obesity intervention follows these important areas will increase the likelihood that a program will be successful in the long term.

Through this review of the literature, a variety of different frameworks for translational research have been identified, each with marked similarities, including the importance for the success of fostering researcher and stakeholder relationships

and identifying and empowering community champions who support the program goals and objectives.

2.11 Study Justification

Implementation and dissemination of the program is the ultimate aim for the iCook 4-H curriculum. The Dissemination Study includes a researcher-assisted transition through partnerships with Cooperative Extension staff. A final review and adoption by National 4-H will take place as the program prepares for sustainable use and availability. This study investigates the success of strategies used to achieve goals in multiple settings across the United States. As a result of this study, iCook 4-H researchers will be able to provide evidence for the impact, sustainability, and success of the developed curriculum.

Since the transition from a research to a real-world setting is complex with many factors involved in the sustainability of a program,²² a dissemination study is needed to test its use by community leaders, and identify barriers to the program's sustainability. Testing dissemination in the context of a research grant provides a researcher-assisted transition, monitoring of implementation, and the generating of results that can be communicated to stakeholders. Therefore, the objective of this study was to test dissemination of the iCook 4-H program using the three-pronged approach to evaluate program outcomes, process and fidelity of implementation when delivered by community personnel with limited researcher-assistance.

CHAPTER 3: METHODOLOGY

The iCook 4-H Dissemination Study was implemented from September through December of 2015. Researchers from five land-grant universities participated in the research study, including; the University of Maine, the University of Nebraska-Lincoln, South Dakota State University, the University of Tennessee, and West Virginia University. State primary investigators, graduate and undergraduate student researchers, and Cooperative Extension personnel led the study.

3.1 Goal and Objectives

The goal of the study was to test the iCook 4-H program using a dissemination model in five states.

The specific objectives were:

- To measure outcome, process, and fidelity of the iCook 4-H program in a community setting with minimal researcher involvement.
- To develop a scoring system to quantitatively assess overall program fidelity of implementation using the modified instrument developed for the Intervention Study.
- To evaluate the success of the Dissemination Study for later widespread availability.

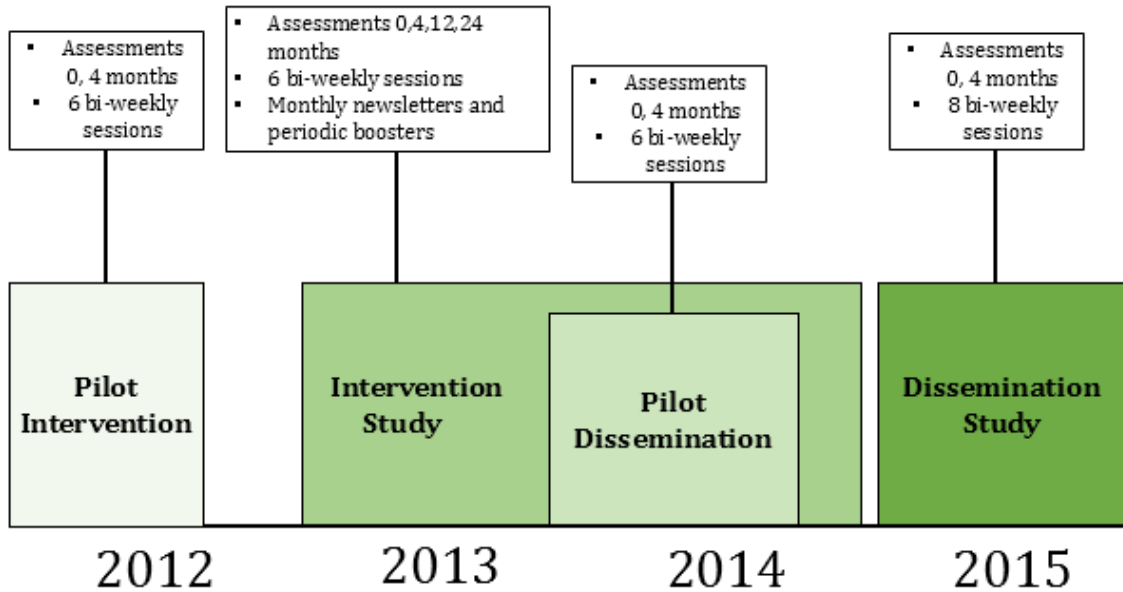
3.2. Study Design

The study was pre/post, control-treatment group, intervention design. It was the last phase of the larger five-year iCook 4-H research study, which took place during year four. It was preceded by the Pilot Intervention, Intervention Study, and Pilot Dissemination studies which were implemented in years 1-3 (Figure 1). The Dissemination Study was designed for minimal researcher involvement. The researchers provided program resources, training, and funding, while the community leaders recruited, conducted program evaluations, and implemented the intervention curriculum. Researchers were available, if needed, but did not serve in a managing capacity. Process reports completed at the end of Sessions 1 through 7 were made available to leaders upon request.

- The control group dyads were recruited by session leaders primarily from existing 4-H programs. Control participants, youth and adult, completed an initial survey, and 16 weeks later were asked again to respond to the same survey. They did not participate in weekly sessions, or experience other iCook 4-H program components.
- The treatment group dyads participated in eight bi-weekly sessions. They completed program outcome evaluations at Session 1 and 8 and process evaluation at the end of Sessions 1 and 7. Leaders could request summaries of each session for their own use. A special evaluation protocol called Ripple Effect Mapping⁶¹ was used to help dyads identify program impacts and was used in session eight in lieu of the process tool.

Sessions were held in a variety of locations identified by researchers and Extension staff, and included university campuses, school cooking facilities, and community sites with proper cooking and technology accommodations.

Figure 1 Five-Year Timeline of The iCook 4-H Research Study



¹The Intervention Study and Pilot Dissemination Study were implemented simultaneously between August-December 2014, as shown with through the overlap.

3.3 Sample

Participants were 9-10-year-old youth and the adult which was the main food preparer. Desired sample size was 48 per state, 24 in control and 24 in treatment for a total of (n=240).

3.4 Dyad Recruitment

Participants for the Dissemination Study were recruited between June and August of 2015 by Cooperative Extension staff from existing 4-H programs using a variety of inclusion criteria. The youth participants were to be between ages 9-10 (11th birthday not before January 2015), the adult participants had to be >18 years old, both must be free of food allergies, have access to a computer with an internet connection at home, and only one dyad per family could take part in the study. Recruitment contact protocol included emails, flyers, posters, verbal outreach, and through Cooperative Extension publications. Control and treatment participants completed appropriate consent forms which were presented as the first question when they started the program evaluation surveys (Appendix A & Appendix B). Each state was given the goal to recruit 20 dyads, a final combined baseline sample of n=36 control and n=28 treatment dyads were recruited.

3.5 Intervention

The intervention was comprised of eight bi-weekly sessions developed to emphasize the study focal areas of cooking, eating, and playing together for obesity prevention. Table 1 is an overview of the content in each session (including the session title, recipe of the day, culinary skills to be developed, physical activity, and technology training), including use of a study website and cameras, and how these focal areas were met during each session. Sessions were designed to be completed in a two-hour time frame with careful planning to make accomplishing session objectives possible in the time allotted. As part of the research effort to capture the

reaching effect of the program. The final Session 8 included a ripple effect mapping activity, directed by the leaders, to involve the participants in a discussion about the outcomes they gained from being a part of iCook 4-H.

Session leaders were trained on both materials and methods of program delivery before study commencement. Training materials provided by the researchers were available for leader use electronically through the eXtension moodle.

Table 1 iCook 4-H Curriculum Component Content Overview by Session

#	Session Title	Recipe	Culinary Focus	Physical Activity	Technology Training & Goal Setting
1	Program Introduction	Fruit and Yogurt Parfaits	Dairy, whole grain identification, and fruit food groups	Introduction	Navigating the iCook Website, participant cameras
2	Tools of the Trade	Fruit Salsa w/ Cinnamon Tortilla chips	Knife Skills, washing fruits	Circle Game-getting to know you	SMART-R Goal Setting
3	Keeping it Cool in the Kitchen	Go Green and Favorite Fruit Smoothies	Food Safety-avoiding cross contamination	“Know your heart rate” exercise	Short and long term goals
4	The Art of Meal Planning	Oven Roasted Veggies	Peeling vegetables, oven stove top safety	Charades Game	Family meal place settings
5	Supermarket Smarts	Baked Apples	Grocery shopping, food labels, canned foods	Stretching activity, yoga	Quality communication conversation starter cards
6	Family Meals-Eating Together	Quick Stir-Fry Rice	Using leftovers, skillet cooking	iCook Shuffle-Healthy Downtime	Safe reheating temperatures
7	Packing the Power-Protein and Spices	Lentil & Cheese Quesadillas	Using seasonings, shredding, flipping	Cup stacking relay	Communication skills
8	Program Wrap-up	MyPlate Turkey Roll-ups	Using all food groups	Traffic light Health Quiz	Ripple mapping

Table modified from Franzen-Castle et. al.²³

¹There was no specific physical activity for Session 1 due to program introduction time and technology training.

3.6 Survey Data Collection Instruments

Surveys were completed by leaders, assistant leaders, adults, and youth in-person concluding each session.

- Online program outcome instruments [n=45 items for youth (Appendix A), n=55 items for adults (Appendix B)]; employed the use of questions, broken into subscales, to assess program outcomes. The instruments were developed during the previous Intervention Study, with alpha levels reported.¹⁷

The youth survey tool has seven subscales:

- 8-item Cooking Skills ($\alpha=.8$)
- 3-item Physical Activity ($\alpha=0.69$)
- 6-item Culinary Self-efficacy ($\alpha= 0.84$)
- 2-item Goal Setting ($\alpha= 0.76$)
- 7-item Technology Skills($\alpha=0.75$)
- 4-item Togetherness with Food ($\alpha= 0.72$)
- 3-item Open to New Foods ($\alpha= 0.78$)

The adult survey tool has two subscales:

- 15-item Program Outcomes of —Cooking, Eating, and Playing Together ($\alpha=0.69$)
- 7-item Technology Skills ($\alpha=0.84$)

- Online process evaluations [n=14 items for youth (Appendix C), n=24 items for adults (Appendix D), n=12-items for leaders (Appendix E)]. Participants and leaders completed process evaluations following each session. These instruments included qualitative and quantitative feedback, collected about cooking, eating, and playing together over the course of the Dissemination Study. While no inferential statistics could be run on this type of data, through graphing the frequency of responses, a visual representation of increases and decreases between sessions is observed. Process

survey reports were generated by this researcher at the request of the state leaders to provide midsession feedback and allow for concurrent leader accommodation tailored to their own participant responses.

- Fidelity of Implementation (FOI) evaluations were used by independent observers of the program, developed for the Intervention Study¹⁷ and designed to measure structural (e.g. objectives, timing) and instructional components⁶⁰ (dyad engagement) of the curriculum (Fidelity Evaluation for session 1 found in Appendix F). A generic model was adapted for each of the eight sessions. The FOI was designed as an easy-to-use-and-analyze instrument. Of the total 96 sessions (8 sessions/program x 12), a goal of 25% (n=24; 3 times for each of 8 sessions) was set for fidelity testing. Evaluators (n=18) were trained to attend programs and complete FOI instruments independently by observation as the program was implemented. Each state completed evaluations at assigned intervals. The first 12 structural questions in each fidelity evaluation were designed to assess the level to which individual weekly goals and objectives were met, along with attendance and timing; the 12 final instructional questions remained the same each week in order to gather feedback on leader effectiveness, curriculum sufficiency, and adult/youth engagement.

3.6.1 Development of Fidelity Instrument Scoring

In order to quantify the overall fidelity of implementation, a scoring system was developed which resulted in an overall percentage of total program fidelity. Survey questions of structural components including attendance, session timing, and objectives met were computed as a percentage of total possible points. For example, if 5 out of 10 objectives were met, that question would receive a 50% level of fidelity. This same method was applied to the instructional components including participant engagement, leader effectiveness, curriculum material adequacy, and number program elements covered. For questions rated from “Very ineffective to “very effective,” a total possible score was calculated from the total number of evaluations completed. If all evaluations (n=28) received a “very effective” rating that question would receive a score of 100% fidelity, and so on. This was completed for each question, and an overall mean fidelity was calculated for all evaluations completed during the Dissemination Study.

Table 2 Schedule of iCook 4-H Evaluations During Fall 2015 as Implemented

	September		October		November		December	
Session #	1	2	3	4	5	6	7	8
Program Evaluation	X							X
Process Evaluation	X	X	X	X	X	X	X	X
Fidelity Evaluation								
Maine	X	X						
Nebraska	X	X	X	X		X		X
South Dakota	X	X	X	X	X	X	X	X
Tennessee		X		X	X	X	X	
West Virginia		X				X		

3.7 Data analysis

Analysis of data was completed using IBM SPSS Statistics (version 23). Descriptive statistics were used to report demographic data, assessed at baseline, by frequency.

Program survey subscales were summed per participant before paired student's *t*-tests were used to evaluate program evaluation pre- and post- data within-group, providing a measure of program impact. Unpaired student's *t*-tests were used to account for differences between control and treatment groups.

Due to the nature of the data collected from the process surveys, responses from both youth and adults were thematically coded by this researcher and an assistant researcher to ensure consistency. Responses for youth/adult questions were streamlined into key themes for each question. After thematic coding, participant responses were used to create word clouds; these offer a visual representation of the frequency of answers such that the larger the word appears, the more often the participants provided that response. Process surveys were used in the study as a method of obtaining feedback from participants and leaders throughout the duration of the study. Additional process data were presented using frequency of responses and not directly linked to discrete participant outcome, but rather a qualitative analysis of the participants' experience during the program.

Fidelity responses were compiled and analyzed using descriptive statistics of each session individually, in addition to the summed responses from all sessions. A scoring system was developed to determine the overall fidelity by each session, but

also for a total percentage of program fidelity over the entire program. Jonathan Moyer, MS was the consulting statistician.

During the fall of 2015, this researcher acted as the University of Maine co-campus coordinator along with fellow graduate student Douglas Mathews. Responsibilities included program, process, and fidelity data management in the Qualtrics (www.qualtrics.com) survey system, weekly multi-state survey updates/leader reports, and interacting with leaders and participants each week by being available for questions at an iCook 4-H helpdesk via Skype, email, and phone conversations.

CHAPTER 4: RESULTS

4.1 Youth and Adult Participant Demographics

At baseline, control youth (n=63) and adults (n=71), and treatment youth (n=76) and adults (n=75), completed the pre-program process survey. At post-program, control youth (n=39) and adults (n=39), and treatment youth (n=35) and adults (n=39) had completed both pre-and post-assessments. Only participants with completed pre- and post-assessment data were included in the outcomes analyses.

Youth participants were mostly female. As expected due to study inclusion criteria, participants were primarily in 4-5th grade during the intervention. Youth participants mainly accessed the internet using a personal computer or mobile device (Table 3). Most of the adult participants, both control and treatment were married, did not participate in temporary assistance to needy families (TANF) , and primarily accessed the internet using a personal computer/mobile device (Table 4).

4.2 Program Outcome Results

In Table 5 are the pre- post difference scores for the program outcome measures. Treatment youth increased goal setting compared to control youth ($P \leq 0.05$). The control group increased cooking skills and technology skills. Within-group difference of scores from pre to post was seen in the treatment group youth for the cooking skills subscale (4.06 ± 5.3) and for the treatment group adults on the cooking, eating and playing together subscale (2.1 ± 4.7).

Table 3 Youth Participant Baseline Demographic Characteristics

	Control n=63	Treatment n=76
Mean age (years ± standard deviation)	9.58± 0.9	9.86± 0.58
	Frequency (%)³	
Gender		
Female	42(67.7)	52(68.4)
Male	20(32.3)	24(31.6)
State		
Maine	4 (6.5)	18(23.7)
Nebraska	24(38.7)	11(14.5)
South Dakota	9(14.5)	15(19.7)
Tennessee	22(35.5)	14(18.4)
West Virginia	3(4.8)	18(23.7)
Grade in School		
3 rd	10(16.7)	7(9.3)
4 th	22(36.7)	37(49.3)
5 th	27(45)	30(40)
6 th		1(1.3)
7 th	1(1.7)	

¹The sample size differs from total dyad sample size because responses for adult and youth were measured independently when matched the total dyad completion was lower than the individual.

²Missing values indicate no responses in that category

³Percent calculated from responses received per question

Cronbach’s alpha was used to determine reliability. During Dissemination, two youth instrument subscales, (togetherness with food, and physical activity) did not meet the desired reliability (Table 6). Remaining youth subscales, (cooking skills, open to new foods, goal setting, technology skills, culinary self-efficacy,) and both adult subscales, (program outcomes and technology skills) remained consistent with the desired alpha levels.

Table 4 Adult Participant Baseline Demographic Characteristics

	Control n=71	Treatment n=75
Mean age (years ± standard deviation)	38.77±5.7	39.41±7.76
	Frequency (%)³	
State		
Maine	6(8.6)	18(24)
Nebraska	24(34.3)	10(13.3)
South Dakota	9(12.9)	18(24)
Tennessee	25(35.7)	15(20)
West Virginia	6(8.6)	14(18.7)
Marital Status		
Married	52(80)	55(74.3)
Divorced	8(12.3)	4(5.4)
Widowed		1(1.4)
Single		4(5.4)
Committed Relationship	5(7.7)	10(13.5)
Highest Level of Education		
Elementary School		2(2.7)
Some High School	1(1.6)	2(2.7)
High School	9(14.1)	12(16)
Some College	12(18.8)	15(20)
Associates Degree	6(9.4)	15(20)
Bachelor's Degree	29(45.3)	19(25.3)
Graduate Degree	5(7.8)	7(9.3)
Doctoral Degree	2(3.1)	3(4)
Employment Status		
Employed for wages	42(64.6)	42(59.2)
Self-employed	5(7.7)	7(9.9)
Out of work but not currently looking for work		1(1.4)
Stay at-home mom/dad	17(26.2)	16(22.5)
Student		2(2.8)
Unable to work		1(1.4)
Choose not to answer	1(1.5)	2(2.8)
TANF		
Yes	17(25)	27(36)
No	51(75)	48(64)

¹Missing Values indicate no responses in that category.

²Missing values indicate no responses in that category.

³Percent calculated from responses received per question.

Table 5 Program Outcome Pre/Post Subscale Difference Scores for Youth and Adults

Group	Control (mean±SD)	Treatment (mean±SD)
Youth	(n=39)	(n=35)
Cooking Skills¹	1.74 ± 4.4 ^w	4.06 ± 5.3 ^y
Goal Setting²	0.08 ± 2.1	1.1 ± 2.3 ^{x,z}
Open to New Foods³	0.85 ± 3.5	0.74 ± 3.5
Culinary Self-Efficacy⁴	0.1 ± 3.1	0.80 ± 4.2
Technology Skills³	1.9 ± 4.3 ^x	2.2 ± 7.4
Physical Activity⁵	-0.3 ± 1.4	-0.23 ± 2.6
Togetherness with Food⁶	0.08 ± 2.5	1.06 ± 3.6
Adult	(n=39)	(n=37)
Program Outcome: Cooking, Eating, and Playing Together ²	-0.051 ± 2.8	2.1 ± 4.7 ^{x,z}
Technology Skills	1.46 ± 5.05	-0.92 ± 5.46

¹Subscale score range from 8-40; Likert scale 5-point frequency ranging from never to always; see appendices A & B

²Subscale score range from 2-10

³Subscale score range from 3-15

⁴Subscale score range from 6-30

⁵Subscale score range from 7-35

⁶Subscale score range from 4-20

^w= p ≤ 0.05; ^x= p ≤ 0.01; ^y= p ≤ 0.001, within group pre/post differences

^z=Treatment significantly different from control for youth (p ≤ 0.05), and for adults (p ≤ 0.01)

Table 6 Program Evaluation Instrument Reliability

Subscale	Cronbach's Alpha	
	Pre-test	Post-test
Youth		
Cooking Skills	0.812	0.782
Open to New Foods	0.708	0.728
Togetherness with Food ¹	0.381	0.578
Culinary Self-Efficacy	0.731	0.775
Physical Activity ¹	0.417	0.548
Goal Setting	0.782	0.759
Technology Skills	0.793	0.816
Adult		
Program Outcomes: Cooking, Eating, and Playing Together	0.647	0.632
Technology Skills	0.882	0.869

A Cronbach's alpha of 0.70 is desired when determining instrument reliability

¹Sub-scales not meeting acceptable reliability value (0.70)

4.3 Process Results

Results from the process evaluations are presented in Table 7 & Table 8, and Figures 2 through Figure 12, and follow the program focal areas of cooking, eating, and playing together.

4.3.1 Youth Process Results

Table 7 Youth and Adult Process Evaluations Completed at Each Session

iCook 4-H Session	Number of Youth Responses	Number of Adult Responses
1	72	62
2	56	44
3	49	42
4	40	33
5	32	31
6	39	27
7	31	24

Treatment youth responses, as total percent over the iCook program, for what activities were learning experiences for them, are presented in Table 8. Based on frequency, tasting and cooking a new dish were the responses most often reported as learning experiences, practicing conversations with family and friends while eating, and helping to clean the kitchen were reported less often.

Figure 2 is a word cloud generated from treatment youth responses to “what was the most important thing you learned today?” Across all sessions, cooking, knife skills, and healthy eating were most frequently cited as the most important thing learned. Less frequent answers and therefore smaller font sized words included

cross contamination, labeling, and spices. Figure 3 includes data from treatment youth responding to “how often did you family eat together during the last two weeks?” The response “often” was answered most frequently at each session, while “never” and “rarely” were answered least.

Table 8 Treatment Youth Learning Experiences

Possible Responses ¹	Percent selected
Cooking a new dish	62.9
Tasting a new dish	69.7
Practicing conversations with family and friends while eating	26.2
Learning new ways to be physically active	36.2
Helping to clean the kitchen.	32.6

¹Youth were asked “which of these activities were learning experiences for you,” and could select more than one response.

Figure 2 Youth Descriptors of Most Important Thing Learned

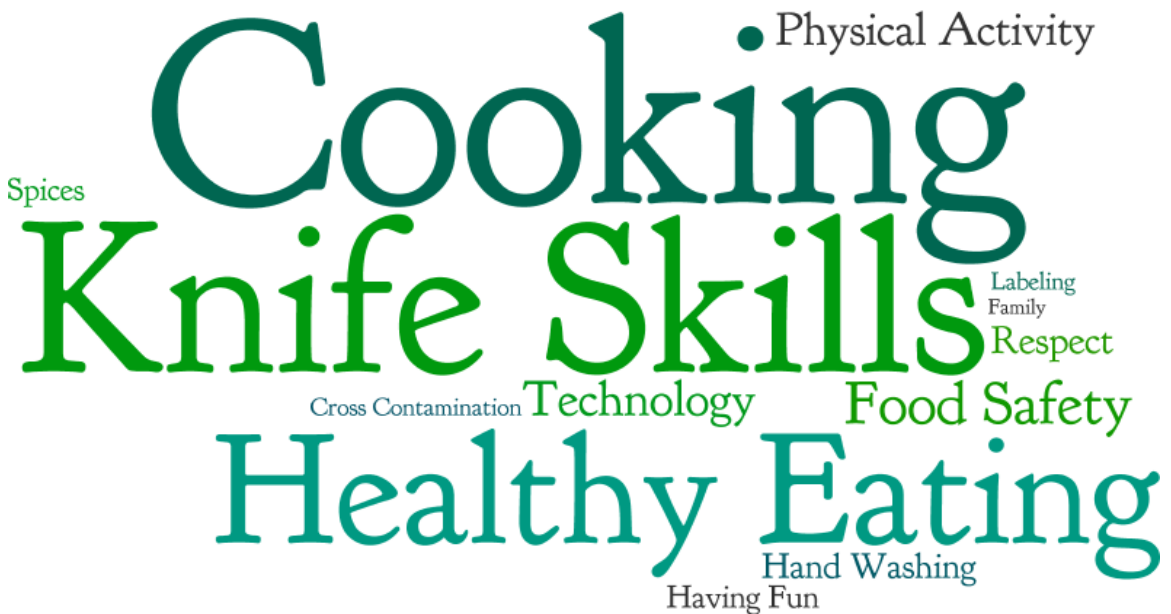
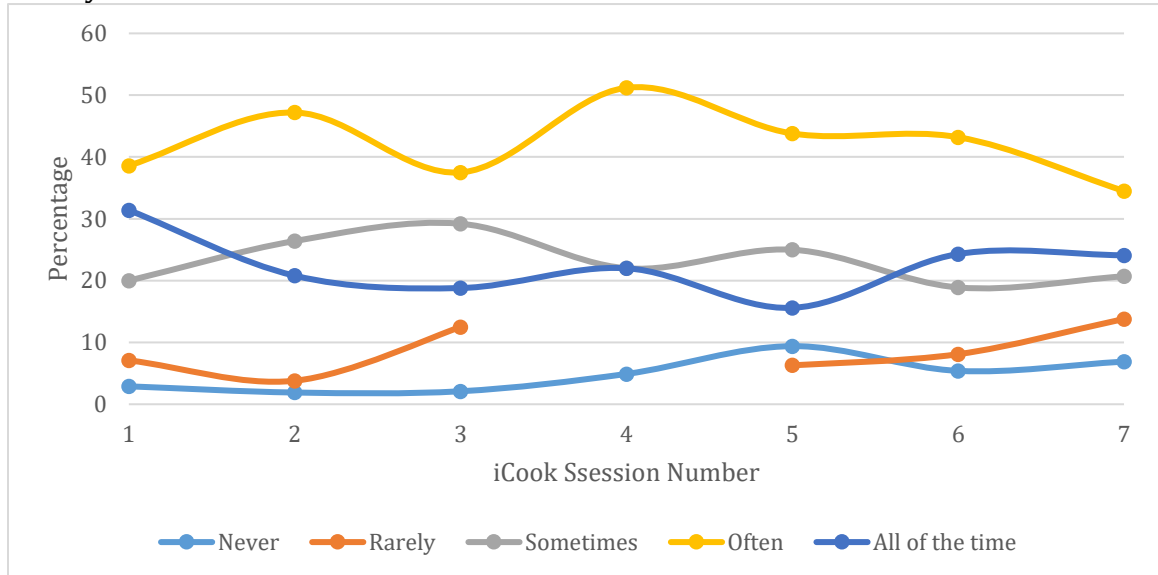


Figure 3 Percentage Responses Reported by Youth About Eating Together as a Family Between Sessions



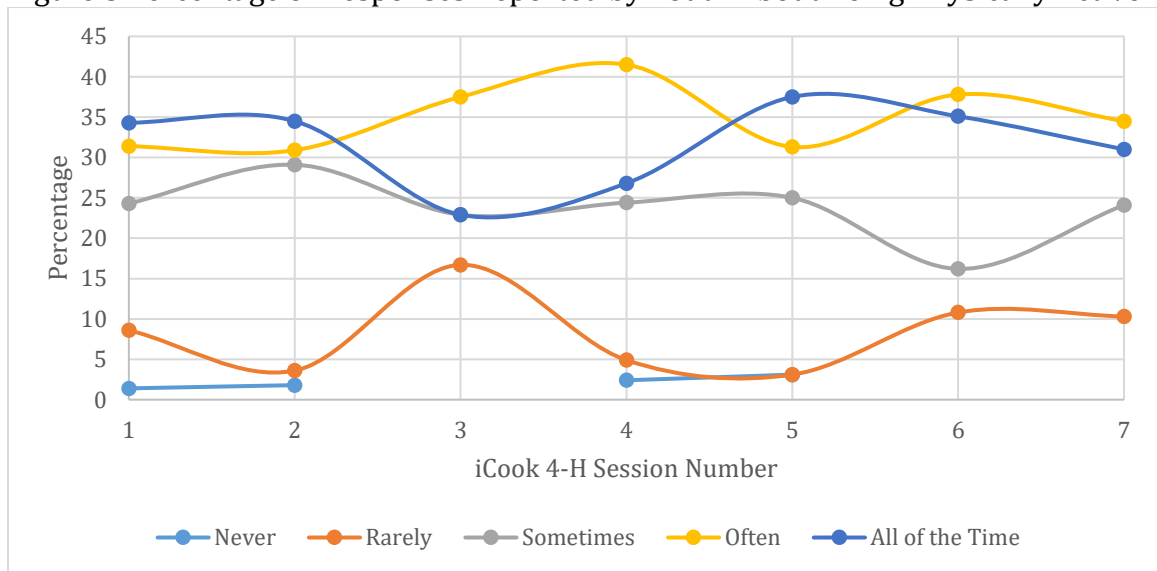
¹Youth were asked to respond to how often they ate together as a family between sessions. ²Possible responses 1=never, 2=rarely, 3=sometimes, 4=often, 5=all of the time.

As shown in Figure 4, when youth treatment participants were asked “What is the word to describe your family meals?” a word cloud of the most frequent responses, as indicated by larger words were positive words, as fun, good, and awesome, while less positive words, were provided less often, including sad, loud, and boring. Figure 5 includes treatment youth responses to “How often were you physically active during the last two weeks?”. The majority of youth responses were often, the least frequent responses were never and rarely.

Figure 4 Youth Descriptors of Family Meals



Figure 5 Percentage of Responses Reported by Youth About Being Physically Active

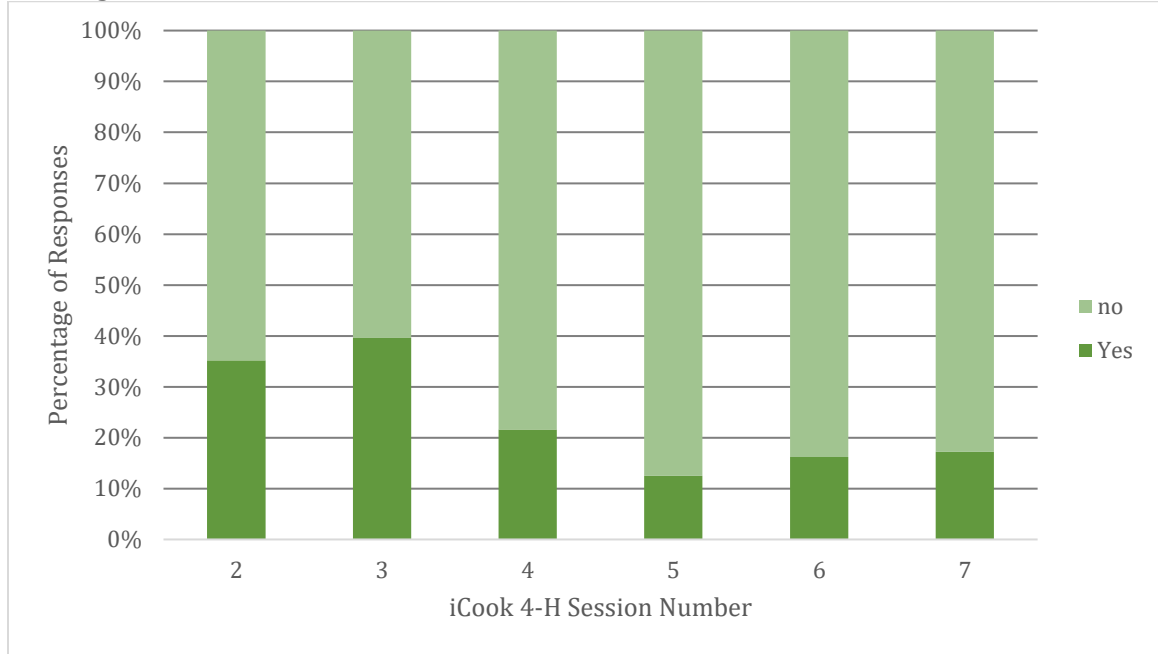


¹Youth were asked to respond to how often they were physically active in the last two weeks.

²Possible responses 1=never, 2=rarely, 3=sometimes, 4=often, 5=all of the time.

To assess the use of the iCook 4-H website forum, youth were asked if they made and posted a video of their family cooking, eating, or playing together since the last class (Figure 6). Based on a frequency count, a higher percentage of yes responses were reported in sessions 2 and 3, with lower percentages over the remaining sessions. Across all sessions, there were more “no” responses than “yes” responses.

Figure 6 Percentage of Yes or No Responses Reported by Youth About Making and Posting Videos on the iCook Website Between Each Session



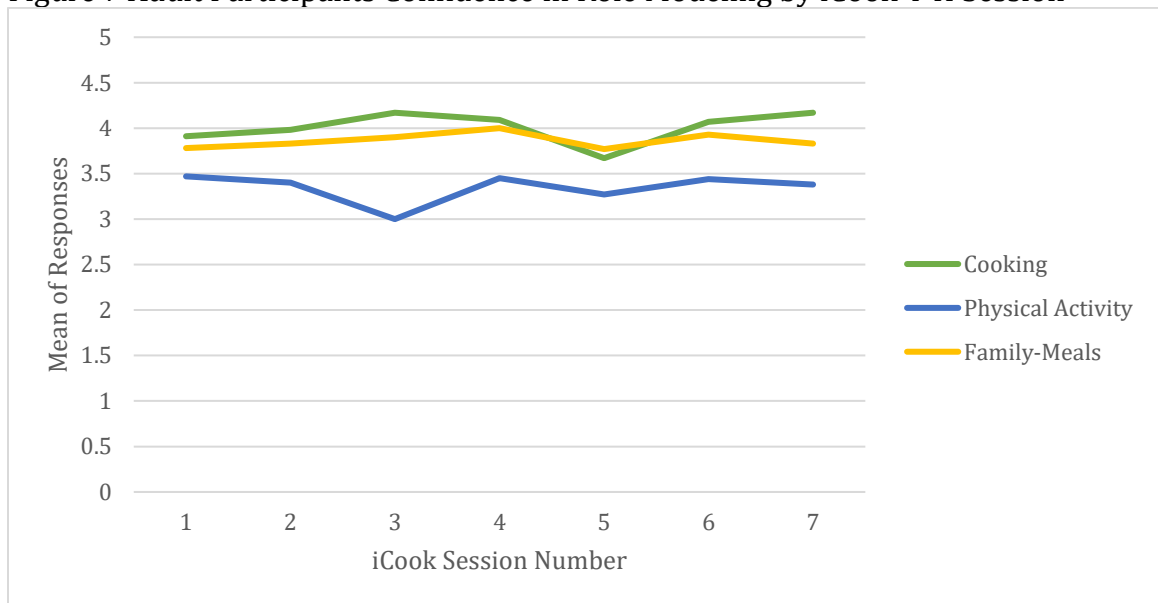
Treatment youth participants were asked “Which of the following are true? I will go to the iCook 4-H website and set a goal of eating fruits and vegetables and/or set a goal about being physically active, and whether or not they planned to do a new activity that week.” Between session 1-7, youth responded that they planned to do a new activity 63.2 % of the time, 30% of the time they planned to go to the iCook

4-H website to set a goal about eating fruits and vegetables, and 32.4% of the time they planned to go to the website to set a goal about being physically active.

4.3.2. Adult Process Feedback Results

In Figure 7 is the treatment adults’ confidence in being a role model for their youth in the areas of cooking, being physically active and eating and preparing family meals. Common adult responses to the question “What was the most important part of this class for your child?” were about the youth being safe in the kitchen. They also reported on youth learning to be confident in their abilities in the kitchen and being open to trying new and differently prepared foods. Treatment adults responded to “what was the most important thing learned in class today?” Whether they were asked about the most important part of the session for themselves, or for their child, being “together” was most often reported (Figure 8).

Figure 7 Adult Participants Confidence in Role Modeling by iCook 4-H Session



Process surveys only completed during sessions 1-7
 Possible responses ranged from 1-5 (how confident): 1=very unconfident, 2=unconfident, 3=somewhat confident, 4=confident, 5=very confident.

Figure 8 Adult Most Important Thing Learned



Treatment adult’s responses to “What is one word to describe your family meals” are presented in Figure 9. Together and family time were answered most often. A greater percent of responses by treatment adults about whether they made and posted videos on the iCook 4-H website between sessions were “no” rather than “yes” and remained low through the program (Figure 10).

When adults were asked about the frequency of meeting program goals of cooking, eating, and playing together at least twice a week, or four times between sessions, reports for eating together between sessions were fairly consistent at five times per week. For meeting goals of cooking and being physically active together, they reported between two and three times per week. By Session 7, their reports of cooking and playing with their youth were closer to three than two times per week (Figure 11).

Figure 9 Adult Descriptors of Family Meals

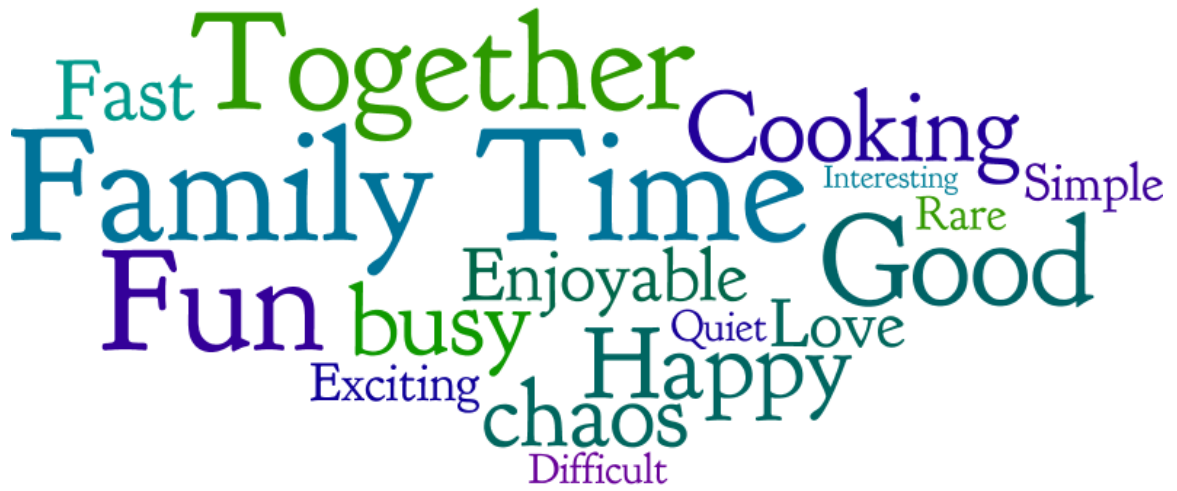
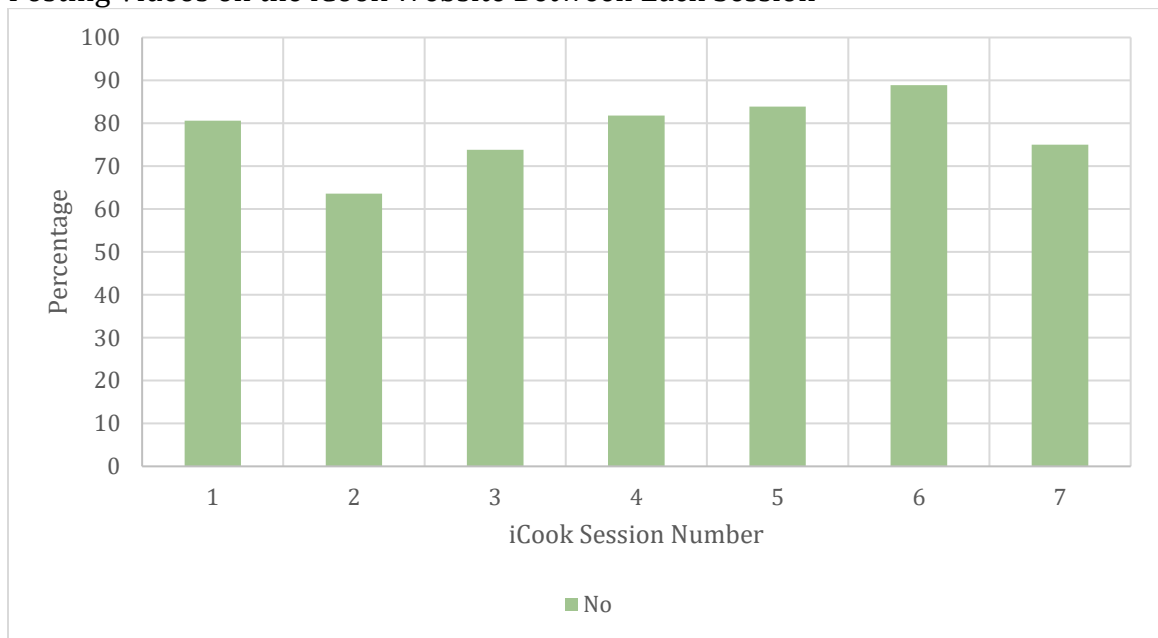
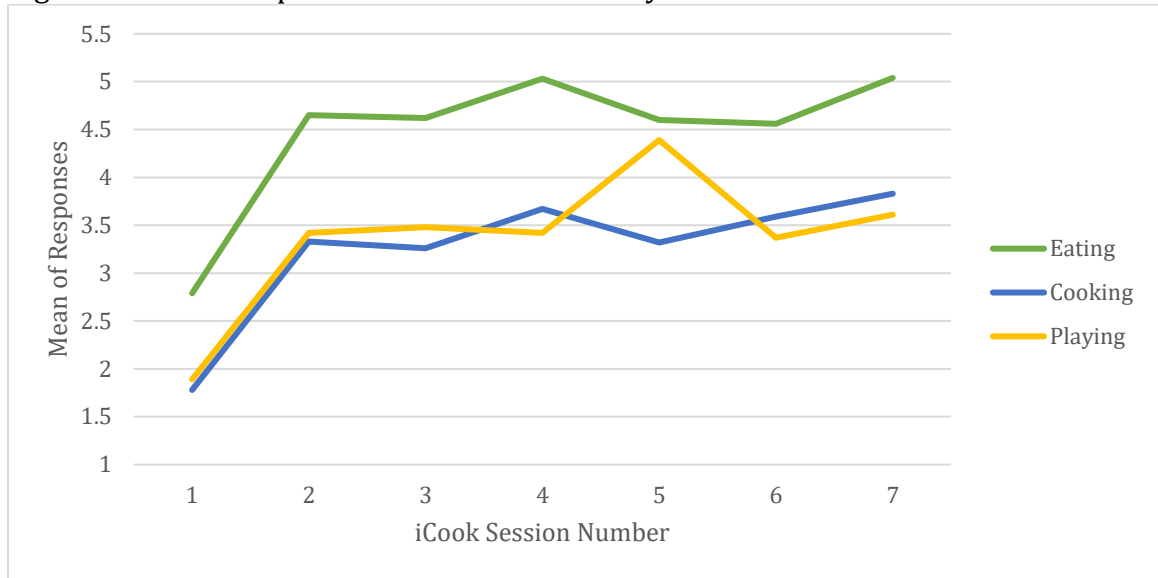


Figure 10 Percentage of Yes or No Responses Reported by Adults About Making and Posting Videos on the iCook Website Between Each Session



¹ Treatment adult responses to “did you make and post a video since the last class?”

Figure 11 Adult Responses for iCook 4-H Family Goals Met



Process surveys only completed during sessions 1-7

Possible responses ranged from 1-6 (number of times per week goals were met): 1=none, 2=one, 3=two, 4=three, 5=four, 6=more than four.

When analyzing the qualitative participant feedback in addition to verbal leader feedback, it was clear that some participants struggled with the length and amount of paperwork included in the research study. Many participants found the program surveys very long and completing the same process survey after every session felt redundant. Participants greatly enjoyed the activities within the curriculum and would have preferred to devote less time to the data collection portion of each session.

Participants were asked to provide suggestions for improving the session, the most often stated response was “nothing,” and many adults commented on how much they enjoyed the class as it was. The top responses for improvement included more time, more food, more challenging recipes, and many participants commented

on technology difficulty and inadequate site accommodations, often citing lack of access to technology or cooking facilities as barriers.

4.3.3 Leader Process Feedback Results

In their process evaluations, session leaders reported that the most important part of the sessions was the primary focal areas of the curriculum: cooking, kitchen safety, communication, and physical activity, along with togetherness and teamwork.

Figure 12 Leader Most Important Part of the Session



When asked if the curriculum resources provided were adequate, leaders reported they were 88.1% of the time. Sixty percent of the leaders reported that the planned 1.5 hours of preparation for the class was adequate. In order to clarify this, leaders provided an answer to how much time it took them to adequately prepare for each session. If leaders responded that more preparation time was needed,

32.1% answered one to two hours, 35.8% required three to four hours, and 30.2 % said that they required greater than four hours of preparation time for each session.

4.4 Fidelity of Implementation

Demographics of those who conducted the evaluations are given in Table 9. There were 18 evaluators across all five states; 12 session leaders completed 96 sessions, and of those sessions, fidelity of implementation was conducted in 28 (29.2%), which was above the goal of evaluating 25% of sessions (Table 10).

Table 9 Fidelity Evaluator Demographics (n=18)

Age	Frequency (%)
18-24	5 (27.8)
25-35	4 (22.2)
36-45	1 (5.6)
46-55	3 (16.7)
>55	5 (27.8)
Gender	
Male	2 (11)
Female	16(89)
Position	
4-H/Extension Staff/Volunteer	7 (38.9)
Student Researcher	6 (33.3)
Other ¹	5 (27.8)

¹Nurse/researcher, AmeriCorps Volunteer, Director of Family Resource Network, Community Volunteer, Homemaker, Retired

Table 10 Planned Versus Actual Sessions Evaluated for Program Fidelity²

iCook 4-H Session	1	2	3	4	5	6	7	8
Planned Evaluations ¹	3	3	3	3	3	3	3	3
Actual Evaluations	4	6	2	5	2	5	2	2
Percent of each session assessed of total sessions held	33.3	50	16.7	41.7	16.7	41.7	16.7	16.7

¹Each session out of the 12 programs held was to be evaluated a total of three times.

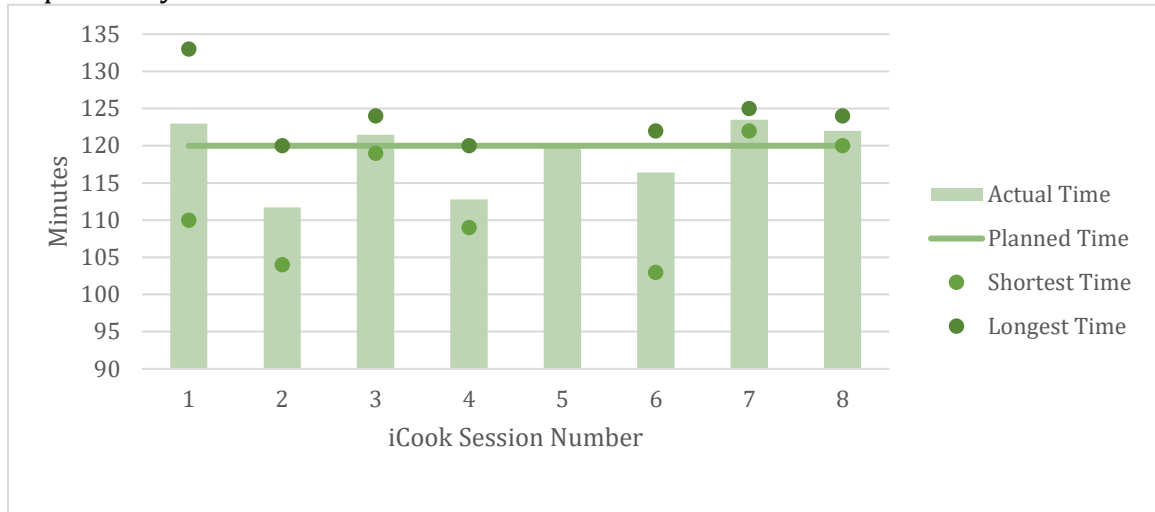
²Data from 28 Sessions, 29.2% of total sessions (n=96).

Table 11 Fidelity Evaluations Completed by State and by Session

State	Site Location	Sessions Evaluated
Maine	Penobscot	1,2
	Kennebec	
Nebraska	Scottsbluff	1,2,3,4,8
	Omaha	4,6
South Dakota	Sisseton	1,3
	Watertown	1,7
	Rapid City	2,6,8
	Wilmot	2,4,5
Tennessee	Extension Office (R- Hughes)	2
	Williamson County	6
	Christenberry/South Knox	4,4,5,6,7
West Virginia	Wirt County	2, 6
Total		28

Throughout all sessions, evaluators reported that leaders were “very effective/effective” 97% of the time, and a total of 91% of all planned objectives were met. They reported adults as “engaged” 91% of the time and youth 88% of the time. When assessing curriculum materials, evaluators reported they were adequate 88% of the time. Their comments about inadequacies related to inconsistencies with directions for technology when different camera brands or styles were used. Actual mean time of sessions was reported as 118.9, slightly under from the planned time of 120 minutes. Sessions ranged from 103-133 minutes, with the Session 2 being the shortest session at 111 minutes and Session 7 being the longest session at 123.5 minutes (Figure 14).

Figure 13 iCook 4-H Session Planned Versus Actual Time¹ of Implementation Reported by Evaluators

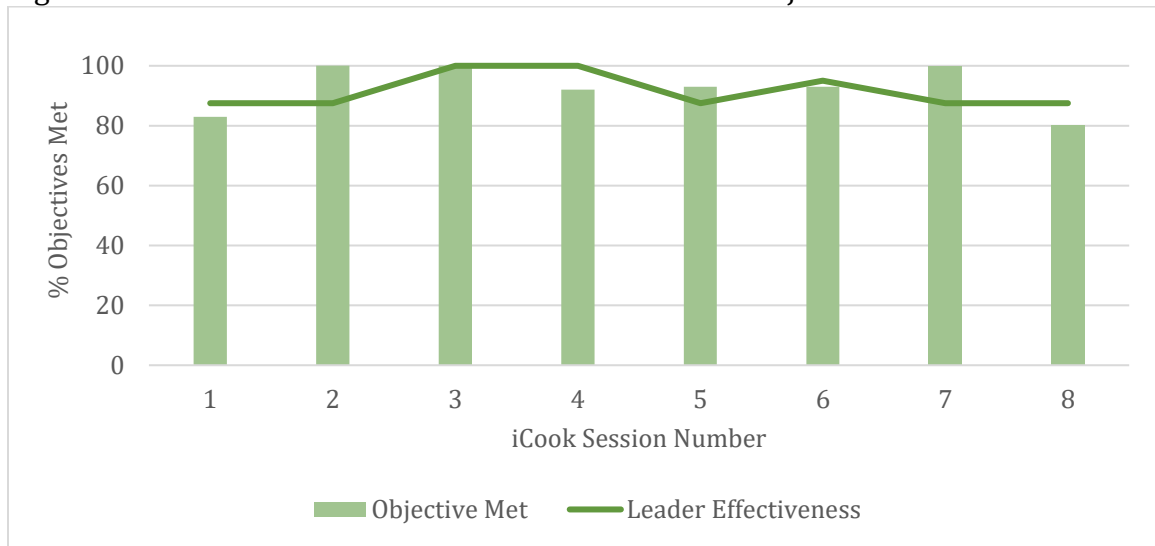


¹Actual length of session averaged of those tested for fidelity.

²Data from 28 Sessions, 29.2% of total sessions (n=96).

Based on plotting leader effectiveness scores with the percent of overall objective met by session, there appeared to be a tendency that as evaluators reported that session objectives were met, leader effectiveness was also reported at a higher percentage. When plotting the evaluators' reports of the level of engagement of the youth and level of engagement of the adults at each session against the effectiveness of session leaders, there are strong consistencies between participants' interest and leader effectiveness. The only exception was during Session 8 when a large part of the session was the Ripple Effect Mapping activity. Total fidelity of implementation for combined structural and instructional components across all eight sessions evaluated was 82.1%. A Fidelity of structural and instructional components compared to total fidelity by session is depicted in Figure 16. Through observation, the fidelity of instructional components was slightly higher compared to the structural components.

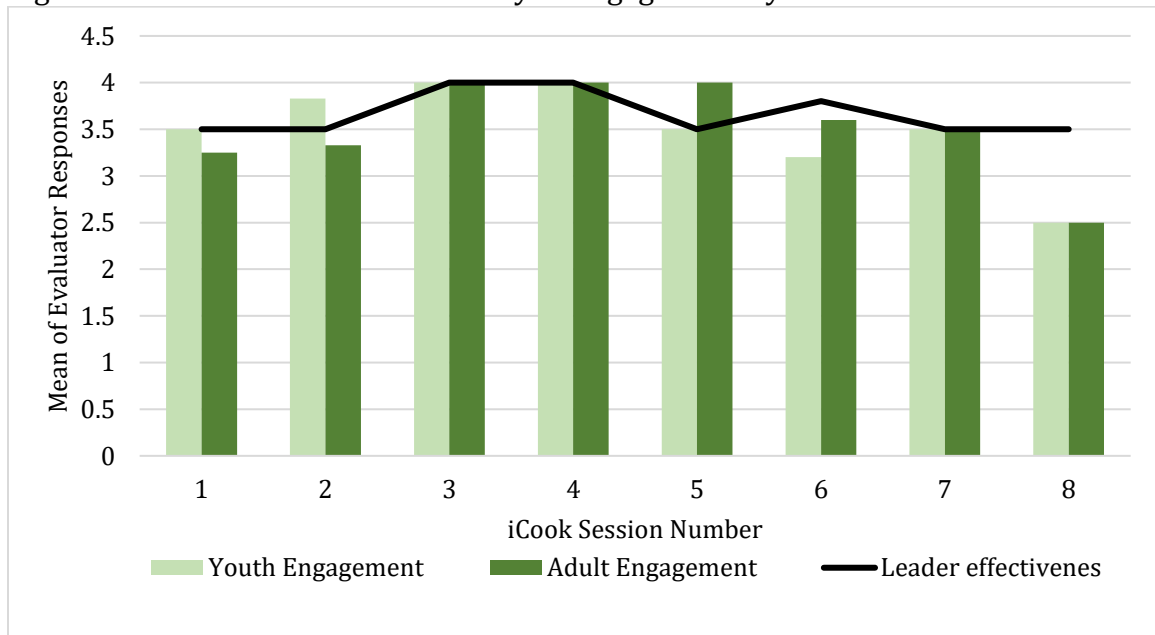
Figure 14 Leader Effectiveness and Percent of Session Objectives Met



¹Leader effectiveness rating (1-item) and percent of objectives met averaged by individual session.

²Data from 28 Sessions, 29.2% of total sessions (n=96).

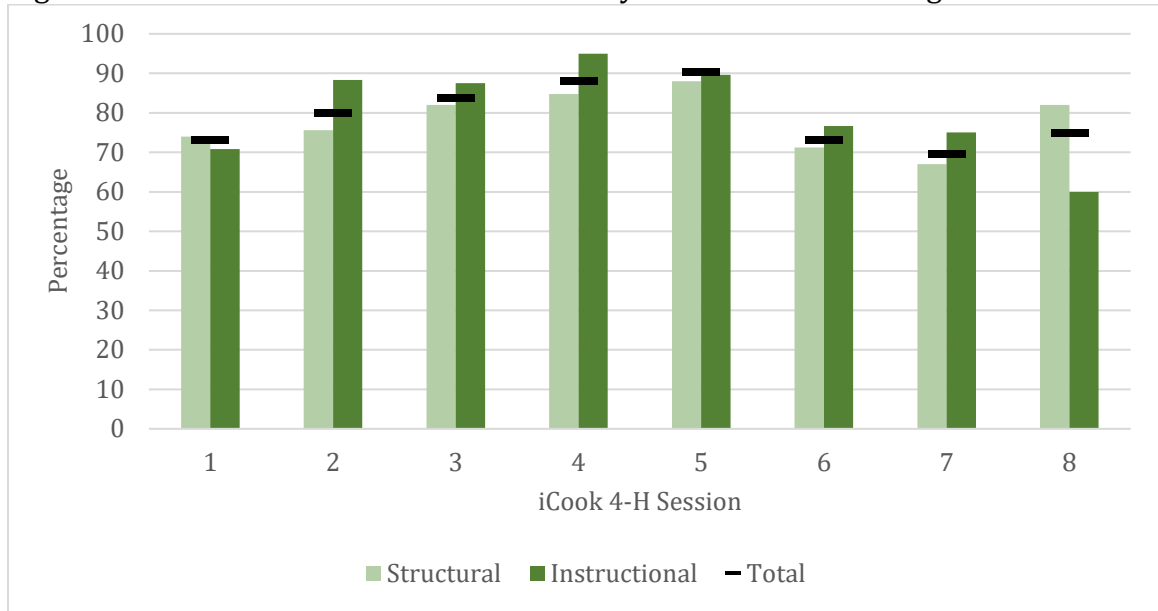
Figure 15 Leader Effectiveness and Dyad Engagement by iCook 4-H Session



¹Leader effectiveness rating (1-item), youth engagement (1-item), adult engagement (1-item) averaged by individual session.

²Data from 28 Sessions, 29.2% of total sessions (n=96).

Figure 16 Structural and Instructional Fidelity Instrument Percentage



¹Data from 12-item instructional components and 12-item structural components averaged by individual session.

²Data from 28 Sessions, 29.2% of total sessions (n=96).

CHAPTER 5: DISCUSSION

The iCook 4-H Program was developed with the intent of being disseminated broadly. The Dissemination Study was designed to test whether the program could be implemented in a community setting primarily by Cooperative Extension educators, with minimal researcher involvement. Measures included pre- and post-outcomes for youth and their adult main meal preparer; process evaluation from youth, adults, and program leaders, and fidelity of implementation, conducted by independent evaluators on 29% of the sessions. During the fall of 2015, 12 leaders completed 96 total programs in five states. Complete pre- post data were received from a control group of 39 youth and 39 adults, and a treatment group of 35 youth and 39 adults.

While treatment youth reported increases in cooking skills and goal setting, they did not increase the subscales for technology skills, culinary self-efficacy, open to new foods, physical activity, or togetherness with food, even though the program focal areas included eating and playing together, as well as cooking. It was surprising that the control youth also increased their cooking skills, but it could have been due to the Hawthorne effect⁶² or simply that they were drawn to the study because of their interest in cooking. Treatment adults improved cooking, eating, and playing together, based on differences in pre-post subscale scores both within- and between-group. Because adults changed due to iCook 4-H, there could be a resulting cluster effect, as described by Cornelius and colleagues³⁷, when positive changes are seen in the child as a result of cooking, eating, and playing together with the parent.

The open-ended questions of the process evaluation provided great qualitative data such as the adults positively commenting on their youth's learning, becoming confident of their abilities in the kitchen, and being open to trying new and differently prepared foods. Being together and having fun was reported by both youth and adults as important aspects of program participation. Treatment youth claimed that cooking and tasting new dishes were highlights of the learning experiences of the program. Hersch and colleagues¹¹ commented on the usefulness of pairing cooking and tasting classes with parent involvement for nutrition education programs. It was also clear that most participants viewed their family meals positively. Neumark-Sztainer and colleagues⁴² found that family mealtimes are important because they are related to a positive health perception and improved dietary intake. Process data were valuable in tailoring and improving participant experience.^{55,63} By providing session leaders with bi-weekly reports to identify participant problems and capture their perspective on the focal areas, they were able to modify future sessions.

Most of the youth in the current study reported that they were often physically active. No other measure was used in the current study to corroborate their reports. Kattelman and colleagues⁶⁴ found that youth often over-reported measures of how physically active they were. Youth who wore accelerometers and were also asked how physically active they were tended to overestimate their total active time. While it seemed from the process data that youth responses of never being physically active decreased by session 7, these data were not collected for the purpose of running inferential statistics to confirm reports. The Physical Activity

Guidelines for Americans⁴⁵ state that female and male children do not meet the recommended physical activity time of 60 minutes per day. Since youth spend a large portion of their day sitting during school, and because school days are part of their routine, they may not fully understand how sedentary time impacts total active time throughout the week. Adults did report that they met the study goal of playing with their youth at least two times each week. It may be beneficial to place more emphasis on physical activity in the iCook program for greater impact on physical activity in youth.

Having adults report on their confidence in being role models for their youth at each session was important since the iCook 4-H program was designed using the Social Cognitive Theory⁶⁵ construct of reciprocal role modeling. Using the dyad model, youth-adult modeling of behavior was to result in family togetherness in skill building and self-efficacy in cooking, eating, and playing together. Adults reported confidence in being role models in cooking and eating family meals from the beginning of the sessions, so there was not much room for improvement as the study progressed. While they were less confident in being role models for physical activity, they remained somewhat confident throughout the program. In the iCook program, discussion time with adults about their confidence as role models for being physically active is recommended.

Similarly, for meeting the iCook 4-H goals of cooking, eating, and playing together at least twice per week, adults reported they met or exceeded the goals throughout the program, and a slight improvement in the number of times reported

for cooking, eating, and playing did occur by session 7. These findings are important for a childhood obesity prevention intervention since youth health behavior is associated with similar parental behavior.^{12,37,43}

Knowing whether a program is implemented as it was intended is imperative, especially when the program has been tested in the rigor of a research study. Fidelity outcomes have been related to program impact.⁵⁷ The findings from the current study will help the research team finalize the iCook program for widespread availability. Comparable to Butel and colleagues,⁵⁹ the FOI developed by the iCook 4-H team was a multi-step process that included a rubric for easy evaluation of the program. A scoring system was successfully developed for the current study, that allowed researchers to quantify overall FOI. Based on a total program fidelity of 82.1%, there was good agreement between the planned and actual implementation. Shek and Sun⁵⁸ reported fidelity of their drug prevention curriculum for seventh graders to be 85.71% and reported the score as quantification of program fidelity. Their score was slightly above the findings from the current study.

Overall, the dissemination of the iCook 4-H program was successful with minimal researcher involvement. Still, there were limitations and problems encountered that allow for recommendations and modifications for the future. Further work on the two youth subscales with low reliabilities is recommended, togetherness with food ($\alpha=0.381$ /pretest), and physical activity ($\alpha=0.417$ /pretest).

When reliabilities of the other outcome subscales were measured, results were generally consistent with those of Mathews and colleagues.¹⁴

Throughout the study, there were obstacles with technology, from inadequate equipment, to technical difficulties experienced when navigating the iCook 4-H website, even though training was done with both leaders and participants to facilitate ease of technology. Eliminating the website, streamlining technology directions, and suggesting the use of personal equipment and private social networking platforms (Facebook, YouTube, etc.) are recommended for the future.

When transitioned fully to a community setting, the three-pronged evaluation will include information that will be directly relevant to session leaders and their administrators. With that in mind, the iCook 4-H team will continue to work on the three-pronged evaluation instruments to provide a working package that will be applicable and beneficial for future community leaders to use in conjunction with the program.

While the communication between this researcher and the session leaders was a direct resource for program clarification, and researcher guidance if necessary, the intended protocol for leaders to request process evaluation summaries at the end of each session did not work as planned. Session leaders did not consistently initiate the request for process reports. Some of the leaders had led previous iCook 4-H studies (the Intervention Study or the Pilot Dissemination Study), and they expected the reports to be sent to them automatically as had been

previously done. While some leaders were consistent in this request, newer leaders did not think to prompt for the reports. In true dissemination, administering and gathering data from the evaluations will be the responsibility of the leaders and their administrators, and the barriers experienced between community members leading the program and researchers will not be as prevalent.

This work was possible because of the close relationship between researchers and community stakeholders. Nigg and colleagues,⁶ Harris and colleagues,⁷ Meyers, Durlak, and Wandersman,¹⁶ and Altman²² each included the importance of partnerships as a condition of their framework for successful dissemination. The iCook 4-H research team was a partnership of academic and Cooperative Extension professionals from each of the participating land-grant universities with the mutual hope to ultimately transition to a national setting. Close researcher/community relationships were imperative to identifying improvements and the development of the iCook 4-H program.

During the current study, improvements and suggestions were identified, including both curriculum and evaluation tool modifications. Even though significant training was done with both leaders and participants to facilitate ease of technology, i.e., online survey assessments, cameras, and study website, the technology piece of the program will not be included in the iCook 4-H curriculum for national distribution.

The strength of the relationships developed during the iCook 4-H study is a good indicator of future success. Through the research partnerships with

Cooperative Extension, there is a framework for future program execution. As described by Meyers, Durlak, and Wandersman¹⁶ in their Quality Implementation Framework (QIF), the hierarchical approach to organization was used within the Dissemination Study. iCook 4-H researchers have considered the setting of the program, structure of implementation, ongoing execution, and future improvements, which are the four identified phases of the QIF. These considerations have prepared iCook 4-H for successful future program distribution and national enactment.

CHAPTER 6: CONCLUSION

The iCook 4-H Dissemination Study was conducted to test whether the 8-session, bi-weekly program would be successfully implemented by community leaders with minimal researcher involvement. A three-prong evaluation was used to evaluate the program using measures of outcome, process, and fidelity of implementation. The evaluation tools, specifically developed for the Intervention Study, were modified for use in the current study.

Trained leaders (n=12) led twelve total programs (96 individual sessions) and reported that 88% of the time resources were adequate and most (60%) were able to prepare for sessions in the prescribed 90 minutes.

A dyad model was used for youth (mean ages: control=9.6±0.9; treatment=9.9±0.6) and their adult main food preparers (mean ages: control=38.8±5.7 mean age; treatment=39.4±7.8 mean age). The control group, youth (n=63) and adults (n=71), and treatment group youth (n=76) and adults (n=75) completed pre- and post- program surveys.

Treatment dyads completed the intervention, eight bi-weekly sessions on program focal areas of cooking, eating, and playing together. Treatment youth significantly increased outcome scales of cooking skills ($P<0.001$) and goal setting ($P<0.01$), changes in goal setting held when compared to control youth ($P<0.05$). When compared to controls, treatment adults increased in the outcome subscale with a total instrument mean score difference of $+2.1\pm 4.7$ ($P\leq 0.01$). Based on information collected on process evaluations, youth reported that cooking and

tasting new foods as learning experiences for them 70 % of the time. On average, 64.7% reported they often/all the time ate together as a family over the previous two-weeks, and the main words they used to describe family meals were fun, good and awesome. At each session at least 60% of the youth reported they were often/all the time physically active. Low percentages of both youth (19.7%) and adults (22.1%) reported making and posting videos on the private study website. Adults reported confidence (5=very confident) in being role models for cooking (4.00) and eating/preparing family meals (3.90), but reported less confidence in being role models for physical activity (3.33). They reported meeting or exceeding goals of cooking, eating and playing together at least twice per week.

Fidelity of implementation was successfully conducted by trained evaluators (n=18; mean age=43.2±17.8) on 28 (29.2%) sessions, above the goal of evaluating 25% of sessions. Actual individual session length was on average 118.9 minutes versus the intended 120 minutes. Evaluators reported that 97% of the time leaders were effective/very effective, that a total of 91% of planned objectives were met, and that materials were adequate 88% of the time. They reported that youth were engaged in the sessions a mean of 88% and that adults were engaged a mean of 91% of the time. Based on results from the outcome, process and fidelity measures, there is strong potential for the iCook 4-H program to be disseminated beyond the current five states and to be sustainable in practice settings.

The iCook 4-H program is an evidence-based out-of-school intervention for preventing childhood obesity. The program aim is to foster positive attitudes and

health behavior about food for the youth, but also their families and home environment. The multi-component intervention developed with extensive testing and community collaboration results in beneficial changes in the health behaviors of cooking together, eating together, playing together, and setting goals together.

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APPENDICES

APPENDIX A: Youth Program Survey Instrument

Hello! Thank you for participating in the iCook project. Please take your time and answer these questions. There is no right or wrong answer.

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?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you use an oven for cooking?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you use a stovetop for cooking?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you use a blender?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you cook foods to the right temperature?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you store foods the right way?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you measure ingredients for a recipe?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

Can you use herbs and spices when cooking?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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

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

- Very unwilling (1)
- Somewhat unwilling (2)
- Neither unwilling nor willing (3)
- Somewhat willing (4)
- Very Willing (5)

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

- Very unwilling (1)
- Somewhat unwilling (2)
- Neither unwilling nor willing (3)
- Somewhat willing (4)
- Very Willing (5)

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

- Very unwilling (1)
- Somewhat unwilling (2)
- Neither unwilling nor willing (3)
- Somewhat willing (4)
- Very Willing (5)

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 (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

I am sure I can follow a recipe.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

I am sure I can use a knife safely.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

I am sure I can use an oven.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

I am sure I can use a stovetop.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

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

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

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 (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often do you help your parents shop for groceries?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often does your family eat together?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often do you help cook meals for your family?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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 (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often does your family play actively together?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often do you set healthy goals for yourself?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

How often do you meet your healthy goals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can access the Internet.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can take digital pictures.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can download digital pictures to the computer.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can take digital videos.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can download digital videos to the computer.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can upload a video to YouTube.

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

I can link videos to the iCook 4-H website.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

How do you get on the Internet?

- Personal computer (laptop or desktop) (1)
- Personal mobile device (2)
- School computer (laptop or desktop) (3)
- School mobile device (4)
- Gaming console (7)

Where do you usually access the Internet?

- Home (1)
- Friend or Family member's house (2)
- School (3)
- Public place (like a library) (4)

What is your name?

What is your iCook 4-H User ID (ask an iCook person)

What state do you live in?

- Maine (1)
- South Dakota (2)
- Nebraska (3)
- West Virginia (4)
- Tennessee (5)

How old are you?

What grade are you in this year in school?

Are you a boy or a girl?

- Boy (1)
- Girl (2)
- Choose Not to Answer (3)

APPENDIX B: Adult Program Survey Instrument

Thank you for participating in the iCook program. Please answer the following questions. There are no right or wrong answers. At any time if you do not wish to answer a question you may skip it, or select choose not to answer.

This is a survey about ways you plan and fix foods for your family. For these questions, think about the recent past. This is not a test. There are no wrong answers.

	Do Not Do (1)	Seldom (2)	Sometimes (3)	Most of the Time (4)	Almost Always (5)	Choose Not to Answer (6)
How often do you plan meals ahead of time? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you compare prices before you buy food? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you run out of food before the end of the month? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you shop with a grocery list? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This question is about meat and dairy foods. How often do you let these foods sit out for more than two hours? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you thaw frozen food at room temperature? (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When deciding what to feed your family, how often do you think about healthy food choices? (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How often have you prepared foods without adding salt? (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use the "Nutrition Facts" on the food label to make food choices? (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do your children eat something in the morning within two hours of waking up? (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Are you active on 4 or more days a week? (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you or any members of your family participate in any of the following? Aid to dependent children/TANF EFNEP Free/Reduced price school meals Medicaid, welfare-to-work, WIC SNAP Supplemental security income

- Yes (1)
- No (2)
- Choose Not to Answer (3)

How often do you shop with a grocery list?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often do you plan your weekly meals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often does your child help you cook meals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often does your family eat together each week?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often do you enjoy making meals with your child?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often does your child help in meal planning?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often do you enjoy making meals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often does your child help you shop for groceries?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often does your family actively play together?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

How often do you feel confident with your kitchen skills?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Most of the time (4)
- Always (5)

I am comfortable accessing the Internet.

- Always (1)
- Most of the time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable taking digital pictures.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable downloading digital pictures to the computer.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable putting pictures on the iCook 4-H website.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable taking digital videos.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable downloading digital videos to the computer.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

I am comfortable uploading videos to YouTube.

- Always (1)
- Most of the Time (3)
- Sometimes (4)
- Rarely (5)
- Never (6)

I am comfortable linking videos to the iCook 4-H website.

- Always (1)
- Most of the Time (2)
- Sometimes (3)
- Rarely (4)
- Never (5)

What is your primary method of accessing the Internet?

- Personal computer (laptop or desktop) (1)
- Personal mobile device (2)
- Work/school computer (3)
- Work mobile device (4)
- Gaming console (5)

Where do you use the Internet the most?

- Home (1)
- Friend or Family member's home (2)
- Work or school (3)
- Public Library (4)
- Other public location (5)

What state do you live in?

- Maine (1)
- South Dakota (2)
- Tennessee (3)
- West Virginia (4)
- Nebraska (5)

What is your name?

What is your iCook 4-H User ID? (ask an iCook researcher for this information)

What is your age in years?

What is your child's month of birth?

- January (1)
- February (2)
- March (3)
- April (9)
- May (10)
- June (11)
- July (12)
- August (13)
- September (14)
- October (15)
- November (16)
- December (17)

What is your child's date of birth?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)
- 11 (11)
- 12 (12)
- 13 (13)
- 14 (14)
- 15 (15)
- 16 (16)
- 17 (17)
- 18 (18)
- 19 (19)
- 20 (20)
- 21 (21)
- 22 (22)
- 23 (23)
- 24 (24)
- 25 (25)
- 26 (26)
- 27 (27)

- 28 (28)
- 29 (29)
- 30 (30)
- 31 (31)

What is your child's year of birth?

- 2004 (1)
- 2005 (2)
- 2006 (3)
- 2007 (4)
- 2008 (5)
- 2009 (6)

Are you the parent/grandparent of the child in the study?

- Parent (1)
- Grandparent (2)
- Other (3) _____
- Choose not to answer (4)

Are you the biological parent/grandparent of the child in the study?

- Yes (1)
- No (2)
- Choose not to answer (3)

From your child's point of view, how many other people live in your household (at least most of the year)?

- ____ Grandparents (1)
- ____ Parents (2)
- ____ Aunts and/or Uncles (3)
- ____ Siblings (4)
- ____ Other Children (not siblings) (5)
- ____ Adult Cousins (6)
- ____ Other (non-related) (7)

How many children do you have?

What is your current marital status?

- Married (1)
- Widowed (2)
- Divorced (3)
- Single (4)
- In a committed relationship (5)
- Choose Not to Answer (6)

Do you or any members of your family participate in any of the following? Aid to dependent children/TANF, EFNEP, Free/Reduced price school meals, Medicaid, welfare-to-work, WIC, SNAP, Supplemental security income

- Yes (1)
- No (2)
- Choose not to answer (3)

What is the highest education level you have completed?

- Elementary School (1)
- Some High school (2)
- High School (3)
- Some College (4)
- Associates Degree (5)
- Bachelors Degree (6)
- Graduate Degree (7)
- Doctoral Degree (8)
- Choose Not to Answer (9)

What is your employment status?

- Employed for wages (1)
- Self-Employed (2)
- Out of work and looking for work (3)
- Out of work but not currently looking for work (4)
- Stay at-home mom/dad (5)
- A student (6)
- Retired (7)
- Unable to work (8)
- Choose Not to Answer (9)

How tall are you? Feet Inches

	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feet	4	5	6	7
(1)	((((((((((((
	1	2	3	4	5	6	7	8	9	0	1	2
))))))))))))
Inch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
es	0	1	2	3	4	5	6	7	8	9	0	1
(2)	((((((((((((
	1	2	3	4	5	6	7	8	9	1	1	1
))))))))))))

How much do you weigh (in pounds)?

Including yourself, how many total people live in your house? How many are adults?
 How many are children under age of 18?

_____ Adults (1)
 _____ Children (2)

APPENDIX C: Youth Process Survey Instrument

iCook 4-H Feedback.

What state are you in?

- Maine (1)
- South Dakota (2)
- West Virginia (3)
- Nebraska (4)
- Tennessee (5)

What is your leader's name?

What lesson did you just complete?

- 1 - Introduction to iCook and Pre-program Evaluation (1)
- 2 - Tools of the Trade (2)
- 3 - Keeping it Cool in the Kitchen (3)
- 4 - The Art of Meal Planning (4)
- 5 - Supermarket Smarts (5)
- 6 - Family Meals - Eating Together (6)
- 7 - Packing the Power - Protein and Spices (10)
- 8 - Program Wrap-Up and Post Program Evaluation (8)

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.

And what was it across each session.

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

- Yes (1)
- No (2)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the time (5)

Which of the following are true?

- I will go to the iCook 4-H website and set a goal about eating fruits and vegetables (9)
- I will go to the iCook 4-H website and set a goal about being physically active (10)
- I plan to do a new activity this week (13)

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

- Cooking a new dish (1)
 - Tasting a new dish (2)
 - Practicing conversations with family and friends while eating (3)
 - Learning new ways to be active (4)
 - Helping to clean the kitchen (5)
- Across each session

What is the word to describe your family meals?

Copy the goals you wrote on your MyPlate tear sheet.

What was the most important thing you learned today?

What is your name?

What is your iCook 4-H user ID? (Ask your leader for this number)

APPENDIX D: Adult Process Survey Instrument

Which lesson did you just complete?

- 1 - Introduction to iCook and Pre-program Evaluation (1)
- 2 - Tools of the Trade (2)
- 3 - Keeping it Cool in the Kitchen (3)
- 4 - The Art of Meal Planning (4)
- 5 - Supermarket Smarts (5)
- 6 - Family Meals - Eating Together (6)
- 7 - Packing the Power - Protein and Spices (7)
- 8 - Program Wrap-Up and Post Program Evaluation (8)

What state are you in?

- Maine (1)
- South Dakota (2)
- Tennessee (3)
- West Virginia (4)
- Nebraska (5)

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

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

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

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- All of the Time (5)

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

- Never (4)
- Rarely (5)
- Sometimes (6)
- Often (7)
- All of the Time (8)

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

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

- Yes (1)
- No (2)

If Yes Is Selected, Then Skip To My child has learned kitchen skills t...

If you did not make and post a 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 (1)
- Disagree (2)
- Neither Disagree or Agree (3)
- Agree (4)
- Strongly Agree (5)

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 (6)
- Four times since the last class (7)
- Three times since the last class (2)
- Two times since the last class (3)
- One time since the last class (4)
- None (5)

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 (4)
- Four times since the last class (5)
- Three times since the last class (6)
- Two times since the last class (7)
- One time since the last class (8)
- None (9)

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 (4)
- Four times since the last class (5)
- Three times since the last class (6)
- Two times since the last class (7)
- One time since the last class (8)
- None (9)

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

	Very Unconfident (1)	Unconfident (2)	Somewhat confident (3)	Confident (4)	Very confident (5)
Cooking (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being Physically Active (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting and eating meals with my family (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

- Very Unlikely (1)
- Unlikely (2)
- Undecided (3)
- Likely (4)
- Very Likely (5)

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 (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

What is your name?

What is your iCook 4-H ID? (Ask your leader for this number)

APPENDIX E: Leader Process Survey Instrument

What is your name?

What is your state?

- Maine (1)
- Nebraska (2)
- South Dakota (3)
- Tennessee (4)
- West Virginia (5)

Q21 Are you an assistant leader?

- Yes (1)
- No (2)

Which session did you just complete?

- 1 - Introduction to iCook and Pre-program Evaluation (1)
- 2 - Tools of the Trade (2)
- 3 - Keeping it Cool in the Kitchen (3)
- 4 - The Art of Meal Planning (4)
- 5 - Supermarket Smarts (5)
- 6 - Family Meals - Eating Together (6)
- 7 - Packing the Power - Protein and Spices (7)
- 8 - Program Wrap-Up and Post Program Evaluation (8)

How many participants were in the class today?

- ____ Youth Participants (1)
- ____ Adult Participants (2)

Were the curriculum resources provided adequate to complete the class?

- Yes (1)
- No (2)

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

Were the 1.5 hours planned for class preparation adequate?

- Yes (1)
- No (2)

How much time was needed for class preparation?

Do you have any comments about any of the objectives?

What do you feel was the most beneficial aspect of the class for the child/parent team?

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

APPENDIX F: Session 1 Fidelity Instrument



Instructions for Use

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

Within a week of completing the form, please return this form to your state dissemination contact.

State Dissemination Contact

To complete this evaluation you will need:

The session specific leader guide (The session leader you are helping will provide)The session specific participant guide (The session leader you are helping will provide)

A way to time different session activities (e.g. cell phone, stopwatch, wristwatch, clock)



General Information

Evaluator Name:

State: Site Location: Session Leader:

Number of Youth Present: Number of Youth Expected:

Number of Adults Present: Number of Adults Expected:

Expected Session Start Time: Actual Session Start Time:

Expected Session End Time: Actual Session End Time:

Objectives

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

	Allotted (min)	Actual (min)
Welcome and Introduction	10	
Pre-Program Evaluation and Documents	20	
Cooking Skills and Recipe for the Day	10	
Set: Overview of iCook	5	
Technology Training	55	
Family Communication: Focus of Family Mealtime	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)

Complete the preprogram evaluation?	
Participate in technology training?	
Make the Crunchy Berry Parfait?	
Make an introduction video?	
Upload and Post an introduction video?	
Participate in family communication discussions?	

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

Showed little engagement in the session

Were somewhat engaged in the session

Were engaged in the session

Were actively engaged throughout the session

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

Showed little engagement in the session

Were somewhat engaged in the session

Were engaged in the session

Were actively engaged throughout the session

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

Very ineffective

Ineffective

Effective

Very Effective

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

Unobserved

Never

Rarely

Sometimes

Very Often

Always

7. Check the program elements that were covered.

Cooking Skills

Physical Activity Skills

Nutrient Focus

Family Communication

Goal setting

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

Yes No

9. If Question 8 is no, what materials were missing?

Evaluator Demographics

10. Age:

11. Gender: Male Female

12. Position:

4-H Staff/Volunteer

 Extension Staff

 School Educator

 Student Researcher

 Other _____

Biography of the Author

Tara Gould was born in Bangor, ME on August 11th, 1989. She grew up on Mount Desert Island(MDI) and attended MDI high school, graduating in 2007. She completed her Bachelor of Science in Food Science and Human Nutrition with a minor in Biology in 2015 at the University of Maine. She was accepted into the combined Food Science and Human Nutrition Master's program and Dietetic Internship in 2015 and was appointed to a Research Assistantship for the iCook 4-H Research Study, under Primary Investigator Dr. Adrienne White. Tara is a member of Kappa Omicron Nu, the Society for Nutrition Education and Behavior, the Academy of Nutrition and Dietetics, and served as a department senator in the Graduate Student Government. Her future plans include completing her dietetic internship and sitting for the registered dietitian exam, and hopes to live and work in the beautiful state of Maine. She is a candidate for the Master of Science degree in Food Science and Human Nutrition from the University of Maine in August 2017.