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Process of Evaluation of an EFNEP-Enhanced PSE Intervention in Urban Schools

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PROCESS EVALUATION OF AN EFNEP-ENHANCED PSE INTERVENTION IN URBAN SCHOOLS

BY

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ABSTRACT

Objectives: To determine to what extent the EMPOWER intervention was delivered as originally planned and how participants perceived its delivery.

Methods: This was a process evaluation study; data was collected using fidelity and observation checklists, grading rubrics, focus groups, semi-structured interviews, and meeting minutes. Program fidelity was assessed by calculating percent average of curriculum delivery. Program perception was assessed using the subjective data recorded on the fidelity checklists and responses from focus groups and semi-structured interviews. Qualitative data were analyzed to detect common themes using NVivo11 Software.

Results: The intervention was well received by students, school staff, and foodservice. Implementation was high, 97% of the curriculum objectives were met on average. Sixty-four percent of the take-home assignments were turned in. Ninety-four percent of enrolled students participated throughout the intervention. The evaluation identified several areas for improvement, lessons should be shortened and simplified and communication with classroom teachers should be improved.

Conclusion and Implications: The EMPOWER intervention was successfully implemented with a high degree of fidelity, dose, and reach and was positively perceived by all stakeholders. Additional comprehensive process evaluation studies are needed to identify areas of improvement for future implementation of effective PSE-change interventions.

Key Words: process evaluation, PSE, school-based, empowerment.

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DEDICATION

Para los amores de mi vida, Marcos y Valeria

PREFACE

This thesis has been prepared in a manuscript format for the Journal of Nutrition and Education and Behavior. Manuscript format follows the journal's manuscript guidelines for authors. The manuscript may be submitted for publication.

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INTRODUCTION

The growing rate of childhood obesity and its association with serious medical consequences have created the need for sustainable evidenced-based interventions to prevent childhood obesity, particularly among low-income and ethnically diverse populations who are at a higher risk.[1] Given the important role that the environment has on the development of obesity, public health interventions are increasingly implementing strategies involving policy, systems and environmental (PSE) change.[2] Policy, systems and environmental change interventions focus on multi-sectorial levels of influence to change and sustain healthy behaviors in communities by applying socio-ecological theories.[3] In contrast to individual or small group interventions, PSE change programs offer strategies with greater population impact than individual change strategies by making healthy choices the easiest and most convenient choice.[4-6] However, descriptions of their implementation and evidence of the effectiveness of PSE interventions is still lacking, particularly among school-aged children.[7] School settings are now considered to be a viable location for PSE interventions.[8] Previous reviews of school based interventions have demonstrated the effectiveness of a variety of different approaches to improve dietary behaviors, and some of these interventions aimed at modifying school policies and environments.[9, 10] Although PSE interventions are now considered to be most effective for public health, more studies are needed to establish a strong evidence base for the process by which PSE change interventions are effective.[2-4]

Outcomes research as well as process evaluation research of PSE interventions is needed to address this research gap. Process evaluation is used to

monitor and document program delivery and can help explain program outcomes.[11] Recently, emphasis has been placed on the importance of process evaluation of PSE change programs; however, research has been based primarily on their outcomes rather than how programs accomplish their goals.[12, 13] Outcome evaluations determine whether an intervention was successful or not.[13] Process evaluation is used to document and determine to what extent a program was implemented as designed and can aid in understanding why it was or was not effective.[11] Process evaluations help explain whether specific elements such as fidelity (how well the intervention was delivered as intended), dose (to whom it was delivered) and reach (the extent to which the target population was reached) could affect program impact and outcomes and can help fine-tune program components.[11] Process evaluations gather data on the social processes involved in the delivery and reception of the intervention and use survey questionnaires, structured or semi-structured interviews, attendance logs, checklists, inventories, focus groups and direct observation.[13-15] Reviewers have found that interventions often focus more on documenting outcomes and less on process evaluation, which are needed to better understand the barriers and facilitators of achieving PSE changes and provide comprehensive guidance to future studies.[2, 3, 7, 15] Recently, more school-based interventions have begun to include process evaluation in their studies.[15-28] Given that some school-based interventions have only achieved moderate success in changing dietary behaviors, process evaluations measuring how well strategies were implemented can help provide direction for increasing program effectiveness in the future.[18]

The purpose of this study is to conduct a process evaluation of a school-based PSE intervention on increasing fruit and vegetable intake in fifth-grade children from low-income, ethnically diverse schools.

METHODOLOGY

Overview

This project was a process evaluation using data collected from a one-year school-based intervention called "Empowering Urban School Children to Increase Fruit and Vegetable Consumption through EFNEP-Enhanced PSE Interventions" (EMPOWER). This study was designed to determine to what extent the program was delivered as originally planned and to explore perception by students, staff, and other stakeholders. This process evaluation study was planned following a comprehensive guide described by Saunders et al.[11] An overview of the methodology and instruments used can be found on Table 1.

Participants

The EMPOWER sample included fourth-grade classrooms at four urban schools in Pawtucket, Rhode Island which are serviced by Aramark foodservice. Two treatment schools and two control schools were selected by the research committee. All four schools participated in the Fresh Fruit and Vegetable Program (FFVP) and health teachers were expected to deliver a nutrition education curriculum developed by The University of Rhode Island's (URI) Supplemental Nutrition Assistance Program Education (SNAP-Ed) during the 2015-2016 school year. Each classroom included

about 25 students, for a total of 300 participants equally divided between control and intervention schools. The final sample size included 312 students from both intervention and control schools. The target population in this school district is racially and ethnically diverse with 35% White, 31% Hispanic, 26% Black or African American with 76% from low-income households.[29] Six students from each school (total of 12 students), two school principals, and three health teachers at the two experimental schools receiving the PSE intervention were also included as part of the process evaluation data. As well as one Aramark foodservice assistant manager, three Expanded Food and Nutrition Education Program (EFNEP) nutrition educators, and members of the Pawtucket Wellness Committee.

Procedure and Description of the Study

As part of the EMPOWER intervention, the following data were collected for the process evaluation study. Data were collected pre-, post- and during the intervention spanning from September 2015 to May 2016.

The process evaluation of the EMPOWER intervention consisted in determining to what extent the curriculum was delivered as planned. The program was made up of 10 lessons designed to be delivered every other week over a period of 20 weeks. Each lesson was developed to build upon an existing URI SNAP-Ed FFVP curriculum consisting of 8 lessons that focused on nutrition education to increase fruit and vegetable consumption in elementary school students and is designed to be taught by classroom teachers. The PSE lessons, delivered by trained EFNEP educators, were designed to be delivered in alternating weeks with the SNAP-Ed FFVP curriculum.

The PSE lessons were planned to be taught during 20 minute sessions each. Two classrooms at one intervention school and 3 classrooms at another received this PSE intervention.

Fidelity and Dose Delivered. Three paraprofessional EFNEP educators with experience teaching community nutrition programs were responsible for delivering the PSE intervention curriculum and documenting the degree of program delivery. Given the lack of experience with the new PSE curriculum, all three EFNEP educators participated in two 2-hour curriculum training sessions and received an overview of the importance of process evaluation data collection, instruction in collecting process evaluation data, and instruction about completing the data collection forms and checklists as well. The data that the educators collected, reflected if lessons were delivered as intended and in a timely manner. Each EFNEP educator, responsible for two classrooms, assessed their own curriculum delivery by completing a fidelity checklist for each lesson. In addition, SNAP-Ed staff also observed each educator during three randomly selected lessons and documented program delivery using observation checklists to assess fidelity.

Dose Received. EFNEP educators also recorded their perception of the students' attentiveness and understanding during each lesson using the fidelity checklists.
In addition, dose received was evaluated by three take-home assignments throughout the study. The extent of assignment completion was evaluated by the average number of submitted assignments. Furthermore, each submitted assignment was scored using a rubric developed of each assignment to evaluate the students' learning.

Reach. EFNEP educators were also responsible for documenting the total number of students exposed at each lesson to assess the intervention's reach. In addition, the proportion of parent participation was evaluated by the number of submitted assignments which required parental input.

Perception of the Program. Data on the attitudes and perceptions of the intervention were collected by conducting one focus group discussion with EFNEP educators and two focus group discussions with six students from each intervention school. Successes, barriers, and challenges to this intervention were also assessed through the handwritten notes and comments that EFNEP educators recorded using each lesson's fidelity checklist. In addition, semi-structured interviews were conducted with one school principal, three classroom health teachers, and an Aramark foodservice manager. Lastly, SNAP-Ed staff members attended the Pawtucket Wellness Committee's meetings and recorded the meeting minutes. These minutes were used to assess the committee's perceptions and acceptance of the program.

Instruments

Fidelity Checklists. Curriculum fidelity was primarily measured using checklists covering all lesson objectives, which were taken directly from each lesson plan. This instrument was developed for each lesson and it was completed by the EFNEP educator responsible for delivering the lesson. Items on the checklists reflected each lesson's objectives which educators completed by checking either "yes" or "no" to indicate which objectives were met. This instrument also documented student attendance, time spent preparing for each lesson, and time spent teaching. In addition,

each checklist was supplemented with a survey assessing student attentiveness and understanding of the lesson. Educators could assess this by indicating the degree of attentiveness on a scale of 1 (not attentive at all) to 5 (very attentive) and understanding on a scale of 1 (did not understand) to 5 (understood everything). Space was also provided for educators to write notes and comments for each of their assessments.

Observation Checklists. Checklists were also developed for each of the three lessons SNAP-Ed staff observed throughout the intervention. This instrument documented fidelity of program delivery as well as objective data pertaining to the curriculum and student participation for each of the lessons observed. In addition, space was provided to record comments or suggestions for future implementation of the program.

Rubrics. Rubrics were created to evaluate each of the three take-home assignments. These rubrics evaluated whether students were successful in understanding lesson and/or activity objectives. Each rubric contained specific criteria for each assignment. One SNAP-Ed staff member scored each submitted assignment by checking off "yes" or "no" to indicate if the assignment's criteria was met.

Focus groups. All focus groups with students and EFNEP educators were conducted with the assistance of focus group guides. These guides were developed based on previously tested focus group questions used in other SNAP-Ed interventions and were reviewed and edited by a SNAP-Ed staff member with prior focus group experience. The student focus group questions were piloted with five 5^{th}-grade students in a non-participatory school in Providence, Rhode Island.

Semi-structured interviews. Semi-structured interviews with one school principal, three health teachers, a foodservice manager, and members of the Pawtucket Wellness Committee were carried out at the intervention's conclusion with the use of interview guides. All interview questions were reviewed and edited by a SNAP-Ed staff member with previous interviewing experience.

Meeting minutes. Throughout the intervention year, SNAP-Ed staff attended the Pawtucket Wellness Committee meetings and were tasked with recording the meeting's minutes. These minutes were used to track any policy changes that took place as a result of the EMPOWER intervention.

Hypotheses

Hypothesis 1: Average fidelity and dose delivered of the EMPOWER intervention will be 80% as measured by educator self-reporting checklists and observation checklists.

Hypothesis 2: Average student engagement and understanding assessed by educator checklists will be ≥80% and average student engagement and participation assessed by completion of take-home assignments will be ≥75%.

Hypothesis 3: Average reach measured by the proportion of students participating in the EMPOWER intervention, as measured by student attendance per lesson will be ≥80%.

Hypothesis 4: Students, school staff, and educators will evaluate the program positively as measured through focus groups and interviews.

Analysis

Quantitative data from each self-reported fidelity checklist, observation checklists, and grading rubrics were transferred to Microsoft Excel, which was used to analyze descriptive results (via averages and percent values). All handwritten comments from fidelity and observation checklists were typed onto a structured template. Focus group and interview responses were recorded via a note-taker. All responses were typed and reviewed with the note-taker to discuss initial finding and impressions. All checklist comments, focus groups, interviews, and meeting minutes were entered into NVivo11 (NVivo qualitative data analysis software; QSR International). Codes were generated from topics and questions covered in all the interview and focus group guides and checklist templates, which were then thematically analyzed.[30] The emergent themes are illustrated in this manuscript by selected anonymous quotes which exemplify the data.

RESULTS

The overall findings for each component and its respective instruments can be found on Table 2. Presented next, are the detailed findings.

Fidelity and Dose Delivered. EFNEP educators indicated that the intervention on average met 97% fidelity. In addition, the SNAP-Ed staff observations of lessons #2, #6, and #8 indicate an average of 95.6% curriculum fidelity. The percent of observed fidelity by SNAP-Ed is shown on Table 4. Lastly, 100% of lessons were delivered to both intervention schools.

Dose Received. Table 3 lists EFNEP educators' perception of student understanding and attentiveness. On average, the students' understanding of the curriculum scored 4.5 (90%) on a scale from 1 (did not understand) to 5 (understood everything). The lowest scoring lessons were #4 and #9 with an average score of 3.8 and 4.1, respectively. The students' attentiveness and active participation scored 4.5 (92%) on a scale of 1 (not attentive at all) to 5 (very attentive).

Table 5 shows the findings of the take-home assignments for all six intervention classrooms. For lesson #5's assignment, 83 recipes (58%) were submitted for the recipe contest, of which 21% met all the rubric guidelines. On average, students scored 4.7 out of 7 necessary criteria. However, 70% of the submitted recipes met the fruit- or vegetable-based criterion which was the primary point of the assignment. For lesson #6, fifty-six (39%) assignments were submitted and 71% of these met rubric guidelines. On average, students scored 5.5 out of 6 necessary criteria. Lastly, 135 students (97%) submitted their lesson #9 assignment and 69% met all rubric guidelines. On average, students scored 1.5 out of 2 necessary criteria.

Reach. Table 3 also lists the attendance for each lesson. On average, 134 students (94%) from both intervention schools were exposed to all 10 lessons.

Perception of the Program. The following section presents the common theme findings for each lesson, reported by EFNEP educators. Subjective data were evaluated to detect common themes between all three EFNEP educators. Common themes were identified by word repetitions and/or words in context. The following findings are presented from most mentioned themes to least mentioned as shown on Figure 1:

1) Positive student participation

The most emergent theme from all fidelity checklists indicate that student participation and engagement in lessons was high throughout the intervention. Attentiveness was particularly high for games and activities which involved group work and interaction with other students. As these educators illustrate:

They worked in their group and were very involved in the discussion about making requests. (Educator 2, Class 1, Lesson #5)

Students seemed very involved and creative. (Educator 2, Class 2, Lesson 9)

Students were willing to participate and showed a lot of enthusiasm. They had many ideas. (Educator 1, Class 1, Lesson #10)

2) Difficulty of lessons

Although EFNEP educators generally rated their sense of the students' understanding with a 4.5 on a scale of 1 to 5, several instances of student confusion with the material were revealed. As previously mentioned, most of the difficulty came from lessons 4 and 9. Educators indicated that a few specific terms created confusion, as well as some activity directions, and creating persuasive messages.

I realized I needed to explain words when mentioning the list of barriers categories. (Educator 2, Class 1, Lesson #2)

Confused about what to write and where to write, and what steps…even after explaining. (Educator 3, Class 1, Lesson #4)

Students had difficult time coming up with persuasive message about fruits and vegetables. (Educator 1, Class 1, Lesson #9)

Some students had a hard time coming up with messages for the fruit or vegetable and roasted carrots. (Educator 2, Class 1, Lesson #9)

3) Length of lessons

As seen on Table 1, all lessons lasted longer than the intended 20 minutes. The restrictions of fitting the lessons into the allotted time meant that lessons were initially designed with content heavy material and did not account for lengthy activities. This also explains why some objectives were not fully covered, particularly recapping concepts, passing out newsletters after lessons, and completing some activities as originally planned.

Yes, I wanted to go over the newsletter but didn't have enough time. (Educator 1, Class 1, Lesson #1)

I may have to summarize lessons more to ensure more time is available to complete group work. (Educator 2, Class 1, Lesson #1)

The role-playing activity took longer than expected. 5th graders read slow and wrote slow, which took up a lot of time. (Educator 1, Class 1, Lesson #4)

We missed the opportunity/activity to share what they learned about advertisement. We ran out of time. (Educator 2, Class 1, Lesson #9)

4) Suggestions for change

EFNEP educators also contributed many suggestions for future implementation of the intervention through the checklists. Suggestions mostly consisted on strategies that may benefit and improve student understanding of lessons and activities.

Current food advertisements could have helped students come up with messages (Educator 1, Class 2, Lesson #9)

Make sure to refer back to three persuasive strategies throughout the lesson. The repetition seemed to help students get a better understanding. (Educator 2, Class 1, Lesson #9)

As an example, we could have used statements from the top 10 reasons to eating more fruits and veggies handout. Just to get students comfortable with writing a message. (Educator 1, Class 1, Lesson #9)

Yes, I created worksheets (with clearer directions) for the ELMO [Electronic Light Machine Organization] projector. (Educator 3, Class 1, Lesson #10)

I felt that is would have been more beneficial to the students that were going to help collect votes on recipe day to practice their roles in class, instead of having other students play out all of the different roles (Educator 1, Class 2, Lesson #10)

5) Classroom management

Several EFNEP educators also noted recurring instances in which student participation was out of control. Some educators stated having difficulty maintaining order in their classrooms, which disrupted and possibly lengthened the lessons.

All students did actively participate however the noise level was hard to control. (Educator 2, Class 2, Lesson #4)

…very noisy, my class was a bit inattentive because the noise level. (Educator 3, Class 1, Lesson #4)

Assigning topics to students seemed to be a challenge for me. There is always one group that doesn't want their topic. (Educator 2, Class 2, Lesson #9)

A bit crazy when role playing. Loud-felt unorganized. I didn't feel I was able to see everyone act out the roles – just too crazy and loud. (Educator 3, Class 1, Lesson #10)

However, it should be noted that although some lessons deemed to be unorganized and chaotic, all EFNEP educators agreed that overall the students' perceptions were positive. This theme was revealed in several instances throughout all of the lessons' fidelity checklists.

Overall, students were excited about the project and very involved by the second half of class. (Educator 2, Class 2, Lesson #1)

Students were excited about making advertisements but wanted to work on it in class, so they can get my feedback. (Educator 1, Class 1, Lesson #7)

Students were excited about the whole event, especially having the recipe on the lunch menu. (Educator 2, Class 1, Lesson #9)

ENEP Focus Group. After the intervention's conclusion, a focus group was held with the three EFNEP educators. The discussion was followed using a guide with questions

that included topics such as barriers and challenges of teaching the curriculum, suggestions for change in the lesson plans, what activities worked well, and what activities should be discontinued or paid more focus on. Several themes that had been revealed on the handwritten notes of the fidelity checklists also emerged during this discussion, which confirmed them as the main challenges of this intervention. These themes include the length and difficulty of some lessons and activities. However, other themes also emerged; all three educators agreed that a major barrier throughout the intervention was miscommunication with classroom health teachers and school staff. Some classrooms completed lessons and activities in other classes, such as art, without the educator's knowledge, while others were confused as to who was teaching what.

Posters were designed with art teacher. Big disconnect either let art teacher do all or we do all. (Educator 3)

Teachers seemed confused about what is happening after being originally excited about it. (Educator 1)

In addition, it was revealed that the URI FFVP curriculum was not taught in conjunction to the PSE curriculum by health teachers as it was originally planned. When asked how many FFVP lessons out of ten were taught, one health teacher said only 1, another said 4, and the other did not respond.

Wish I had seen FFVP curriculum to know what was taught. Maybe be involved with meetings with PE/art teacher. (Educator 3)

FFVP was not taught. Because Mr. P said C took up whole class time. (Educator 1)

Communicate more with gym teachers concerning making sure they teach the healthy food curriculum. (Educator 2)

More communication between intervention and school staff was then determined to be an integral part for intervention success.

The curriculum's wordiness was also found to be a common challenge for all educators. All educators felt that some of the content was rather dry and needed to be condensed and more modified.

Tried to memorize lessons and rewrote the lessons because they were wordy. (Educator 1)

Curriculum was very wordy, it had lots of talking. (Educator 3)

Timing of lessons also seemed to be a struggle that all educators perceived throughout the intervention year. This issue was tied into the students' difficulty understanding several aspects of the curriculum. Lessons were delivered every other week, and educators believed that this may have contributed to the students' PSE knowledge.

Hated two-week spacing – with too much time away. (Educator 3)

I think the classes could have been more effective for students if they were more consist, every week instead of every other week. Because sometimes they would forget the subjects during review of previous week because of the time lapse in-between the weeks. (Educator 2)

Student Focus Groups. Two focus groups with five students each was held at each intervention school at the intervention's conclusion. The discussion was led using a

guide with questions that asked what students recall learning, what they liked and disliked about the intervention, and if/what dietary changes they had made as a result. As shown on Figure 4, what students recalled doing and enjoying more were creating their own posters advertising either fruits, vegetables, or the winning recipe. In addition, discussing barriers to eating fruits and vegetables was the lesson that students at both schools remember enjoying talking about. Overall, it was the interactive games and activities that students particularly enjoyed. Taste-testing recipes was one of the most popular activities according to students. When asked if students preferred to do other activities compared to the recipe contest, all students responded they would repeat the project if given the chance.

There's nothing I didn't like doing. (School 2)

Would do it again because liked having a choice in cafeteria. (School 2)

I liked trying recipes and learning what not to eat and what eating a lot of vegetables can do to me. (School1)

If this is the first school in Pawtucket to do this program, you guys did a really, really good job. (School 1)

In addition, all students from both schools attributed making positive dietary changes as a result of this intervention.

I asked mom to buy more carrots when I had recipe. I like them now. (School 2)

Before I didn't eat lots of fruits and vegetables, now I eat tomatoes, lettuce, apples, banana, grapes. (School 1)

I asked mom to put fruits and vegetables in refrigerator where I can see them. (School 1)

Semi-Structured Interviews. The interviews with the three classroom health teachers, one principal, and one foodservice manager were followed using an interview guide with questions asking about any perceived barriers, successes, suggestions for change, and any effect if any that the intervention had on their students. Like EFNEP educators, health teachers mostly expressed similar findings. The following quotes illustrate the most common perceived barriers.

Once more, delivering lessons every other week proved to be a major struggle for students.

The program was delivered every 2 weeks and a lot of students forgot what they had learned on the previous lesson. Timing was the hardest. (Health teacher 2, School 1)

…students were confused since having the class every two weeks was confusing to them and I am not sure they got it on a day-to-day basis. (Health teacher 3, School 2)

The miscommunication between intervention and school staff was also made apparent by health teachers and foodservice.

Felt like sometimes we were not on the same page and there was some miscommunication. There needs to be more re-capping with EFNEP director. (Foodservice manager)

There was miscommunication with the art teacher and there was confusion as to who was teaching what. (Health teacher 3, School 2)

In addition, health teachers also mentioned the wordiness of the lesson plans as being a challenge in engaging student participation and understanding.

Have more hands-on activities and less talking from the instructor… kids got bored with a lot of lecture. (Health teacher 2, School 1)

Script was very wordy and not very user friendly. The curriculum was a little over their head. (Health teacher 3, School 2)

The same as students, all school staff that participated in these interviews as well as foodservice agreed that the recipe testing and contest was the most successful part of this intervention. All of them felt that students particularly enjoyed this aspect of the project and expressed their desire to see this intervention being delivered again.

The students really enjoyed taste testing the recipes. It was nice to see a different program that the students really enjoyed getting involved in. I would love to see the same program again. (Health teacher 2, School 1)

The students really liked coming up with their recipes and polling the whole school. I think this was a great program and I would like to see it again. (Health teacher 1, School 1)

Both cafeterias were very excited and looked like the kids really enjoyed Recipe day. (Foodservice manager)

The recipe contest was awesome and the kids really enjoyed the lessons. (Principal, School 2)

Lastly, the most commonly mentioned theme that school staff mentioned as a result of this intervention was student empowerment. Most agreed that the lessons and activities increased their students' self-confidence in requesting the fruits and vegetables they want to see being offered more, in school and at home.

The program made them realize they had a voice in their school and were being heard. They realized they had power to make changes in their school. (Health teacher 2, School 1)

It definitely empowered the students and it's always good to get a different perspective from different speakers. (Health teacher 1, School 1)

I have had parents come up to me saying their kids are asking them to try new fruits and vegetables. (Principal, School 2)

Wellness Committee Meetings. Overall, the members of the Pawtucket Wellness Committee were very pleased with the outcome of the EMPOWER intervention. No relevant themes emerged from analysis of the meeting discussions and minutes.

DISCUSSION

The purpose of this study was to conduct a comprehensive process evaluation of a school-based PSE change intervention called EMPOWER. The primary aim was to assess the intervention's fidelity, dose, and reach as well as it's perception by various stakeholders and staff. This comprehensive process evaluation followed the comprehensive guide described by Saunders et al.[11] and its results have been used to fine-tune the intervention. Overall, both students and school-staff reported liking the

intervention. Fidelity, dose, and reach were high throughout the intervention as well. However, as expected from process evaluations, this study found areas to improve for future implementation. Some of the key changes include reducing the length of the lessons, simplifying language, including more interactive learning, and increasing communication between researchers and school staff.

The results from the interviews, focus group responses and handwritten portion of the checklists revealed that the EMPOWER intervention was perceived in a highly positive manner. Similar to other school-based interventions,[17, 31] the hands-on activities which in this study included the recipe taste-testing, creation of promotional posters, polling on "Recipe Day", and lesson games proved to be the most popular aspects of the intervention. The students' self-confidence and empowerment to have a voice in their school community and family environment increased as a result of these activities, as illustrated in the semi-structured interviews with the classroom health teachers and student focus groups. Student engagement has been discussed in other studies.[16, 23, 26] Researchers from these studies agree that increasing student engagement is an integral piece in assuring an intervention's success. One of the ways of ensuring engagement is by incorporating activities such as the ones reported in this study, which encourage self-efficacy to make their own choices.[23] Another way is by also amending lessons with take-home assignments to reinforce the skills learned.[16, 31]

In this study, 83 out of 142 students (58%) submitted a recipe as part of the lesson #5 take-home assignment. Students submitted a fruit or vegetable-based recipe from home, to participate in a school-wide recipe contest. The winning recipe was then provided on the school lunch menu one day during the intervention. Data from the

rubrics used to evaluate the recipes revealed that only 21% met 7 out of 7 criteria with an average 4.7/7 score. Most of the recipes failed to provide specific quantities, suggesting that basic cooking skills are deficient in this population. However, 70% of the recipes submitted met the fruit or vegetable-based criteria, which was the primary goal of the take-home activity. Around 70% of the remaining two take-home assignments met criteria. Return rates dropped to 39% for the second activity which involved making requests to parents for fruits and vegetables. The last assignment about creating persuasive messages to eat more fruits and vegetables increased to a 97% return rate. Another study found that return rates tend to diminish over time.[31] However, in this study, the first two assignments required involvement from parents, which could explain the lower submission rates. Writing a recipe required students to interview a parent or family member, while the making requests assignment required a parent signature. This suggests that involvement from parents may have been low. In addition, all three take-home assignments were only written in English. The Pawtucket School District has a high percentage of Hispanic families (31%), which could also explain the lower participation from parents in these activities. Nevertheless, it should be noted that almost three-fourths of the students submitted their take-home assignments, which show that those students understood the lesson and activity objectives. Similar to the Active for Life Year 5 (AFLY5) study, the aim of incorporating take-home assignments was to reinforce the learning covered in the lessons and also extend the reach to parents or other family members.[16] However, other studies have not comprehensively analyzed returned assignment scores.

The data from the fidelity and observation checklists presented in this manuscript show that the EMPOWER curriculum was implemented with a high degree of fidelity. An average curriculum fidelity of 97% was recorded in the self-reported fidelity checklists and 95.6% in the observation checklists with a 99% agreement between self-report and observations. Percent agreement was measured by calculating the difference between the self-reported fidelity and observations. Results of this study compare favorably to other school-based intervention studies that have also used self-reported curriculum fidelity measurements and observations. Davis et al. found that teachers reported completing nearly all the curriculum activities, while observations found that about half of the activities were completed.[18] However, teachers in the Davis study were observed only once during this 6-week intervention, in comparison to three times in the current study. The Child and Adolescent Trial for Cardiovascular Health (CATCH) educators reported completing about 92% and 95% of curriculum activities in fourth and fifth-grade classrooms.[32] In contrast, their observations indicated that activities were only completed by 78% of students in fourth-grade and 84% of students in the fifth-grade.[32] However, it is unclear how many observations were completed throughout the CATCH study. These two studies, which have found a lack of correspondence in completion of activities between self-reports and observations, raise the question of the validity of the self-reporting instruments. Additional research that examines observations of all curriculum lessons is needed.

The dose delivered compares positively to other studies; 100% of the EMPOWER lessons were taught in all six intervention classrooms. In studies such as AFLY5, 77% of the lessons were delivered[16] and Project Tomato which reported an average of 45%

implementation.[17] The dose of CATCH at 86%, although good was over-reported by the school staff who delivered the intervention.[32] Helitzer et al. also reported that some school teachers were not following lessons entirely.[22] In these studies that had low implementation rates, lessons were delivered by school staff rather than research staff, which may explain their outcomes. The studies such as It's Your Move[26] and High 5[31] where intervention curricula were delivered by research staff have reported higher implementation rates similar to the present study.

The reach of EMPOWER was similar to other studies, with an average of 94% student attendance rate. Several school-based studies have reported high degrees of reach, including Project Tomato which had 94%, AFLY5 had 95%, and High 5 had a range between 93-96%.[16, 17, 31] Student attendance for the Gimme 5 study by Davis et al. and the CATCH study were not reported, however the CATCH study had 100% participation from the 96 intervention schools.[18, 32]

The evaluation identified several areas for improvement. The lessons were too long and there were concerns about the difficulty of some vocabulary and concepts. Lessons plans have been modified and condensed for future implementation of EMPOWER to meet all objectives in the original scheduled time, similar to other studies which have encountered these issues while implementing new interventions.[16, 22] Moreover, most of the lessons were viewed as being wordy by both EFNEP educators and health teachers. This finding may mean that educators memorized the curriculum in order to "check-off" all of the objectives on the fidelity checklists. Like previous process evaluation studies have pointed out[22], modifying the lesson plan scripts in the future might help minimize this issue, as some educators expressed

frustration in trying to cover the lessons plans as they were written. Another explanation could be that educators typically rely more on reading or memorizing lesson plan scripts when they are not yet comfortable with the curriculum. EFNEP educators only attended two 1-hour training sessions where the ten lessons were covered.

Other themes such as student and classroom management were identified as problematic. Some educators seemed to struggle with student discourse. It should be noted that educators with less experience teaching school-aged children, such as EFNEP educators, tend to struggle with this issue.[22] In addition, the hands-on activities which students enjoyed the most and had the strongest effect on student empowerment, were regarded by EFNEP educators as the most difficult to deliver. This finding is consistent with other studies, where more time-consuming activities were implemented at lower rates.[31-33] Another challenge in this study was the miscommunication between intervention and school staff. Several studies have experienced similar challenges and have highlighted the need for open communication between project staff and stakeholders to ensure intervention success.[23, 28, 32, 34] Some of this miscommunication may also help explain the lack of URI's FFVP lesson implementation. Health teachers reported not delivering the lessons since they thought lessons were already being delivered by EFNEP educators. The AFLY5 study encountered a similar challenge, in which classroom teachers who delivered the lessons mentioned lack of time to fit all lessons into an already full curriculum as the main reason for the low implementation rate.[16] The EMPOWER lessons were designed to be taught in conjunction to the FFVP curriculum, however the PSE-

change lessons took more time than intended. This also may have influenced the lack of FFVP delivery at both intervention schools. Lastly, inciting involvement of the Pawtucket Wellness Committee during the intervention proved challenging in this study. One parent and student dyad were recruited and attend one of the Wellness Committee meetings, however engagement from the committee itself was low. This could have been due to the recent creation of this Wellness Committee, whose recent creation unfortunately did not coincide well with this study.

Limitations

The fidelity checklists were completed by EFNEP educators and relied solely on self-report. Educators were observed three times throughout the intervention period. There was a 99% agreement between the self-reported fidelity and the observations. However, like many previous studies, these results should always be interpreted with caution. This has implications for future implementation at other schools; more observations by research staff may add more comprehensive data and reliability of the results. In addition, interviews and focus group responses were not audio recorded and transcribed. This decision was made to encourage student participation and a moderator and a note-taker were present at all focus groups and comprehensive notes were taken. Yet, findings also need to be approached with caution. Another limitation of both the semi-structured interviews and focus groups is that teachers and students might also be inclined to give socially desirable answers. This could in turn lead to overestimation of the effects and perceptions of the intervention.

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

Results from this comprehensive process evaluation can be used to help design future school-based PSE change interventions. In order to improve a multicomponent PSE-change intervention's success, lesson content needs to be made relevant and tailored to fifth-grade level comprehension. Lessons should be shortened and simplified. Future interventions should explore delivering key concepts in more interactive ways geared towards school-aged children. There also needs to be more frequent communication between research and school staff. Future interventions should explore incorporating pre-implementation meetings with classroom teachers and regular "check-ins" to avoid confusion of teaching roles. Finally, future research should incorporate full-scale observations of curriculum delivery to determine an intervention's fidelity with confidence.

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TABLES AND FIGURES

TABLE 1. PROCESS EVALUATION ELEMENTS AND METHOD OF APPROACH

Process Evaluation Element	Evaluation Questions	Method of Approach (Instrument)
Fidelity	To what extent were each of the program's lessons implemented as planned?	• Fidelity checklists • Observation checklists
Dose Delivered	Were all intervention components delivered as planned?	• Fidelity checklists
	Was feedback provided to the Wellness Committee?	• Copies of Wellness Committee meeting minutes
Dose Received	To what extent did students engage in lesson activities?	• Fidelity checklists
	To what extent did the students complete assignments?	• Number of submitted take-home assignments
	Did the students learn?	• Graded rubrics
Reach	Was the curriculum delivered to at least 80% of fifth grade students?	• Student attendance
	What proportion of parents participated in the intervention?	• Copies of family recipes • Graded rubrics
Perception of Program	How did the students react to the intervention?	• Student focus groups (2)
	How did educators and school staff react to the intervention?	• EFNEP focus group • Fidelity checklist notes • Interviews (4)
	Did the students improve attitudes about fruits and vegetables and feel empowered to change fruit and vegetable options?	• Student focus groups (2)

TABLE 2. PROCESS EVALUATION INSTRUMENTS AND OVERALL FINDINGS.

Hypothesis	Instrument	Overall Findings

Fidelity &Dose Delivered (≥80%)	Fidelity Checklists	• On average:
		  ○ 97% lesson fidelity
		  ○ 100% of lessons delivered

	Observation Checklists	• 95.6% lesson fidelity, on average

Dose Received (≥80% attentiveness and understanding & ≥75% assignment completion)	Fidelity Checklist (handwritten notes)	• On average:
		  ○ Student attentiveness 92%
		  ○ Students understanding 90%
		• Students actively participated and were engaged in all lessons particularly in games and group activities.
		• Lessons 4 and 9 activities were the most confusing for students.
		• Some lesson objectives were not met due to lengthy lessons.
		• Some educators struggled keeping student discourse and classroom order.
		• Overall, educators agreed students were excited about the intervention.

	Rubrics	• **Lesson #5 – Writing Recipes**
		  ○ 58% recipes were submitted
		  ○ 21% met all rubric guidelines
		  ○ 70% were fruit/vegetables based
		  ○ Average score = 4.7/7
		• **Lesson #6 – Making Requests**
		  ○ 39% submitted.
		  ○ 71% met all rubric guidelines
		  ○ Average score = 5.5/6
		• **Lesson #8 – Persuasive Messages**
		  ○ 97% submitted
		  ○ 69% met all rubric guidelines
		  ○ Average score = 1.5/2

TABLE 2. PROCESS EVALUATION INSTRUMENTS AND OVERALL FINDINGS. (CONTINUED)

	Instrument	Overall Findings
Reach (≥80%)	Student Attendance (fidelity checklists)	• On average 94% of students attended all lessons
Perception of Program	Student Focus Groups	• Common themes: o Enjoyed creating posters o Particularly recall discussing "barriers to eating fruits and vegetables" o Liked recipe taste testing the most o All would repeat the project if given the chance o All attributed making dietary changes because of intervention
	EFNEP Focus Group	• Common themes: o Lessons were lengthy and some difficult for students o Miscommunication between researchers and school staff o URI FFVP not being taught in classrooms o Wordiness of lessons o Timing of lessons every other week
	School Staff and Food Service Semi-Structured Interviews	• Most common themes mentioned: o Student struggle with lessons delivered every other week o Miscommunication between educators and school staff o Wordiness of lessons o Recipe taste-testing most successful activity o Student empowerment most perceived effect of the intervention
	Wellness Committee Meeting Minutes	• Overall, very pleased with outcome of the intervention.

TABLE 3. EFNEP FIDELITY CHECKLIST DATA

Lesson number	Attendance (total)	Time Spent Teaching (average)	Percent Lesson Taught (average)	Perceived Student Understanding (average)	Perceived Student Attentiveness (average)
1	137	36 min	91%	4.5	4.5
2	138	34 min	100%	4.5	4.5
3	125*	40 min	98%	4.5	4.5
4	117*	44 min	95%	3.8	4.5
5	139	25 min	96%	4.6	4.5
6	137	24 min	100%	4.6	4.6
7	139	34 min	100%	4.6	4.8
8	139	30 min	100%	4.6	4.6
9	141	34 min	93%	4.1	4.3
10	72**	33 min	n/a**	5	5
Overall Average	134[a]	33 min	97[a]	4.5	4.6

* No data recorded for one classroom
** No data recorded for three classrooms
[a] Average does not include data from lesson 10

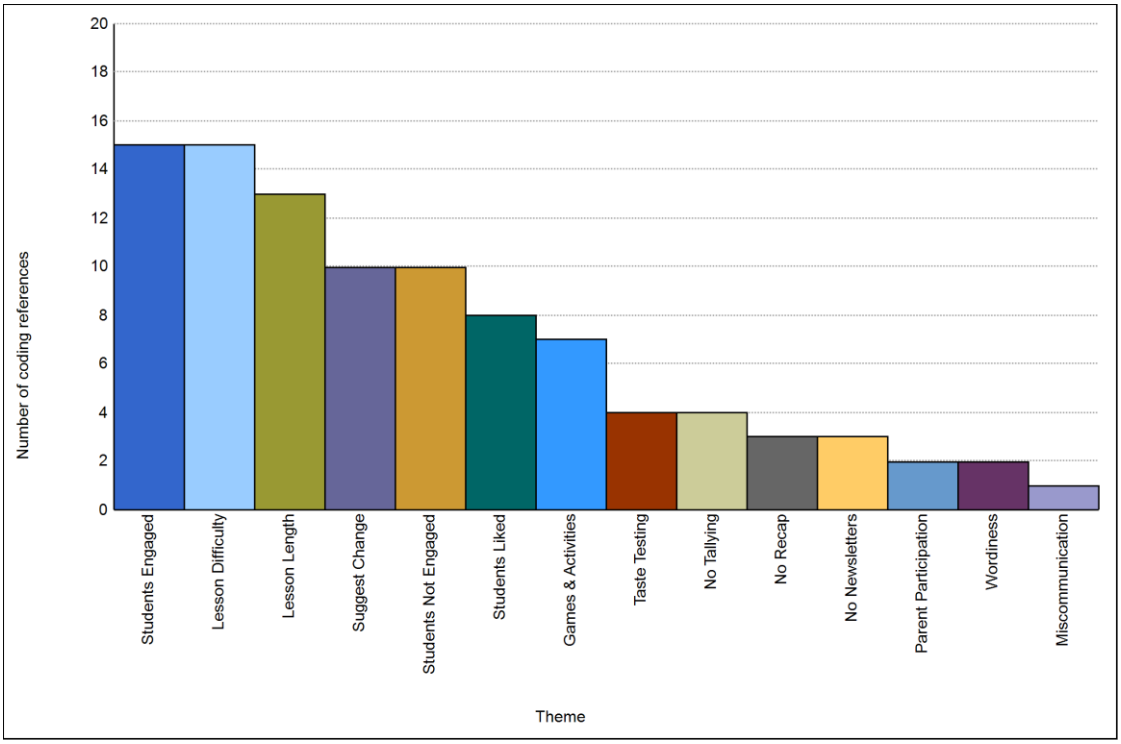
TABLE 4. SNAP-ED OBSERVATION CHECKLIST DATA

Lesson number	Percent of Lesson Taught (average)
2	100%
6	93%
8	94%

TABLE 5. GRADING RUBRICS DATA

	Classroom ID	**A**	**B**	**C**	**D**	**E**	**F**	**Total**
Lesson 5: Fruit and Vegetable Recipes from Home	Recipes (n)	10	8	17	11	16	21	83
	Total 7 out of 7 (n)	0	2	5	2	5	4	18 (21%)
	Average score out of 7	3	5	4.7	5	5.4	5.1	4.7
	Main ingredient fruit or vegetable	6	6	13	7	11	15	58 (70%)
Lesson 6: Making Requests	Submitted (n)	9	8	6	5	8	20	56
	Total 6 out of 6 (n)	8	4	4	3	6	15	40 (71%)
	Average score out of 6	5.8	5.4	5	5.6	5.6	5.7	5.5
Lesson 9: Creating Messages	Submitted (n)	24	25	18	21	27	20	135
	Total 2 out of 2 (n)	21	19	2	17	24	11	94 (69%)
	Average Score out of 2	1.9	1.7	0.8	1.7	1.9	1.4	1.5

FIGURE 1. FIDELITY CHECKLIST NOTES AND COMMENTS BY THEME



FIURE 2. OBSERVATION NOTES AND COMMENTS BY THEME

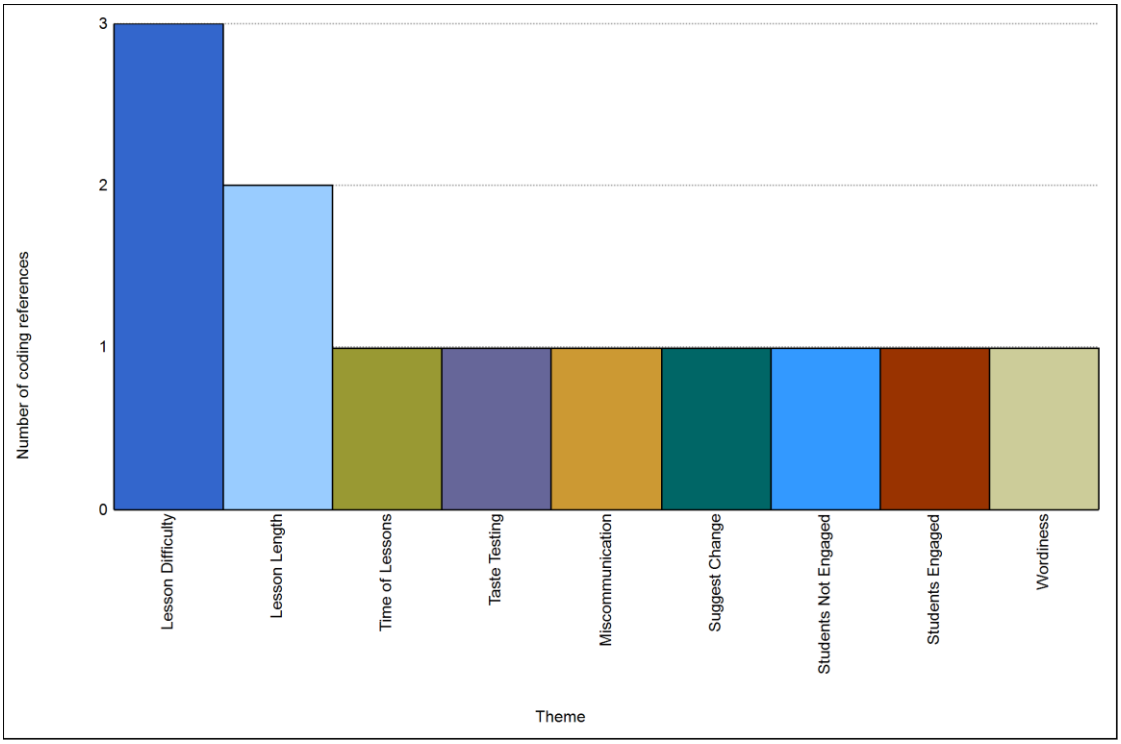


FIGURE 3. EFNEP FOCUS GROUP RESPONSES BY THEME

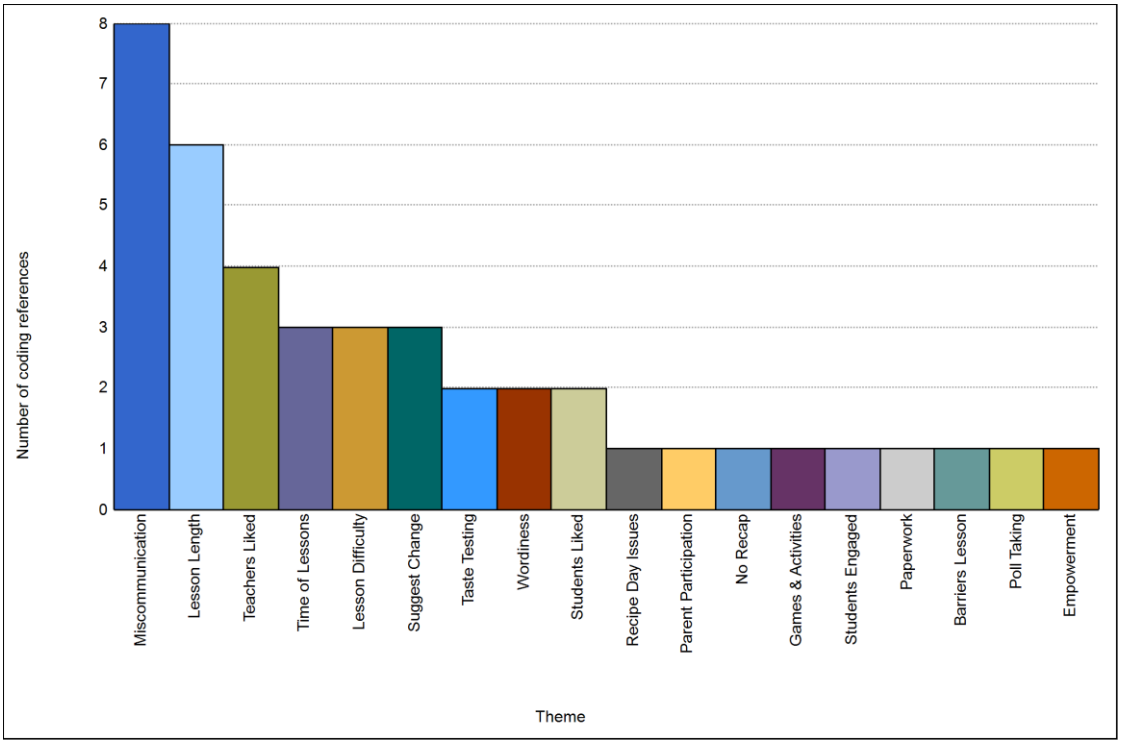


FIGURE 4. STUDENT FOCUS GROUP RESPONSES BY THEME

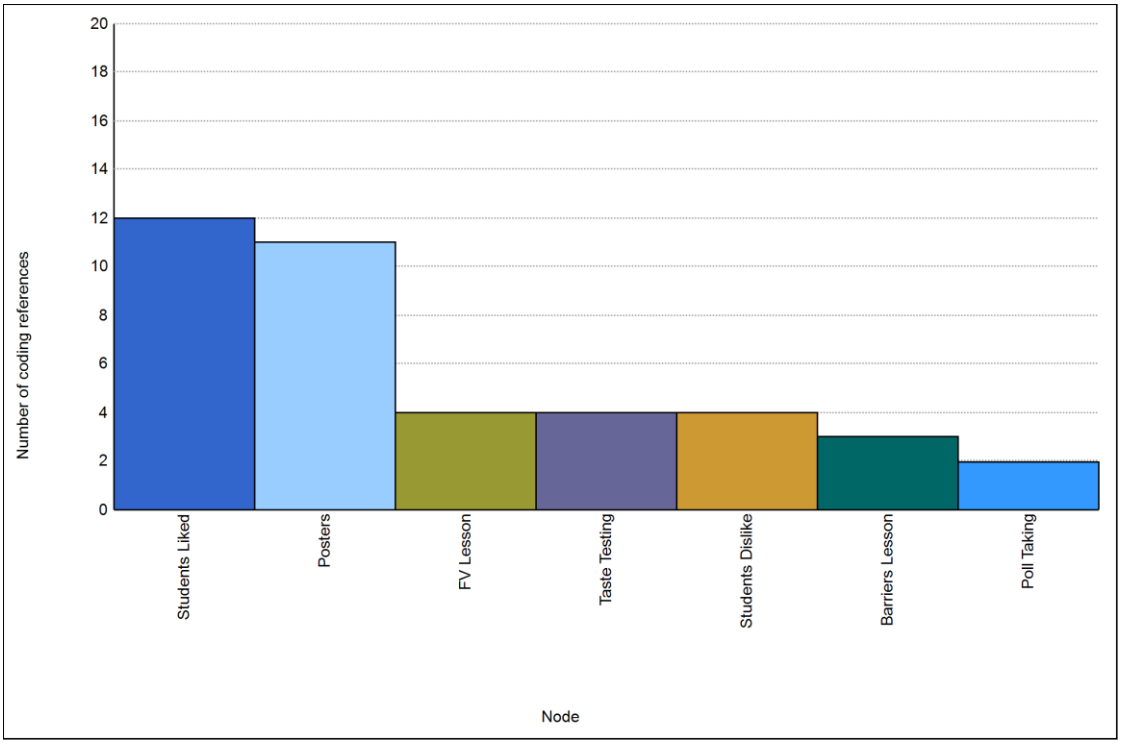
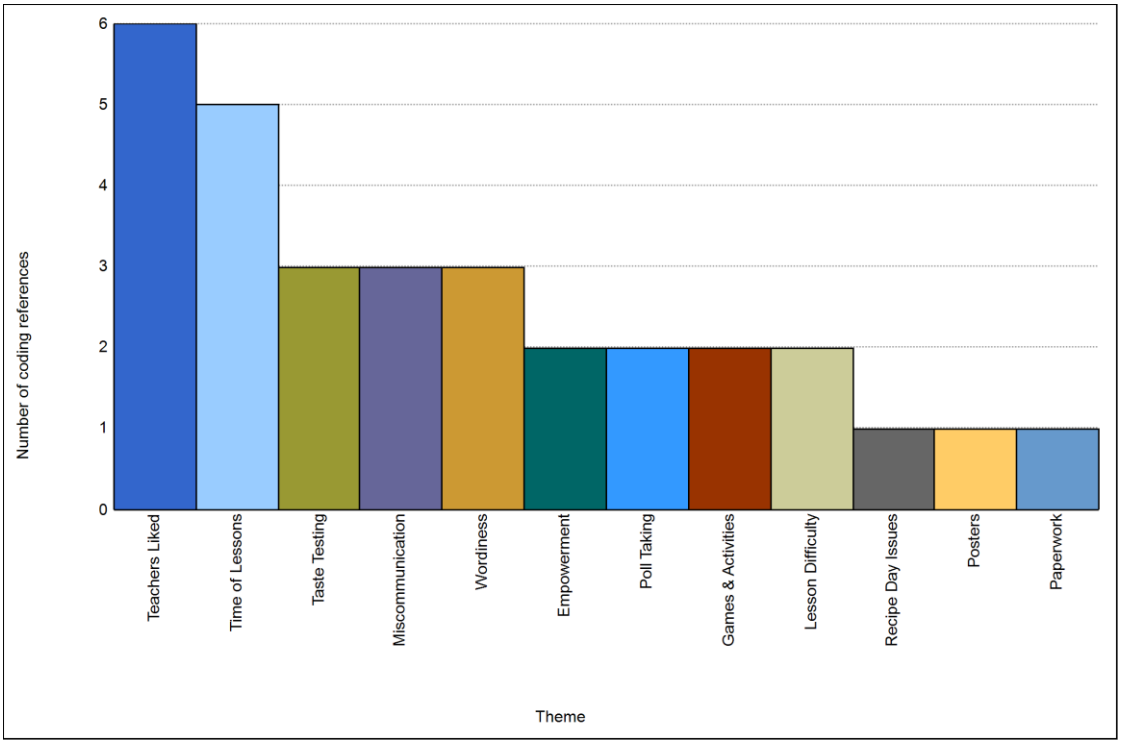


FIGURE 5. SEMI-STRUCTURES INTERVIEW RESPONSES BY THEME



APPENDIX A

EXTENDED LITERATURE REVIEW

Introduction

This extended literature review will provide the justification for the process evaluation of the EMPOWER intervention by reviewing and comparing PSE change interventions in urban elementary schools to assess their impact on the dietary behaviors of school-aged children. In addition, process evaluations of PSE change interventions will be reviewed to identify different components that have been effectively used to explain the way by which these interventions have been successful or unsuccessful in their outcomes. Process evaluation is used to monitor and document program implementation and can aid in explaining intervention outcomes.[1] An intervention's success or lack thereof could be accredited to any number of elements including how the intervention was designed, how successful it was at delivering its different components as they were originally planned, and how much audience participated and/or were exposed to the intervention.[1] These elements are what process studies aim to evaluate: to enhance the understanding of intervention results. There are differing methods by which PSE interventions are evaluated, therefore, details of the methods and instruments used to document the process will be examined.

Childhood Obesity

The prevalence of childhood obesity is a major health problem in the United States. It has been documented that the prevalence of elementary-school children between 6 and 11 years of age with obesity (body mass index at or above the 95th

percentile for age) has increased from 4.2% in 1963-1965 to 18.0% in 2009-2010[2] and since then has remained fairly stable.[3] Moreover, lower-income and ethnic populations are at a greater risk and have the highest rates of obesity.[2, 4] Overweight (body mass index at or above the 85th percentile and below the 95th percentile for age) and obese children pose a major public health concern since many children who are overweight or obese maintain their obesity as adults. This in turn, leads to related comorbidities such as diabetes, heart disease, high blood pressure, high cholesterol, stroke, some cancers, arthritis, and sleep-disordered breathing.[5]

Multiple factors influence obesity. Not only are genetics a cause, but the environment where we live, work, and play is also a major determinant of our dietary and physical activity habits.[6] In addition, evidence suggests that community-level policies that affect local food environments, may also be contributing either positively or negatively to the obesity epidemic.[6, 7] Given the important role that the environment has on the development of obesity, public health interventions are increasingly implementing strategies involving policy, systems, and environmental (PSE) change which aim to change health behaviors and social norms at a population level.[4] Although interventions that modify the environment are the most effective for public health, more studies are needed to establish a strong evidence base for the process by which PSE change interventions are effective, which in turn may help explain the disparities in health behaviors and disease among different populations.[4, 6]

Policy, Systems, and Environmental Change

Strategies to reduce the prevalence of obesity involve changing individual health behaviors.[8, 9] However, public health professionals are now also targeting the

policies, systems, and environments (PSEs) that support this behavior change.[9] A sedentary lifestyle and increased intake of unhealthy foods and beverages are more commonly found in community areas where there is a decreased access to healthy foods, increased exposure to advertising and availability of fast food, and a lack of access to safe recreational areas that promote physical activity.[8] Several frameworks for public health intervention have been proposed, all of which aim at population-wide interventions at their base, however most target aspects of clinical health and health system infrastructures.[10] Other frameworks, such as the Health Impact Pyramid, address socioeconomic determinants of health at the base, which require less individual effort and have a greater population impact, followed by public health interventions to encourage healthy decisions (access to clean water, safe roads, and healthy foods), long-lasting protective interventions (such as immunizations), clinical interventions (treatments for individual diseases), and counseling and education at the top.[8, 10] It is in the second tier of the pyramid where PSE changes make choosing healthy options the default choice regardless of socioeconomic factors or individual risk.[10, 11] Changing from saturated to unsaturated cooking oils in school cafeterias, enacting policies that create safe options and encourage walking or bicycling to work instead of driving, designing buildings to promote stair use, increasing cost of unhealthy foods, etc. are some PSE change interventions that can have greater population impact and improved the societal burden of disease.[10]

School-based PSE Interventions

Given that on average, a child obtains about 26% of their total energy intake during the school day, PSE change interventions in schools have been deemed as top

priorities in the battle against childhood obesity by both the American Academy of Pediatrics and the Institute of Medicine.[12-15] In addition, schools are the only setting where many children are gathered and can be provided with opportunities to receive education on a healthy lifestyle.[14] The aim of PSE change interventions in schools, unlike individual nutrition education interventions, is to change the school setting by targeting system-wide policy and environmental factors so that the entire school community (students, student's families, and school staff) will be positively affected and encouraged on a daily basis to make healthier choices.[12] Despite the growing interest and investment in modifying the school policy and environment, there is little available evidence of their effectiveness, and more specifically which strategies have had the greatest effect.[11, 13] A systematic review of both published and unpublished literature up to 2007 by Jaime et al. found evidence of the effectiveness of 18 school-based PSE interventions, mostly involving changes in nutrition guidelines (such as decreasing total and saturated fat) and item pricing which affected both healthy food intake and availability of fresh fruits and vegetables.[12] However, long-term evaluation such as the measurement of body mass index (BMI) was lacking. A study by Foster et al. did evaluate BMI and the prevalence of overweight and obesity. This involved a multicomponent (nutrition education, physical activity education, and food environment) school-based intervention which found significant changes in the prevalence of obesity but not in overweight children.[16]

Other previous studies that have examined PSE changes in middle schools and how they affect food consumption in students have found mixed results.[17-19] A two-year intervention by Sallis et al. found that the policy and environmental changes they

implemented were effective in improving physical activity but were not successful at reducing total and saturated fat intake from all school food sources including cafeteria, a la carte foods, school stores, and bag lunches.[17] Other two-year interventions by Birnbaum et al. and Lytle et al. which formed part of the TEENS study, included classroom education incorporating peer leaders and parent activities in addition to environmental changes.[18, 19] These interventions reported little dietary change as well.

The Healthy ONES intervention carried out in four low-income schools (elementary and middle schools), focused on eliminating unhealthy foods and beverages, providing nutrition education, and modeling healthy eating by school staff inside the classroom, before and after school, and inside the cafeteria.[14] Changes in obesity rates were measured using height and weight at baseline and after one and two years post intervention. There were no significant changes in obesity rates, however, the primary significant change was seen in the amount of unhealthy foods and beverages per week brought from outside campuses which is a measurement of both the policy and environmental changes that took place throughout the intervention. In general, multicomponent interventions seem to have the greatest effect on dietary changes. Some studies such as the one carried out by Cullen et al. have mainly focused on modifying one aspect of the school environment, in this case foodservice.[20] In this pilot study, six middle schools from three different states participated in implementing thirteen potential policy and environmental changes to school foodservice programs. Changes included increasing fresh fruit and vegetable availability and decreasing high fat snack items and sweetened beverages in cafeterias and vending machines. One of six middle schools did not attain the 75% goal achievement, but overall the

researchers found that in the short-term of six weeks, the foodservice changes were acceptable to students and school staff.[20] However, changes to the vending machines proved the most difficult due to vendor contracts and sources of revenue to the school.[20] Generalizability of this intervention is limited due to its short duration and lack of data on actual student dietary intake.

Although these studies provide some evidence of the effectiveness of PSE change interventions in schools, most have encountered similar issues along the way.[14, 17-20] These issues include, difficulty implementing school food changes due to financial constraints (vending machine contracts, fundraising, etc.), failure to control unhealthy foods brought from home, lack of integration into daily school activities due to delivery of intervention solely from research staff, and difficulty of implementation within the context of standardized academic performance testing.[14] These barriers and challenges have been clearly documented in the literature due to the investment of many public health professionals in building an evidence base for the emerging study of PSE change.[21]

Process Evaluation

In recent years, public health research has increasingly incorporated qualitative methods into their PSE change outcome studies due to the variability of program implementation and policy adoption, particularly in school and community settings.[1] Unlike outcome studies that seek to determine if an intervention was successful or unsuccessful, process evaluation studies are implemented to determine why and/or how such an intervention attained its respective results.[22] Evaluations such as these can also aid in demonstrating progress and effectiveness before actual outcome results

are measured.[23] In addition, if an outcome study was unable to achieve positive results, process evaluation can aid in using the data collected throughout an intervention to identify potential causes and suggest how that unsuccessful intervention could be modified and improved upon, instead of relying on mild speculation in order to explain why and how.[22] Process evaluations gather data on the social processes involved in the delivery and reception of the intervention. They frequently entail mixed methods involving questionnaires, semi-structured interviews, focus groups, direct observation, and checklists. These different evaluation components provide data to describe how a program was implemented, how well the activities delivered fit the original design (fidelity), to whom was the intervention delivered to (dose), the extent of the target population that was reached (reach), and any other external factors that may influence the intervention's effects.[22, 24] In addition, stakeholder participation is of invaluable importance in process evaluation studies. The views of the participants about the intervention are examined and may help in distinguishing acceptability and success of the different intervention components.[1] However, there are several challenges when conducting process evaluations of PSE change studies. These challenges include assessing implementation fidelity, measuring the dose delivered and dose received, and attributing and quantifying actual effects of the intervention to the outcomes.[23] Therefore, process evaluation plans and designs tend to typically evolve over the course of an intervention, to fit stakeholder priorities and program delivery.[21]

Process Evaluations of School-based PSE Change Studies

One of the first school-based process evaluation studies was one within the Child and Adolescent Trial for Cardiovascular Health (CATCH) which targeted dietary behaviors, physical activity, and smoking through PSE changes in four core programs, including school foodservice, physical education, classroom curricula, and parental involvement.[25] An extensive amount of process data was gathered for each of the four programs during the three-year intervention period, to provide insight of how the CATCH program was implemented and how they successfully implemented the intended PSE changes among the 56 intervention schools. The process measures used specifically for the process evaluation of the classroom curricula were to document teacher exposure to the curriculum training sessions, how much of the curriculum was implemented, to what degree it was implemented as designed, and the barriers to implementation.[26] Teachers were administered questionnaires which examined attendance at training sessions and perceptions from both training sessions and the curriculum itself along with questions targeting self-efficacy of delivering the curriculum. Dose and fidelity of curriculum implementation was measured using self-reported weekly checklists and empirical observations of selected class sessions conducted by research staff. Interviews with teachers were also conducted after the program was concluded, to obtain feedback on individual sessions and the CATCH program as a whole. The data that was collected from all program components was then successfully used to describe implementation of the program for quality and monitoring purposes and also helped explain the program's effects.[26] The data collected revealed that 100% of teachers involved in the intervention attended all

training sessions and the fidelity of implementation was referred to as excellent (more than 90%). There was also high compliance in completing the weekly checklists which revealed high teacher satisfaction. Interviews exposed teacher uncomfortableness with being observed, however during interviews teachers did acknowledge the interventions impact on their students' behaviors, and the most common barrier encountered was the length of each lesson.

Subsequently, more studies began incorporating process evaluations in their research studies following guidance from innovative studies such as CATCH. The process evaluation of an obesity-prevention trial for American Indian schoolchildren by Helitzer et al. examined whether and how the intervention was implemented during the pilot phase.[27] This study described the development and pilot testing of the process evaluation instruments, how these instruments were selected for use on the full-scale trial, and provided information on how the process evaluation results were used to fine-tune the program overall.[27] The research group also developed an extensive data collection method, including 27 sets of instruments involving checklists, attendance logs, self-administered evaluation forms, individual lesson feedback from teachers, structured interviews, surveys for student feedback, surveys for student exposure questions, observation checklists, and meeting minutes.[27] Results from the process evaluation of the pilot study were used to monitor implementation of all the study components and provide input and fine-tune the components and revealed the need for more precise instruments.[27] Through direct observation of lessons, the research group found that most teachers completed the checklists and evaluation forms and gave above average rating to the 12-lesson curriculum. Teacher satisfaction increased

throughout the intervention. However, they found that their open-ended evaluation questions were not very clear to the teachers and therefore provided less useful information. This finding helped improve the evaluation forms. The observations also revealed that teachers were not delivering the curriculum as planned by omitting several parts of lessons and several activities. This indicated a need for more emphasis on the importance of maintaining curriculum fidelity during teacher training sessions. Interviews with teachers and school-staff revealed high satisfaction with the intervention, however several issues were discovered such as lesson duration, lack of training in how to control children during the PE component, and lack of curriculum flexibility. Student exposure was evaluated by administering questionnaires with 15 exposure questions. The data showed that more than 80% of intervention students reported exposures to 7 out of 15 items, however less than 70% reported exposure to 5 of 15 items.[27] These results suggested to the researchers the need for more specificity in the questionnaires since several items described activities that could apply to any elementary school curriculum.[27]

The Gimme 5 Fruit and Vegetables for Fun and Health was a multicomponent intervention, which included 12 lessons, designed to increase fruit, 100% fruit juice, and vegetables in fourth- and fifth-grade students.[28] The process evaluation of this intervention by Davis and colleagues, assessed fidelity of implementation, reach, and use of the intervention materials, which included teacher training sessions, curriculum delivery, family participation in activities, attendance to grocery store activities, and availability and accessibility of fruits and vegetables at home.[29] Data was collected with the use of observations (at least once per teacher),

self-reported checklists, and interviews. Thirty-three teachers in fourth-grade (44 total observations) and 36 teachers in the fifth-grade (59 total observations) were observed and it was found that about half of the curriculum activities were completed. In contrast, teachers reported completing 90% of curriculum activities which raised the question of self-reported bias.[29] Ninety-five percent of participating teachers participated in the training sessions. In addition, 95% completed the curriculum checklists, however no reliability was determined for this measure. Eighty-five percent of teachers rated the lessons as excellent to outstanding (4.6 to 4.8 on a 5-point scale).[29] Common barriers that were exposed included length of lessons, dependability of parent participation, and repetitiveness of material. Interviews were only conducted with fifth-grade teachers. Thirteen to 16 parents were interviewed on the telephone, and were asked questions regarding homework and any materials brought home, participation in parent and grocery store activities, and fruit and vegetable accessibility at home. Five percent of parents reported receiving all 6 newsletters sent home (56% reported receiving between 3 and 4), 87% participated in homework activities,10% reported attending grocery store activities, and fruit availability and accessibility at home was found to have increased significantly ($p=0.02$ and $p=0.003$ respectively) however the same was not found for vegetables ($p=0.14$). Similarly, other studies have also found challenges in extending program reach beyond the student community to increase knowledge and skills to parents.[30, 31]

The process evaluation for Project Tomato, a randomized controlled trial of a school-based intervention designed to maintain fruit and vegetable intake in children ages 8-9 years in the United Kingdom, involved 54 elementary schools.[32] Twenty-

seven of the schools were assigned to the intervention group which received a multicomponent program which included curriculum materials sent home.[32] Process evaluation measurements were taken using teacher, parent, and student questionnaires that included questions about intervention materials that were provided, if lesson plans were completed and what rating was given to each, if children brought intervention materials home, and lesson acceptability rating by students. It was revealed that 79% of teachers, 84% of students, and 38% of parents completed the questionnaires. The research group found through these questionnaires that implementation of the intervention was low, with 21.3% completion of the curriculum component and 56% of completion of the parent component.[32] Overall, the intervention materials were all well received by all three groups and the most commonly accepted items included hands-on activities such as games and recipe taste-testing. However, the main barrier that was found was preparation time, lack of training, and a seemingly labor-intensive intervention. In conclusion, the researchers did not find a positive association between the intervention and the children's eating behavior and process data was able to expose a poorly implemented intervention, similar to another study by Campbell et al.[32, 33]

Another study from the United Kingdom called Food for Fitness, was a multicomponent program as well that was conducted in elementary and middle schools.[34] In addition, trained community nutrition assistants delivered this intervention. The process evaluation, conducted by Middleton et al. used thirteen semi-structured interviews and two focus groups with stakeholders throughout the intervention which included nine health professionals, ten school teachers, and three senior health officials. These qualitative evaluation methods focused on examining

how the program was received by the stakeholders (such as its impact on the students) and how the program was delivered (such as the quality, organization, and availability of the service). These measures aimed at going beyond the "yes/no" and "how much" questions, by instead focusing on qualitative inquiry that would provide more depth by drawing out more understanding and perceptions of the program. The researchers analyzed the transcribed data, coded common themes, and categorized them as either belonging to program receipt or program delivery. The results showed that school teachers perceived the program as a good service, while the health professionals and senior health officials involved in the program perceived it as vital or essential to changing students' health behaviors. However, several program delivery issues were exposed. These were issues concerning program planning, the limited size of the intervention, and difficulty sustaining long term nutritional goals at the schools.[34]

Volpe et al. conducted the process evaluation of the HEALTHY study, a large multicenter trial to decrease the risk factors of type 2 diabetes mellitus in 21 middle schools by promoting physical activity and nutrition.[35] The aim of the HEALTHY study was to improve the quality of the foods and beverages offered to students by changing the total school food environment. Research dietitians and foodservice staff worked together to make environmental changes and organize activities that encouraged students to try new foods at breakfast and lunch. Process measures were taking by combining quantitative and qualitative approaches. Delivery of the intervention was assessed via 210 structured observations of the school environment throughout the intervention. Interviews with foodservice managers and dietitians at each intervention school consisted of Likert-type rating scales and open-

ended non-leading questions used to examine the effectiveness of intervention components, efficiency of implementation, attitudes towards the intervention, recommendations for dissemination, and recommendations for improvements. Overall, the observed fidelity of the five nutrition goals improved from baseline to the end of the study. By the end of the fifth and last semester, all but two nutrition goals were met by a hundred percent.[35] Interviews revealed that the goals of lowering the fat content of the foods offered and offering healthy beverages were easiest to implement. Forming strong communication between foodservice staff and dietitians was a common theme among interviews and was then considered of topmost importance if the nutrition goals were to be met. As with other studies previously mentioned, the most challenging barriers were costs, as well as availability of foods, and student acceptance.

Conclusion

Childhood obesity rates in the United States have plateaued in recent years.[2] However, it still continues to be a major public health concern particularly in low-income and ethnically diverse communities.[2, 3] There are several known factors that have influenced this epidemic, and the environment in which we live, work, and play has been identified as a key contributor.[6] Policy, systems, and environmental change strategies which aim at modifying said environment are increasingly being implemented in many community settings, with particular interest in schools.[12-15] These PSE change strategies aim at changing health behaviors at a population level, which are not determined to have more impact than interventions at the individual level.[8] However, due to the varying success of many school-based PSE change

interventions, studies are including more process evaluations to help explain their final outcomes. [17-21] Process evaluations are implemented to determine why an intervention was successful or not, and can also be used to demonstrate an intervention's progress and effectiveness before outcomes are measured.[21-24] They gather data on the social processes involved in the delivery and reception of an intervention by measuring its fidelity, dose, and reach.[24] Prior school-based process evaluation studies have implemented various strategies that have helped determine the extent of these elements in their interventions.[25-27, 29-35] These process evaluation studies have played an important role in the improvement and success of future school-based PSE change interventions.

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APPENDIX B

FIDELITY CHECKLISTS

NE-RNECE
Objectives & Activities Checklist – Lesson 1

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Block 1		
Lesson 1 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective(s), activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Explained why there: to know how powerful fifth graders are in getting people to eat more fruits and vegetables (briefly mention projects students will do)		
2. Introduced class rules and expectations		
3. Discussed what "wellness" and "being healthy" is		
4. Discussed what healthy foods are		
5. Discussed what environment is		
6. Discussed what a "committee" is		
7. Talked about the Pawtucket Wellness Committee and its purpose		
8. Explained what the goal is: to know if fifth graders have the power to improve the fruit and vegetables choices in their homes and school and get more people to eat fruits and vegetables.		
9. Talked about the ways the students will make these changes: mentioned the projects the students will be involved in		
10. Went through "Think About Fruits and Vegetables in Your Environment" activity with teams of 3-4 students and had 1 reporter from each team		
11. Explained why students will be writing letter to the Wellness Committee with common barriers to eating fruits and vegetables		
12. Drafted letter using top responses from ""Think About Fruits and Vegetables in Your Environment" activity and explained that the students will be signing it		
13. Opened invitation for 1 student and their parent(s) to join Wellness Committee		
14. Discussed what a "barrier" is and explained next week's lesson by giving examples of some barriers to eating fruits and vegetables		

Total time spent teaching: _____

<u>Participant Behavior</u>: Please circle the number corresponding to your response and comment on each aspect below.

Participants demonstrated a sense of understanding of the lesson.

1 **2** **3** **4** **5**
(did not understand) (understood everything)
Comments:

Participants are attentive, engaged and interactive with the educators.

1 **2** **3** **4** **5**
(not attentive at all) (very attentive)
Comments:

Is there any material relevant to the session that you added or feel should be added?

Is there any material that you deleted or were unable to cover?
□ Yes □No If yes, please specify:_____

Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 2

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 2 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)****:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective(s), activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Recapped the purpose of the Wellness Committee		
2. Discussed why it is important to tell the Wellness Committee about fruits and vegetables		
3. Asked students to answer "What are some of your barriers to eating fruits and vegetables"		
4. Identified top barrier to eating fruits and vegetables		
5. Lead students to brainstorm solutions or strategies for overcoming their top barrier		
6. Drafted the final letter to the Wellness Committee including their barriers and solutions		
7. Read the final draft of the letter to the class		
8. Asked the students if anything else should be added to the letter		
9. Passed the signature sheet around the classroom for students to sign their name		
10. Explained what an "Environmental Scan" is, deconstructing the words "environment" and "what it is to scan"		
11. Explained that 2 students from each school and their parent(s) will join the Pawtucket Wellness Committee		
12. Lead students in reflecting on what they learned on today's lesson		
13. Asked students if they have ever followed a recipe		
14. Introduced next lesson: the importance of following a recipe		
Total time spent teaching: **_____**		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		

Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:**_____ _____
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 3

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Block 2		
Lesson 3 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Discussed what a recipe is and why they are important to have and read before cooking		
2. Discussed "Curly Kale Slaw" recipe using props and materials (measuring spoons + cups)		
3. Explained the descriptive words "minced" and "chop"		
4. Explained that students need to ask about precise amounts during their interviews with the help of their measuring spoons and cups		
5. Asked students if the directions for the recipe were easily understood		
6. Explained that students need to ask about detailed directions during their interviews		
7. Explained and completed the recipe card activity		
8. Asked the class about what they learned and the importance of having complete and accurate recipes		
9. Introduced next week's activity and discussed what "role-playing" is		
Total time spent teaching:_____		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		

Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 4

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 4 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:_____***		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Discussed what a role-play and an interview is and how the students will use them for their activity		
2. Explained that the recipes that the students will be interviewing about need to follow certain guidelines including a fruit and/or vegetables as the main ingredient		
3. Gave an example of how carrot cake and vegetable pizza do not contain a vegetable as the main ingredient		
4. Gave an example of how stir-fried garlic broccoli does have a vegetable as the main ingredient		
5. Discussed how recipes need to have step-by-step directions		
6. Explained that students will have a script for their role-play activity and interviews at home and demonstrated the activity with the classroom teacher		
7. Asked students to verify if their recipes followed all guidelines on the Recipe Checklist		
8. Instructed students to take home the interview script and recipe card to complete their interviews at home		
9. Explained the purpose of the Parent Newsletter and instructed the students to write-in their "project due date"		
10. Introduced next week's activity by discussing what a request is and how to make one for fruits and vegetables		
Total time spent teaching: _____		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		

Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 5

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 5 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Allowed 1 or 2 students to share their recipe with the class		
2. Explained that recipes from each classroom will be taste tested and students will vote for a winning recipe to be featured on the school lunch menu		
3. Discussed what it is to make a request		
4. Discussed why parents don't want to buy fruits and vegetables that go to waste (because their kids don't eat them)		
5. Discussed solution to barrier by asking parents what students like instead of what they don't like		
6. Discussed how to make a request by: noticing something you like>making a positive statement>making a request		
7. Gave examples of a request and had students identify the "positive statement" and the "request"		
8. Explained and went through the directions for the "Making Requests" activity, emphasizing the need for it to be related to fruits and vegetables		
9. Asked the students to take the worksheet home and have parents sign		
10. Discussed what a poll is and explained next week's recipe taste test and poll taking activity		
11. Explained how the most voted recipe from all 5th grade classrooms will be served to the entire school at lunch time		
Total # of recipes collected: **_____**		
Total time spent teaching: **_____**		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		

Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____** _____
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 6

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 6 **Date of lesson:** **Staff Initials:**		
Total time in preparation** (i.e. planning/gathering materials)**: _____		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Recapped what a poll is		
2. Explained how to fill out polling papers and passed them out		
3. Instructed students to taste each recipe and take sips of water in between bites and suggested they vote only for themselves		
4. Recapped the purpose of the Wellness Committee and updated the students on their classmate's attendance to the Wellness Committee's last meeting		
5. Discussed what media is and how it influences our fruit and vegetable choices		
Total time spent teaching: _____		
Participant Behavior: Please circle the number corresponding to your response:		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		
Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**		

Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 7

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Block 4		
Lesson 7	**Date of lesson:** **Staff Initials:**	
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Announced winning recipe and instructed the students to keep the winning recipe a secret until other 5th graders know about it too		
2. Discussed food advertising and how it can affect what we eat		
3. Used Food Ads activity and asked students to point out healthy vs. unhealthy foods		
4. Discussed how most advertising money is spent on unhealthy foods, are aimed at children and their appearance in movies is not a coincidence		
5. Discussed that fruits and vegetables are not as heavily advertised because growers lack funds and prompted students to ask themselves to think if people would eat more fruits and vegetables if there was more advertising for them		
6. Asked students if the brand name of a food affects what they eat *(gave Tropicana orange juice example)*		
7. Explained and went through "brand name" activity directions		
8. Discussed what a slogan is and introduced next week's lesson about how students will come up with slogans and posters for fruits, vegetables, and the winning recipe		
9. Passed out and went through "Add Up the Ads" worksheet		
Total time spent teaching:_____		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		

Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 8

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 8	**Date of lesson:** **Staff Initials:**	
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Collected "Ad Up the Ads" homework and discussed how many students saw an ad for unhealthy food and for fruits and vegetables during the past week		
2. Explained what slogans are and do		
3. Played the 6 cards from the Media Slogans Game		
4. Explained that students will be writing slogans for fruits and vegetables		
5. Read through "Top 10 Reasons to Eat Fruits and Vegetables" handout		
6. Explained that every advertisement has a picture with and that students will be creating posters for each of their slogans		
7. Explained the "Writing Slogans" group activity and showed an example of a slogan and a sketch poster		
8. Explained that students will be creating their posters in art class		
Total time spent teaching: **_____**		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		
Participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**		

Is there any material relevant to the session that you added or feel should be added?   **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 9

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Block 5		
Lesson 9 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Introduced morning announcement project		
2. Discussed why posters and announcement are important to reach an audience		
3. Explained how advertising messages try to get people to do or buy things		
4. Discussed the students' purpose and importance of creating their ads (to get people to eat more fruits and vegetables)		
5. Introduced writing a persuasive message activity by discussing the 3 messaging strategies (feel good, information and build trust)		
6. Went through examples of messages and had students decide which type of message each was		
7. Instructed the students to write their own persuasive messages using the messaging strategies		
8. Went through Creating Messages Guide handout and instructed students to use for their messages		
9. Allowed each group to share one message they created		
10. Prompted students to share one thing they learned about advertising from doing the activity		
11. Explained that posters and slogans are up on the school walls and that morning announcements will be read next week		
12. Introduced poll taking practice for next lesson		
Total time spent teaching: **_____**		
Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.		

Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**
Participants are attentive, engaged, and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Educator Notes/Comments:

NE-RNECE
Objectives & Activities Checklist – Lesson 10

School Name: _____ **Class day: _____**
Teacher: _____ **Class time: _____**
Room #: _____

Instructions for educators: Please read carefully and fill in as required.

Lesson 10 **Date of lesson:** **Staff Initials:**		
Total time in preparation *(i.e. planning/gathering materials)**:*** **_____**		
Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Discussed what a poll is and explained that students will be taking a poll of entire school during lunch to see how much they like the new recipe		
2. Asked students and explained what data is by showing an example		
3. Explained that the poll will ask students how much they liked the recipe by either zero, one or two thumbs up		
4. Asked students why it is important to collect data the exact same way and explained by data has to be accurate		
5. Showed an example of different ways you can give a poll and get different answers and explained the difference		
6. Passed out and went through the poll taking script		
7. Allowed students to practice with each other using iPads		
8. Explained that after each lunch period, students will go to each classroom and office in their school to collect their polling data		
Total time spent teaching: **_____**		
Participant Behavior: Please circle the number corresponding to your response:		
Participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**		
Participants are attentive, engaged, and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive)		

Comments:
Is there any material relevant to the session that you added or feel should be added? **Is there any material that you deleted or were unable to cover?** **□ Yes □No If yes, please specify**:_____ _____ _____
Educator Notes/Comments:

APPENDIX C

OBSERVATION CHECKLISTS

NE-RNECE
Observations Form – Lesson 2

School Name: _____ Teacher: _____
Room #:_____ Date of Lesson: ____/____/____ Time started: ____ Time ended: ____
Facilitator: _____
Observer: _____

Instructions for observers: Please read carefully and fill in as required.

Lesson 2

Total number of student attendance: _____

Please check "yes" or "no" to indicate if each of the major objective(s), activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Recapped the purpose of the Wellness Committee		
2. Discussed why it is important to tell the Wellness Committee about fruits and vegetables		
3. Asked students to answer "What are some of your barriers to eating fruits and vegetables"		
4. Identified top barrier to eating more fruits and vegetables		
5. Lead students to brainstorm solutions or strategies for overcoming their top barrier		
6. Drafted the final letter to the Wellness Committee including their barriers and solutions		
7. Read the final draft of the letter to the class		
8. Asked the students if anything else should be added to the letter		
9. Passed the signature sheet around the classroom for students to sign their name		
10. Explained what an "Environmental Scan" is, deconstructing the words "environment" and "what it is to scan"		
11. Explained that 2 students from each school and their parent(s) will join the Pawtucket Wellness Committee		
12. Lead students in reflecting on what they learned on today's lesson		
13. Asked students if they have ever followed a recipe		
14. Introduced next lesson: the importance of following a recipe		

***Total time spent teaching:* _____**

Participant Behavior: Please circle the number corresponding to your response and comment on each aspect below.

Overall, the participants demonstrated a sense of understanding of the lesson. **1** **2** **3** **4** **5** (did not understand) (understood everything) **Comments:**
Overall, the participants are attentive, engaged and interactive with the educators. **1** **2** **3** **4** **5** (not attentive at all) (very attentive) **Comments:**
Is there any material relevant to the session that was added or feel should be added? **Is there any material that was deleted or was unable to cover?** **□ Yes □No If yes, please specify:_____** **_____**
Observer Notes/Comments:

NE-RNECE
Observation Form – Lesson 6

School Name: _____ Teacher: _____
Room #:_____ Date of Lesson: ____/____/____ Time started: ____ Time ended: ____
Facilitator: _____
Observer: _____

Instructions for observers: Please read carefully and fill in as required.

Lesson 6

Total number of student attendance: _____

Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Collected Making Requests worksheet		
2. Introduced the lesson		
3. Recapped what a poll is		
4. Explained how other 5th graders will also taste and vote on the recipe		
5. Explained the criteria for choosing the two recipes the students will be tasting		
6. Passed out polling paper to each student		
7. Explained how to fill out polling papers		
8. Passed out both recipes at the same time		
9. Suggested that students vote only for themselves		
10. Collected the completed polling papers from the students		
11. Recapped the purpose of the Wellness Committee		
12. Students seem to understand what the purpose of the Wellness Committee is		
13. Allowed the student that attended the Wellness Committee's meeting to give their update and/or the educator filled-in as needed 14. **Comment**:		
15. Announced that next week the recipe winner will be revealed		
16. Asked students if they know what media is		
17. At least one student raised their hand/answered the question		
18. Explained and discussed what "media" is		

Total time spent teaching: _____

Is there anything the participants had difficulty with?
□ Yes □No If yes, please specify:

Is there anything that they particularly enjoyed?
□ Yes □No If yes, please specify:

Is there any material relevant to the session that was added or you feel should be added?
□ Yes □No If yes, please specify:

Is there any material that was deleted or was unable to cover?
□ Yes □No If yes, please specify:

Is there any material relevant to the session that you think should be deleted/modified?
□ Yes □No If yes, please specify:

Observer Notes/Comments about the curriculum/lesson as a whole:

NE-RNECE
Observations Form – Lesson 8

School Name: _____ Teacher: _____
Room #:_____ Date of Lesson: ____/____/____ Time started: _____ Time ended: ___
Facilitator: _____
Observer: _____

Instructions for observers: Please read carefully and fill in as required.

Total number of student attendance: _____		
Please check "yes" or "no" to indicate if each of the major objective, activity or point to make below was covered when the session was taught.	**Yes**	**No**
1. Asked students raise their hands if they saw an ad for fruits or vegetables in the last week		
2. At least one student rose their hand to participate		
3. Asked students to raise their hand if they saw an ad for an unhealthy food in the last week		
4. At least one student rose their hand to participate		
5. Collected "Ad Up the Ads" homework		
6. Explained that students will be writing slogans for fruits, vegetables, and winning recipe		
7. Explained what slogans are and do		
8. Posted up the Slogans poster		
9. Played the 6 cards from the Media Slogans Game		
10. Overall the students understood the game		
11. The students actively participated in the game		
12. Passed out "Top 10 Reasons to Eat Fruits and Vegetables" handout		
13. Read through "Top 10 Reasons to Eat Fruits and Vegetables" handout		
14. Instructed students to use the handout when writing their slogans		
15. Asked students what do advertisements have besides catchy phrases		
16. At least one student came up with an answer		
17. Explained that every advertisement has a picture with it		
18. Students will be creating posters with pictures for each of their slogans		
19. Explained goal for the project		
20. Explained the "Creating Slogans and Posters" group activity		
21. Showed an example of a slogan and a sketch poster		
22. Collected each group's slogans into one folder and handed it to the classroom/health teacher		
23. Explained that students will be creating their posters in art class		
24. Explained that posters will be displayed		
25. Explained <u>why</u> posters will be displayed		
Is there anything the participants had difficulty with? **□ Yes □No If yes, please specify:**		

Is there anything that they particularly enjoyed?
□ Yes □No If yes, please specify:

Is there any material relevant to the session that was added or you feel should be added?
□ Yes □No If yes, please specify:

Is there any material that was deleted or was unable to cover?
□ Yes □No If yes, please specify:

Is there any material relevant to the session that you think should be deleted/modified?
□ Yes □No If yes, please specify:

Observer Notes/Comments about the curriculum/lesson as a whole:

APPENDIX D

RUBRICS

NE-RNECE - Fruit and Vegetable Recipes from Home (Lesson 5) Grading Form

Student's name: _____
School name: _____
Classroom teacher's name: _____ Room #: ___
Evaluator's name: _____
Recipe name: _____

Directions: Please check "Yes" or "No" for each of the following criteria.

	Writing a Recipe Criteria	Yes	No	Sometimes
1.	Main ingredient is a fruit or a vegetable.			
2.	Ingredients: precise amounts are given.			
3.	Ingredients: correct abbreviations (Tbs= tablespoon, tsp= teaspoon) and/or correct measurements (cups) are given.			
4.	Directions: Step-by-step directions are provided.			
5.	Directions: all ingredients are used in the directions.			
6.	Directions: cooking times and temperatures are provided (when appropriate)			
7.	Method and preparation for each ingredient is given (i.e. minced, chopped, etc.)			
	"Yes" total:			

Comments:

NE-RNECE - Making Requests Worksheet (Lesson 6)

Grading Form

Student's name: _____
School name: _____
Classroom teacher's name: _____ Room #: _____
Evaluator's name: _____

Directions: Please check "Yes" or "No" for each of the following criteria.

	Making Requests Worksheet Criteria	**Yes**	**No**
1.	Part A, Step 1 is filled-in correctly.		
2.	Part A, Step 2 is filled-in correctly.		
3.	Part A, Step 3 is filled-in correctly.		
4.	Part B, Step 1 is filled-in correctly.		
5.	Part B, Step 2 is filled-in correctly.		
6.	Contains an adult signature.		
	"Yes" total:		

Comments:

NE-RNECE - Creating Messages (Lesson 9)
Grading Form

Group names: _____
School name: _____
Classroom teacher's name: _____ Room #: _____
Evaluator's name: _____

Assigned message topic (Circle one): Fruits Vegetables Recipe

Directions: Please check "Yes" or "No" for each of the following criteria.

	Creating Messages Guide Criteria	Yes	No
1.	Writes about assigned topic.		
2.	Used at least one of the messaging strategies (appealing to emotions, giving information, or build trust)		
	"Yes" total:		

Comments:

APPENDIX E

FOCUS GROUP AND INTERVIEW GUIDES

EFNEP-Enhanced PSE Program

Student Focus Group Moderator Guide

Time: 30 minutes

Audience: current 5th graders; 4-5 per focus group

Objectives:

1) Do the students feel they made or will make any changes in their food and beverage behavior as a result of the program, and if so how will they make these changes?

2) What were some barriers of difficulties they encountered during the program lessons? If any, what changes would they like to see in the future?

3) If the program was helpful in making any changes, what was it exactly about the program that helped?

4) What activities did they enjoy or would like to see more of?

To help the students answer honestly and encourage participation, make them feel welcome. Explain that there is no right or wrong answers and that they are not being judged or graded on what they say. Preface with explanation that they are here to help us determine what works and what does not work with implementing the PSE-enhanced lessons.

Directions for Moderator:

		Notes
Introduction • Thank you • Your name • Purpose • Confidentiality • Duration • How the focus group will be conducted • Opportunity for questions • Written/Verbal consent?	**Say,** Thank you so much for coming! My name is _____ and this is _____ and we would like to talk to you about your experiences participating in the URI Nutrition Grant. Our time here should take about 30 minutes. _____ will be taking notes during this time just so we don't miss anything that you say. Some of the things you say will only be shared with a few other of our team members. I am going to ask some questions and after	

	each question I will give you some time to answer aloud. You don't have to speak in order. If you want to answer a question, you can, just be sure not to talk over another student. You do not have to answer a question if you don't want to but just so you know, there are no right or wrong answers and you will not be graded on anything you say. We are only asking you to be as honest as possible so you can help us improve our program. Do you know what it means to be honest? Do you have any questions about what I explained before we get started?	
Ice-Breaker • Name tags • Markers	Start by writing your names on these tags so we can get to know each other a little better. Do you remember the two recipes that you voted for in your class? Which were they? Let's go around the circle and say which recipe you voted for and why you liked it.	
Questions • Big post-it paper • Marker	1) What do you remember learning about this past year in your nutrition class? 2) What foods are you eating more and what foods are you eating less than before the classes? a. Probe: Learning is one thing, but actually doing something because of it is another! For example, we can learn that milk is healthy to drink every day, but it does not mean we will do it, right? So, is there anything you learned that had an effect on what foods you eat? b. Probe: Do you plan to change the food you eat and drink? Can you explain how? 3) What were some things that you liked doing in this class? a. Probes: Writing a letter to the Wellness Committee? Creating advertisements and slogans? Writing a recipe with your family/guardian? Taste testing the	

	recipe? Taking polls from the school? 4) What are some things that you didn't like doing in this class? a. Probe: Is there anything you would change about the class? 5) What sort of changes would you like to see in the food they are serving at school? 6) You worked on recipe testing this year; would you like to do that again or is there something else that you would like to work on?	
Closing • Additional comments • Thank you • Incentives	Does anyone have anything else that they would like to say about the nutrition class? Thank you so much for meeting with me today! All of your comments have been very helpful.	

EFNEP-Enhanced PSE Program

EFNEP Educators Focus Group Moderator Guide

Time: 30 minutes

Moderator: Silvia

Note taker: Joanna

Audience: EFNEP educators – Katelyn, Joy, Chanthy

		Notes
Introduction • Thank you • Purpose • Confidentiality • Duration • How the interview will be conducted • Opportunity for questions	**Say,** Thank you so much for taking the time to meet with me today. I would like to talk to you about your experiences as educators in the URI Nutrition Program. As part of our program evaluation we are assessing program effectiveness and acceptability. What you have to say will help improve the program for future interventions. _____ will be taking notes during this time just so I am sure to get it all down. All responses will be kept confidential and will only be shared with the other research team members. Any information that's included in the final report will not identify you as the respondent. You do not have to answer a question if you don't want to and may end the interview at any time. Do you have any questions before we get started?	
Questions	1) What were some barriers, if any, that you encountered with the program/curriculum? Probe: lesson 4 – role playing activity, confusing Lesson 8 – slogans activity Lesson 9 – writing messages activity 2) What strategies or components from the curriculum would you recommend be discontinued? Would you just get rid of this component or would you change/alter it? 3) What worked well? Please elaborate	

	4) What strategies or components from the curriculum would you recommend be sustained and/or expanded? 5) What effect, if any, do you feel the intervention/program had on the students? a. Probes: Increased student knowledge? Improved student dietary habits? Changes to the school environment? 6) What other recommendations do you have for future implementation of this program? 7) This year, the students worked on recipe testing and changing their food environment; what other sort of interventions would you like to see in the future?	
Closing • Additional comments • Thank you	Is there anything else that they would like to add? Thank you so much for your time to meet me today.	

Teacher Interviews- Education/Curriculum issues

		Notes
Introduction • Thank you • Your name • Purpose • Confidentiality • Duration • How the interview will be conducted • Opportunity for questions	**Say,** Thank you so much for taking the time to talk with me today. My name is _____ and I would like to talk to you about your experiences participating in the EFNEP-enhanced PSE Nutrition Program. As part of our program evaluation we are assessing program effectiveness and acceptability. What you have to say will help us improve our program for future interventions. I will be recording the session because I don't want to miss any of your comments. However, I will also be taking notes during this time just so I am sure to get it all down. Because we're going to be recorded, I would just like to ask you to please be sure to speak up so that we don't miss any of your comments. All responses will be kept confidential and will only be shared with the research team members. Any information that we include in our final reports will not identify you as the respondent. You do not have to answer a question if you don't want to and may end the interview at any time. Do you have any questions before we get started?	
Questions	1) What strategies or components from the curriculum would you recommend be discontinued? 2) Would you just get rid of this component or would you change/alter it? 3) What worked well? Please elaborate 4) What strategies or components from the curriculum would you recommend be sustained and/or expanded?	

	5) What effect, if any, do you feel the intervention/program had on the students? b. Probes: Increased student knowledge? Improved student dietary habits? Changes to the school environment? 6) What other recommendations do you have for future implementation of this program? 7) This year, the students worked on recipe testing and changing their food environment; what other sort of interventions would you like to see in the future? 8) Did the students receive any sort of additional teaching regarding Policy, Systems and Environmental change before the start of the URI Nutrition Program? a. If so, what sort of information did they receive or talk about?	
Closing • Additional comments • Thank you	Is there anything else that they would like to add? I'll be analyzing the information you and others gave me and submitting a final report. I'll be happy to send you a copy to review at that time, if you are interested. Thank you so much for your time to meet me today.	

Food Service Director & Principal Interviews- Environmental Issues

		Notes
Introduction • Thank you • Your name • Purpose • Confidentiality • Duration • How the interview will be conducted • Opportunity for questions	**Say,** Thank you so much for taking the time to meet/talk with me today. My name is _____ and I would like to talk to you about your experiences participating in the EFNEP-enhanced PSE Nutrition Program. As part of our program evaluation we are assessing program effectiveness and acceptability. What you say will help us improve our program for future interventions. I will be recording the session because I don't want to miss any of your comments. However, I will also be taking notes during this time just so I am sure to get it all down. Because we're going to be recorded, I would just like to ask you to please be sure to speak up so that we don't miss any of your comments. All responses will be kept confidential and will only be shared with the research team members. Any information that we include in our final reports will not identify you as the respondent. You do not have to answer a question if you don't want to and may end the interview at any time. Do you have any questions before we get started?	
Questions	1) What were some barriers, if any, that you encountered with the program? 2) What strategies or program components would you recommend be discontinued? Would you just get rid of this component or would you change/alter it? 3) What worked well? Please elaborate 4) What strategies or program components would you recommend be sustained and/or expanded? 5) What effect, if any, do you feel the intervention/program had on the school? a. Probes: Improved student dietary habits? Changes to the school environment?	

	6) What other recommendations for you have for future implementation of this program? 7) This year, the students worked on recipe testing and changing their food environment; what other sort of interventions would you like to see in the future?	
Closing • Additional comments • Thank you	Is there anything else that they would like to add? I'll be analyzing the information you and others gave me and submitting a final report. I'll be happy to send you a copy to review at that time, if you are interested. Thank you so much for your time to meet me today.	