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Teacher Evaluation of An Integrated Nutrition Curriculum For Mississippi Schools

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TEACHER EVALUATION OF AN INTEGRATED NUTRITION CURRICULUM FOR MISSISSIPPI SCHOOLS

By
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DEDICATIONS

This study is dedicated to my loving and supportive family and friends. Without your constant encouragement and love, I would not be the person I am now. I cannot thank you all enough for all that you have done.

Most importantly, I want to thank God for giving me peace and seeing me through my darkest moments. I cannot imagine life without you. I want to thank you for the people who have come into my life throughout undergrad that provided me with life lessons and wisdom to endure this incredible academic journey.

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ABSTRACT

The prevalence of childhood obesity in the United States has more than tripled over the last four decades from 5 percent in 1978 to 18.5 percent in 2016, and according to the Mississippi Obesity Action Plan, 40.4% of Mississippi elementary school children (grades K-5) were either overweight or obese. Some reports have suggested that Mississippi's overall obesity rate could reach 66.7% by 2030. Although the literature on best practices for the prevention of this condition is limited, some success has been achieved through the use of school-based nutrition interventions, in which children are taught how to make healthy food choices. As of 2020, Mississippi does not have a statewide nutrition education curriculum, but in 2019, the University of Mississippi School of Education and Department of Nutrition and Hospitality Management reported the creation of *Fuel to Learn*, an integrated standards-based curriculum incorporating nutrition-related concepts into the teaching of mathematics and language arts. This study reports the results of a survey and focus group that were conducted with fifth grade teachers from an elementary school in north Mississippi as they evaluated the *Fuel to Learn* program. They answered predetermined survey questions explaining why they would or why not implement this nutrition-based curriculum in their classrooms in an aim to identify the limitations and the highlights of the *Fuel to Learn* program. The results indicated that time, lack of resources, state standards, and parent involvement would affect whether a nutrition program is implemented and successful. The teachers responded very favorably to *Fuel to Learn*, leading to the conclusion that this program has the potential to make a positive impact across the state.

INTRODUCTION

Over the last four decades many correlates of life expectancy have shown improvement, but the prevalence of obesity has risen worldwide (NCD Risk Factor Collaboration, 2017). Obesity has become extremely prevalent in the United States: 18.5% of children and 39.8% of adults are obese (Hales et al., 2017) with the childhood obesity rate tripling over the last 40 years (Anderson et al., 2019). The adults and youth within the state of Mississippi report the highest obesity prevalence at 34.0% and 23.9% respectively (Gamble et al., 2012). Obesity, however is not just an increase in body size. The American Society for Metabolic and Bariatric Surgery stated that the increase in the obesity rate could result in increased rates of disease, diabetes, and hypertension (n.d).

Overweight children are more likely to become overweight adults and develop chronic diseases as a result. Research on this topic states that the statistics continue to rise more every day (Avery et al., 2013). The most profound increase has been in the 5-19 age group, where the global rate of overweight increased from 10.3% in 2000 to 18.4% in 2018 (McDonnell, 2019; Scaglioni et al., 2018). Pediatric obesity could decrease the lifespan of today's children by three to five years, creating the first generation who are not expected to outlive their parents (Avery et al., 2013). One of the factors that contributes to the development of obesity and other illnesses is the ineffectiveness of childhood health and wellness programs. Past programs have been inefficient due to national, state and local gaps within the wellness implementation. It is important to understand the ways in which health and wellness programs affect children at an early age, however, the research concerning this issue is limited.

School environments can be a desirable intervention setting that could influence the health of young children and promote education to reduce obesity because they provide benefit to all students regardless of weight status (Qi and Niu, 2015; Davis et al., 2007). In general, many researchers agree that unhealthy eating behaviors learned during childhood are carried into adulthood, but if children are taught to eat healthier, they will adopt new behaviors (Scaglioni et al., 2018; Birch et al., 2007). Children in elementary school and their parents should be able to acquire the tools needed to influence better eating choices and stop the early presence of health problems.

Currently, the state of Mississippi does not have a statewide nutrition education curriculum. However in 2018-19, the University of Mississippi School of Education and Department of Nutrition and Hospitality Management developed and tested *Fuel to Learn*, a curriculum that integrates standards from the Mississippi Department of Education's *2012 Contemporary Health Education Curriculum* (2012) and the *Mississippi College- and Career-Readiness Standards* in mathematics and language arts (Wright et al., 2016) and found that the program successfully addressed several barriers to nutrition education delivery in elementary classrooms (Stapp, Valliant, Knight, & Goldthorpe, 2019). They also called for a follow-up research with teachers to determine likelihood of and possible barriers to adoption. The purpose of this thesis is to explore the problem, causes, and prevention of childhood obesity and, in a survey and focus group with elementary teachers, to examine the feasibility of using *Fuel to Learn* to teach math and language arts.

LITERATURE REVIEW

Obesity rates like these can lead to higher rates of chronic diseases, and in 2012, 330 million people in the world were suffering with type 2 diabetes. (Van Abeelen et al., 2012). The American Heart Association (2014) stated that 23.9 million children ages 2 to 19 are overweight or obese. Of these children, 12.7 million are obese (Statistical Fact Sheet 2014 Update, 2013). Researchers agree that unhealthy eating behaviors learned during childhood can be carried into adulthood (Scaglioni et al., 2018). If the incidence of pediatric obesity does not improve, it could decrease the lifespan of children by a few years (Avery et al., 2013).

Childhood Obesity

The prevalence of overweight and obesity is the highest in the 16 – 19 years age group with 41.5% being overweight or obese (Skinner et al., 2018). These statistics highlight a major public health problem which has, as yet, not been successfully addressed. Research on childhood obesity is limited, underlining the urgency for further research on how childhood nutritional behaviors have an effect on health in adulthood. An abundance of calorie-dense foods, larger portion sizes, and less physical activity has contributed to the high rates of childhood obesity in our nation (Lieb, 2009). This new food-environment, rich in a variety of processed foods (with added sugar and fat), followed by progressively larger portions, has allowed for an excessive and unbalanced intake of energy and nutrients (Nestle et al., 2000). According to Avery et al. (2013) incidence of pediatric overweight continues to pose significant national health threats due to associated comorbid chronic conditions. Economists have found that obesity is correlated with morbidity, increased medical costs, and mortality; the sharp time trends in the prevalence of

obesity suggest that something in the environment may have changed to make that short-term versus long-term decision-making more challenging: food prices or access, technology, family structure, the built environment, to name a few (Anderson et al., 2019). Interventions to address health behaviors of children often focus on the school environment because of the opportunity to have an impact on child health through nutrition education and optimization of the school food and physical activity environments (Avery et al., 2013). Until the barriers surrounding childhood nutrition education is addressed, childhood obesity could potentially continue to be an issue.

Childhood Obesity in Mississippi

The Centers for Disease Control and Prevention (CDC) determined that the prevalence of overall obesity in the United States remains high at 39.8%. Moreover, childhood obesity rates remained at 18.5% from 2013-2014 to 2015- 2016, indicating no decline (Hales et al., 2017). Gray et al. (2016) stated that the state of Mississippi ranked second highest in the prevalence of childhood obesity in the United States. In Mississippi, 25.4% of youth ages 10 to 17 are obese, giving Mississippi a ranking of 1 out of 51 for this age group among all states and the District of Columbia (*State Briefs, 2017-2018*).

Elementary school children living within a low socioeconomic status in Mississippi, especially in the Mississippi Delta, are at high risk of developing obesity along with other childhood diseases. According to data from a cross-sectional survey, Children and Youth Prevalence of Obesity, of 475,680 K-12 students in 894 public schools in Mississippi, adults and youth reported the highest obesity prevalence in the U.S. (Gamble et al, 2012). One reason for these high rates of obesity in Mississippi is the fact that there is a higher incidence of obesity in African American community than in the white population (Qobadi & Payton, 2017). In 2010,

37.0% of Mississippians were African American, compared with 12.6% of the general Americans population (Gray et., 2016). African American females had a higher rate of obesity compared to African American males, while, there was no significant difference in rate of obesity by gender in whites. The prevalence of obesity was significantly lower in white adults with college degree while the prevalence of obesity was not significantly different by education levels in black adults (Qobadi & Payton, 2017).

Gamble et al. (2012) studied obesity and its link to health risks in children in 11 schools from 3 school districts in 2 counties in the Mississippi Delta. The purpose of the study was to see whether school health policies contributed to the obesity rate. The researchers claimed that youths and adults in the Mississippi Delta had exceeded the obesity rates in the state and the nation. After measuring body mass index (BMI), waist circumference (WC), and waist-to-height ratio (WHtR) of the elementary school students, they concluded that in the MS Delta, the prevalence of overweight and obesity among children is a significant health issue (Gamble et al., 2012). In comparison to national percentages of childhood overweight (15.9%) and obesity (19.6%), the sample from the current investigation had substantially higher percentages of overweight (18.3%) and obesity (28.8%) (Gamble et al., 2012). Gamble et al., (2012) also reported that there were clear disparities between black and white students, with black students increasingly having a higher obesity rate over time. The findings suggested that the obesity epidemic is continuing to manifest in minority children of low socioeconomic status at an increasingly younger age and in particular, the MS Delta has a higher prevalence of obesity in comparison to state and national levels (Gamble et al., 2012).

School-Based Nutrition Interventions

School environments represent a desirable intervention setting that could influence the health of young children and promote interventions to reduce obesity because they provide benefits to all students regardless of weight status (Qi & NIU, 2015; Davis et al., 2007). Due to the childhood obesity rates increasing in the United States, there has been an explosion of food-based obesity prevention in the US public school systems over the last decade (Aloia et al., 2016). Because the US government mandates school attendance for children and adolescents, school-based nutrition programs have become increasingly prevalent to prevent this trend (Aloia et al., 2016).

In a systematic review of school-based nutrition interventions, Aloia et al., (2016) reviewed the literature for evidence of the effectiveness of school-based nutrition interventions on fruit and vegetable consumption (Aloia et al., 2016). The researchers used PubMed to search for articles on school-based interventions that measured students' fruits and vegetable consumption (Aloia et al., 2016). They found 14 articles that met the criteria they were looking for. After reviewing the included studies, they found that two of the most common interventions were parent or family- or teacher-centric (Aloia et al., 2016). They found a negative relationship between students' consumption of fruit and vegetables and parents and teachers "telling" them to consume more. They also found that the perceived norm of parental eating behavior was a significant factor in what their children chose to eat (Aloia et al., 2016).

Avery et al., (2013) discussed a method that they found would be suitable to bridge the gap within school wellness programs. The researchers noticed that school wellness programs had become inefficient over time due to the divide between nutritional education and cooperation with the school administration. Due to the failure of communication within administration, young children started to develop obesity, cardiovascular diseases, asthma, and other diseases.

As a way to combat the growing issue among children, Avery et al., (2013) suggested adding nurses to monitor and enforce the school wellness programs. This was done as a way to figure out why they had a limited amount of success within a program they had implemented (Avery et al., 2013). Similarly, Knight et al. (2017) suggested the use of registered dietitians in schools to help with nutrition education and obesity prevention programming.

In addition to the challenges of implementing these programs in schools, researchers found that families play a large role in the way young children choose to eat. Families create a metaphorical barrier between childhood nutrition programs and the young children.

To understand why the success of their program was fragmented, Avery et al. (2013) interviewed 44 teachers and asked 8 qualitative, open-ended questions about involvement in and implementation of the Coordinated Approach to Child Health (CATCH) initiatives. Although school personnel were initially enthusiastic about adopting an intervention program, during the implementation phase, they were hindered by competing constraints. These constraints were identified as structured curricula that interfered with the health education and physical activity programs, the lack of personal knowledge of health and wellness, and lack of professional health care staff to serve as a resource for support and guidance. The researchers found a correlation between late childhood and adulthood, but to acquire a better understanding of underlying mechanisms between child development and nutrition and health more investigations from biological and social perspectives are still needed (Qi & Niu, 2015).

School-Based Nutrition Interventions in Mississippi Delta

Although Mississippi is making modest progress in childhood obesity prevention and reduction; most of the recent benefits are seen in white children (Knight et al., 2017). In 2012,

evaluators of the Mississippi Healthy Students Act observed that obesity rates stabilized in Mississippi public school children as a whole (Knight et al., 2017). Once the population-level statistics were disaggregated, they show that from 2005 to 2011, obesity in white male and female, and African-American male children remained constant but obesity in African-American females increased every year (Knight et al., 2017). In 2013, obesity rates among all black students was significantly higher than in white students (Knight et al., 2017).

As a way to combat the steady obesity increase among African Americans, Knight et al. (2017) implemented a school-based nutrition intervention called *Eating Good and Moving Like We Should (EGMLWS)* in the Mississippi Delta. *EGMLWS* was a school-based nutrition and physical activity education program designed to address overweight and obesity in the Mississippi Delta and north Mississippi regions by helping children make healthier nutrition and physical activity choices (Knight et al., 2017). This particular school-based intervention was intended to further help prevent childhood obesity in the Mississippi Delta, a region where adult obesity rates (38.9%) is higher than any other region in Mississippi (Knight et al., 2017). Implementation of the nutrition education involved preparation of lesson plans, development and delivery of teacher training, modeling the instruction and evaluation of student knowledge (Knight et al., 2017). The participating schools agreed to all the components of the intervention from nutrition education from a registered dietitian nutritionist to physical exercise and school gardens (Knight et al., 2017). After receiving nutrition education in the classroom, the children's knowledge of nutrition education increased significantly. Previous studies had shown that increases in knowledge and attitudes can lead to desired health behaviors (Knight et al., 2017), so

Knight et al. (2017) measured pre- and post- intervention nutrition and physical activity knowledge and pre- and post-intervention measures of nutrition and physical activity attitudes and behaviors. The results indicated a movement toward healthier habit.

Gray et al. (2016) interviewed parents and teachers of elementary school children in the Mississippi Delta. The purpose of this study was to see if there was any correlation between the unhealthy eating habits children displayed at school and the way they ate while at home. The researchers created 12 different focus groups composed of parents and teachers, separately, to analyze the common themes that persuaded the children to eat a certain way and to allow them to express things they would not normally say in a one-on-one interview. The study showed that the children were only indulging in junk food and making unhealthy food choices (Gray et al., 2016). Gray et al. (2016) later found out that "'families used food to show affection", "teachers received negative feedback while directing kids to choose healthy foods", and "parents eat the wrong things'".

If the issue of unhealthy childhood eating habits is to be mitigated, more research is necessary. At the present time, the research on childhood obesity is limited, underlining the urgency for further research if people are to understand how childhood nutritional behaviors have an effect in adulthood and what possible effects it may have on future generations. Knight et al. (2017) and Gray et al. (2016) studies showed that school children and their parents in the Mississippi Delta need help to increase their knowledge of nutrition education to influence better eating choices and stop the early presence of health problems. With further research, people will be able to obtain a better understanding of the importance of good nutritional health for children and the later benefits in adulthood.

Barriers to Nutrition Education

Fifty-six million children were enrolled in schools in the United States (US) in 2008-2009 (Hammerschmidt et al., 2011). Ogden et al. (2015) reported data from the National Health and Nutrition Examination Survey that stated, "From 1999-2014, obesity prevalence increased among adults and youth." Over the past few decades, schools have emerged as a primary target of interventions designed to slow or reverse the troubling trend of childhood obesity (Jones et al., 2015). Schools have been the ideal setting to reach children because they spend the majority of their time in a classroom. Despite numerous efforts to provide nutrition education in the past, childhood obesity is still prevalent today. There are several barriers that have blocked the progression of nutrition education in schools across the nation.

One of the major issues in implementing nutrition education in schools is the lack of time for education that is not represented on the state tests. Although the federal government has helped increase support for child nutrition education programs, they do not require states to mandate nutrition education in elementary schools. In 2002, President George Bush signed into law a piece of groundbreaking educational reform legislation called the No Child Left Behind Act (NCLB) (P.V. Pederson, 2007). The NCLB increased accountability through testing and teacher certification, greater school choice for students through vouchers, and more flexibility for state and local education agencies to spend money as they see fit as long as Annual Yearly Progress (AYP) is attained (P.V. Pederson, 2007). This AYP is measured by each state through the administration of yearly tests

Pederson conducted a national survey, developed by researchers, that explored the nation's view on the act and discussed trends and issues that emerged (2007). After the respondents sent in their responses, 25 states reported that a reduction of resources and time for

non-tested subject areas were an issue for them. There was a greater focus of resources and responsibilities for accountability purposes, which gave less attention to non-tested subject areas (P.V. Pederson, 2007). The non-tested subject area became a less important part of the normal curriculum. Educators were too busy with the tested subject areas that there was no pressure to focus on fine arts, physical education, or health (P.V. Pederson, 2007). The NCLB mandated what and when specific subjects were assessed because of the economic cost of implementing the mandate (P.V. Pederson, 2007).

In Mississippi, it is policy that elementary school children receive 45 minutes of health education weekly. Nonetheless, health education is not a state tested subject area at the elementary level, so many schools do not address it in their daily curriculum (Stapp et al., 2019). In a research study conducted by Cho and Nadow (2004), food service directors were aware that coordination between the classroom and the cafeteria was critical for the successful implementation of nutrition education, but indicated that they lack the time for collaboration. Some teachers simply stated that there was not enough time in a school day to teach nutrition education (Hammerschmidt et al., 2011). More communication will have to be in order for collaborations to happen between the different staff members.

Researchers have found that parental support has also been a limitation to the advancement of nutrition education. When nutrition messages are not being reinforced at home, students were less than likely to choose something nutritious over junk food (Hammerschmidt et al., 2011). In a study conducted by Gray et al. (2016) one parent stated, “I was brought up to eat what you were supposed to eat and you know you have your junk food but as long as you’ve got the right food you’ll be okay.” Another parent chimed in and said, “‘Let them know what is good for them. If you keep them away from chips, that’s where they’ll run. Give them chips and give

them fruit, tell them to keep a balance between the two, and I think they'll be fine." In both cases, the parents expressed ambivalence about junk food, believing that some junk food was ok (Gray et al., 2016). Health educators consistently pointed out that parental involvement is crucial in promoting student support and making the quality lunch programs a success. Lack of parental involvement was observed in several areas. Some stated that parents often send junk food in ''causing students to eat only the empty calorie snacks" (Cho & Nadow, 2004, p.428). This is not to say all parents do not provide their children with a healthy choice in food. The research is suggesting that parental involvement is essential in encouraging students' preference for healthy food, which in turn would influence the financial viability of quality lunch programs (Cho & Nadow, 2004).

Lastly, administrative support has been noted as a concern among several professionals. A large proportion of people who participated in Jones and Cherr's study indicated that, ''leadership, initiative, and commitment from school and district administrators would make them more likely to teach nutrition" (2015, p. 164). Nurses, health educators, and food service directors expressed that administrators need to exhibit more commitment and leadership. A food service director said, ''Principals and staff think they are babysitting. Parents should be feeding them enough at home so the school doesn't have to worry'' (Cho & Nadow, 2004, p. 429). Similarly, health educators expressed that they feel the administration doesn't think a quality school lunch is an important factor impacting the school's learning environment (Cho & Nadow, 2004).

Schools by themselves cannot provide a solution to such a serious health risk without the cooperation of students, parents, and administration. The results from the former studies mentioned shows the importance of coming together and recognizing the challenges within the

school community. When diverse sectors of a school system come together to address the barriers, schools can serve as an effective venue for fostering children's healthy eating habits (Cho et al., 2004).

Fuel to Learn Integrated Curriculum

To provide nutrition education that can possibly lessen childhood obesity in Mississippi, Stapp, Valliant, Knight and Goldthorpe (2019) developed, implemented, and tested the *Fuel to Learn* curriculum. *Fuel to Learn* is a curriculum developed for elementary teachers and students that aligns language arts and mathematics standards from the *Mississippi College and Career Readiness Standards* (2016) to the *Mississippi Contemporary Health Standards* (2012). The goal for creating this curriculum was to create a synergistic obesity childhood prevention nutrition platform for Mississippi while simultaneously building academic knowledge and healthy behaviors among Mississippi students (Stapp et al., 2018). The researchers adapted a questionnaire in order to identify teachers' perceptions of a nutrition-integrated curriculum through the categories of integration of nutrition content, design, and cooperative learning (Stapp et al., 2019). Data from the survey provided insight into the teachers' perceived deficiencies and possible barriers regarding implementation of a nutrition integrated curriculum. This enabled the researchers to develop both a training and curriculum that fit the needs of the teachers in order to encourage both effective implementation of the nutrition-integrated pilot curriculum and provide insight into future plights of the curriculum (Stapp et al., 2019).

The teachers, who participated in the survey, reported that they enjoyed the new nutrition program, but they found it difficult to teach the integrated learning curriculum in class. They also noted that the *Fuel to Learn* curriculum created a barrier for them because it was not in the

sequential order that teachers are expected to teach the standards in. Instead the teachers had to pick and choose when and where they taught the lessons. They also had a hard time teaching the lessons because it was not how they had been teaching the same standards. While the need for addressing child hood obesity is critical in the United States, there is a deficiency in proven nutrition-integrated programs that support the health and academics of children (Stapp et al., 2019). The newly adopted curriculum proved to be a positive approach to the nutrition-integrated education program.

METHODS

Participants

This study was conducted through the University of Mississippi Department of Nutrition and Hospitality Management under the direction of Dr. Kathy Knight, Dr. Anne Bomba, and Dr. Alicia Cooper Stapp. The study protocol was approved by the Institutional Review Board of the University of Mississippi in Fall 2019, and a recruitment letter was sent to the assistant principal of Oxford Intermediate School, Oxford, Mississippi (Appendix A). The subjects of the study were six 5th grade teachers, selected on the basis of their availability during a common planning period which was the research meeting time. All subjects signed a consent to participate in research (Appendix B) and were given a twenty-dollar gift card as an incentive to participate.

Survey and Focus Group

Each participant received two different sets of *Fuel to Learn* lesson plans (Appendix C) and supporting materials and was given 20 minutes to read them. Then a quantitative Likert-type survey, previously used by Stapp et al. (2019) who adapted it from the work of Thibaut et al. (2018) was administered to determine teachers' perceptions of a nutrition-integrated curriculum. (See Appendix D). Findings of the survey provided insight into the needs and deficiencies of the teachers in relation to a nutrition-integrated curriculum. Finally, a focus group was conducted using three questions to explore the teachers' reactions to the *Fuel to Learn* curriculum: (1) I would use this integrated lesson plan in my classroom. Why or why not? (2) I like this integrated lesson plan, but probably would not us it in my classroom. Why or why not? (3) I would not

want to use this integrated lesson plan in my classroom. Why or why not? The focus group session was recorded and then transcribed at a later date. The teachers' responses were then organized to identify major themes. Data is reported as percentages.

RESULTS

The Teachers Perceptions of a Nutrition- Integrated Curriculum surveys were analyzed based on how many participants selected each of the five options (completely disagree, disagree, neutral, agree, and completely agree). Results for all responses are found in Table 1. Survey items 1, 4, 7, 10, and 13 addressed teachers' perceptions of a nutrition integrated curriculum as it related to perceived difficulty, anxiety, self-efficacy, enjoyment, and perceived relevance, and enjoyment (Stapp et al., 2019). The majority of the participants agreed or completely agreed that it was difficult (Question 1, n=4) and stressful (Question 2, n=5) to align health standards with core standards and were neutral (Question 7, n=4) on their abilities to do so. However, they also liked integrating health and core standards (Question 10, n=4) and felt that doing so increased students' understanding of all subject areas (Question 13, n=4).

Questions 3, 6, 9, 12, and 15 represented the teachers' attitudes toward cooperative learning as it relates to integrated learning (Stapp et al., 2019). Eighty-three percent (Question 3, n=5) of the participants disagreed that teachers find it hard to ensure that all students are actively involved during integrated learning, and 67% (Question 6, n=5) disagreed that they found it stressful to do so. Most of the participants either agreed (Question 9, n=3) or completely agreed (n=1) that they were capable of ensuring that all students are actively involved during integrated learning, liked doing so (Question 12, n=4), and believed that integrated lessons helped students acquire real-world skills (Question 17, n=6).

The last category of survey items, Questions 2, 5, 8, 11, and 14, included statements related to the design of an integrated curriculum (Stapp et al., 2019). The teachers seemed conflicted about whether teachers find it hard to teach a class in which students are involved in an integrated learning environment as only 3 answered the question and they equally disagreed (Question 2, n=1) agreed (n=1), or were neutral (n=1). Sixty-seven percent of the teachers (Question 5, n=4) did not and 33% (n=2) did find it stressful to teach a class in which the students were involved in integrated learning, while 67% (Question 8, n=4) felt capable of and liked (Question 11, n=4) doing so.

Three additional questions were added to the Teachers Perceptions of a Nutrition-Integrated Curriculum as modified by Stapp et al. (2019) to determine if the teachers would use the curriculum in their classrooms. When asked how the participants felt about incorporating a nutrition integrated curriculum 66% (n= 4) of them agreed that they would incorporate the program. The other 34% (n=2) were not sure whether they would try the nutrition program or not. If they were given the proper resources, they were more willing to consider using the program in their classrooms. The participants answered the survey response: *I like this integrated lesson plan, but probably would not use it in my classroom. Why or why not?* 34% (n=2) of the participants stated that they had to focus on the state tested subjects. The dissenters also felt they did not have the proper amount of time to add another subject to their course load.

When asked to expand upon their answers in the focus group, the participants mentioned that they would love to try the *Fuel to Learn* program, if they knew about it at the beginning of the school year. Due to the emphasis on standardized state testing, they would not be able to incorporate the lesson plans without an appropriate amount of time and reminders. Also, some of the participants believed that socioeconomic status of the school district and the quality of

teachers that it could attract could be factors in the implementation of this program. A few of the participants voiced that in class training for teachers would be beneficial in the success of this school-based nutrition intervention program.

Table 1: Teachers Perceptions of a Nutrition-Integrated Curriculum

	Completely Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Completely Agree (5)
1. I think teachers find it difficult to align the core standards with health/nutrition standards.	0%	0%	33%	67%	0%
2. I think teachers find it hard to teach a class in which students are involved in an integrated learning environment.	0%	33.3%	33.3%	33.3%	0%
3. I think teachers find it hard to ensure that all students are actively involved during integrated learning.	0%	83%	0%	17%	0%
4. I find it stressful to align the content of my course with other non-academic standards such as health/ nutrition.	0%	0%	17%	50%	33%
5. I find it stressful to teach a class in which students are involved in integrated learning.	17%	50%	0%	33%	0%
6. I find it stressful to ensure that all students are actively involved in integrated learning.	0%	67%	0%	33%	0%
7. I feel capable of aligning the content of my course with that of health/ nutrition standards.	0%	0%	67%	33%	0%
8.I feel capable of teaching a class in which students are involved in integrated learning.	0%	17%	17%	33%	33%
9. I feel capable of ensuring that all students are actively involved in the integrated learning process.	0%	0%	33%	50%	17%
10. I like aligning the content of my course with that of other non-academic areas.	0%	17%	17%	0	67%
11. I like teaching a class in which students are involved in integrated learning.	0%	17%	17%	0	67%
12. I like ensuring that all students are actively involved in integrated learning.	0%	0%	17%	33%	50%
13. Linking nutrition, mathematics, and ELA standards increases students' understanding of all subject areas.	0%	0%	33%	33%	34%
14. An integrated design helps students to develop real world skills.	0%	0%	0%	67%	33%
15. Students acquire real world skills by working in hands on integrated lessons.	0%	0%	0%	83%	17%
16. I would use this integrated lesson plan in my classroom. Why or why not?	Reason(s): • I would if I was given the resources. I find it hard when I don't think about outside content. • Yes; it helps students in all areas, when there may not be there to do both. • Aligned with standards and laid out to instruct.				
17. I like this integrated lesson plan, but probably would not use it in my classroom. Why or why not?	Reason(s): • I would use it because students need to be introduced to real world content. • Teaching to get students ready for state test is one reason (time).				
18. I would not want to use this integrated lesson plan in my classroom. Why or why not?	Reason(s): • I would only use it if I have a copy.				

DISCUSSION

This study investigated fifth grade teachers' perceptions of nutrition-integrated curriculum using the collected data after a review of *Fuel to Learn* lesson plans. Areas assessed included teachers' enjoyment, self-efficacy, perceived difficulty, perceived relevance and anxiety in relation to a nutrition integrated curriculum (Stapp et al., 2019). During the implementation phase of the Coordinated Approach to Child Health (CATCH), the program, was hindered by competing constraints. The constraints were identified as structured curricula that interfered with the lack of personal knowledge of health and wellness. Other researchers reported that with the increased focus on standardized testing, there was a reduction in the amount of time that teachers can spend on subjects that are not tested (Pederson, 2007). The Fuel to Learn curriculum eliminated these barriers, as the curriculum has integrated nutrition into the subjects that are included in standardized testing (Stapp et al., 2019). The findings agreed with those of Stapp et al. (2019) that the *Fuel to Learn* curriculum has the potential of overcoming common barriers to nutrition education implementation in an academic setting.

When asked to expand on their answers in the focus group, some of the participants believed that socioeconomic status of the school district and the quality of teachers that it could attract could be factors in the implementation of this program. The region of Mississippi that this study was conducted in is prosperous and attracts good teachers, whereas some other regions in the state may not have the funds or the caliber of teachers willing to establish a program such as this. It would probably take additional training and more incentives. A few of the participants voiced that in class training for teachers would be beneficial in the success of this school-based

nutrition intervention program. Overall, the participants responded favorably to the *Fuel to Learn* and stated that the program could potentially make a positive impact across the state.

Based on the results of Avery et al. (2013), the childhood obesity rate has decreased. This is likely due to the improvement and implementation of numerous nutrition programs such as the CATCH program (Avery et al., 2013). During the implementation phase of the CATCH, they were hindered by competing constraints. The constraints were identified as structured curricula that interfered with the lack of personal knowledge of health and wellness. Other research has reported that with the increased focus on standardized testing, there has been a reduction in the time that teachers can spend on subjects that are not tested (Pederson, 2007). The Fuel to Learn curriculum eliminated this barrier, as the curriculum has integrated nutrition into the subjects that are included in standardized testing (Stapp et al., 2019).

The findings of the survey provided insight into the needs and deficiencies of the teachers in relation to a nutrition-integrated curriculum. The results showed that participants would love to try the *Fuel to Learn* program, but due to the emphasis on standardized state testing, they would not be able to incorporate the lesson plans without an appropriate amount of time and reminders. If the nutrition integrated program was given at the beginning of the school term with reminders then it could be an effective tool in building academic knowledge and healthy behaviors among Mississippi students. Overall, the participants responded favorably to the *Fuel to Learn* program and stated that the program could potentially make a positive impact across the state.

CONCLUSION

In summary, the present study sought to address potential barriers of nutrition-integrated curricula through administration of a survey prior to training on and implementation of the Fuel to Learn curriculum (Stapp et al., 2019). Even though the issue with childhood nutrition is being addressed, there is more research that needs to be done to better understand it fully. As prior studies have indicated, childhood eating behaviors can influence the way children choose to eat during adulthood and help contribute to childhood health disorders. *Fuel to Learn* hopes to successfully address the critical barriers, so as to provide a feasible and accessible way for children to receive daily/weekly nutrition education (Stapp et al., 2019). With further research, researchers will be able to pinpoint the exact causes of childhood obesity and help implement nutrition integrated curriculums across the nation.

REFERENCES

Aloia, C. R., Shockey, T. A., Nahar, V. K., & Knight, K. B. (2016). Pertinence of the recent school-based nutrition interventions targeting fruit and vegetable consumption in the United States: a systematic review. *Health Promotion Perspectives*, *6*(1), 1–9.

Anderson, P. M., Butcher, K. F., & Schanzenbach, D. W. (2019). Understanding recent trends in childhood obesity in the United States. *Economics and Human Biology*, *34*, 16-25.

Avery, G., Johnson, T., Cousins, M., & Hamilton, B. (2013). The school wellness nurse: A model for bridging gaps in school wellness programs. *Pediatric Nursing*, *39* (1), 13-17.

Birch, L., Savage, J. S., & Ventura, A. (2007). Influences on the development of children's eating behaviours: from infancy to adolescence. *Canadian Journal of Dietetic Practice and Research: a publication of Dietitians of Canada= Revue Canadienne de la pratique et de la recherche en dietetique: une publication des Dietetistes du Canada*, *68*(1), s1.

Cho, H., & Nadow, M. Z. (2004). Understanding Barriers to implementing quality lunch and nutrition education. *Journal of Community Health*, *29*(5), 421–435.

Davis, M., Gance-Cleveland, B., Hassink, S., Johnson, R., Paradis, G., &
Resnicow, K. (2007). Recommendations for prevention of childhood obesity. *Pediatrics, 120* (Suppl. 4), S229-253.

Gamble, A., Waddell, D., Ford, M.A., Bentley, J. P., Woodyard, C. D., & Hallam, J. S. (2012). Obesity and health risk of children in the Mississippi Delta. *Journal of School Health, 82* (10), 478-483

Grant, T., Lott, L., Miller, J.S., Roberts, J., Sutton, V., Zhang, L. (2018) Mississippi Obesity Action Plan, the Office of Preventive Health and the Office of Health Data & Research. Mississippi State Department of Health, Jackson, MS, February 2018.

Gray, V. B., Byrd, S. H., Fountain, B. J., Rader, N. E., & Frugé, A. D. (2016). Childhood nutrition in the Mississippi Delta: Challenges and opportunities. *Health Promotion International*, *31* (4), 857-868.

Hales C.M., Carroll M.D., Fryar C.D., Ogden, C.L. Prevalence of obesity among adults and youth: United States, 2015-2016. NCHS data brief, no 288. Hyatsville, MD: National Center for Health Statistics, 2017 Oct. Available at: https://www.cdc.gov/nchs/data/databriefs/db288.pdf. [Accessed: 11 January 2020.]

Hammerschmidt, P., Tackett, W., Golzynski, M., & Golzynski, D. (2011). Barriers to and facilitators of healthful eating and physical activity in low-income schools. *Journal of Nutrition Education and Behavior*, *43*(1), 63 -68.

The Impact of Obesity on Your Body and Health: ASMBS. (n.d.). Retrieved March 30, 2020, from https://asmbs.org/patients/impact-of-obesity

Jones, A. M., & Zidenberg-Cherr, S. (2015). Exploring nutrition education resources and barriers, and nutrition knowledge in teachers in California. *Journal of Nutrition Education and Behavior*, *47*(2), 162–169.

Knight, K. B., Cole, J. W., Dodd, L. M., & Oakley, C. B. (2016). Eating good and moving like we should: A consideration for registered dietitians in schools. *International Journal of School Health*

Knight, K. B., Cole, J. W., Dodd, L. M., & Oakley, C. B. (2017). Effects of a school-based intervention on BMI z-scores and fitness parameters in Mississippi delta Children. *International Journal of School Health*

Levy, J., Segal, L. M., St. Laurent, R., Lang, A., & Rayburn, J. (2018, November 1). F as in Fat: How Obesity Threatens America's Future 2013. Retrieved March 30, 2020, from https://www.rwjf.org/en/library/research/2013/08/f-as-in-fat--how-obesity-threatens-america-s-future-2013.html

Lieb, D. C., Snow, R. E., & Deboer, M. D. (2009). Socioeconomic factors in the development of childhood obesity and diabetes. *Clinics in Sports Medicine*, *28*(3), 349–378.

McDonnell, T. (2019, October 17). Childhood Obesity Is Rising 'Shockingly Fast' - Even in Poor Countries. Retrieved March 30, 2020, from https://www.npr.org/sections/goatsandsoda/2019/10/17/770905500/childhood-obesity-is-rising-shockingly-fast-even-in-poor-countries

Nestle M, Jacobson MF. Halting the obesity epidemic: A public health policy approach. *Public Health Rep*. 2000 Jan-Feb; *115* (1):12–24.

Ogden, C. L., Carroll, M. D., Fryar, C. D., & Flegal, K. M. (2015). Prevalence of obesity among adults and youth: United States, 2011–2014.

Ogden, C.L., Carroll, M.D., Kit, B.K., & Flegal, K.M. (2012). Prevalence of obesity and trends in body mass index among U.S. children and adolescents, 1999-2012. *Journal of the American Medical Association*, 307(5), 483-490.

Pederson, P. V. (2007). What is measured is treasured: The impact of the No Child Left Behind Act on non-assessed subjects. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 80(6), 287-291.

Qi, Y., & Niu, J. (2015). Does childhood nutrition predict health outcomes during adulthood? Evidence from a population-based study in china. *Journal of Biosocial Science*, 47(5), 650-666.

Qobadi, M., & Payton, M. (2017). Racial disparities in obesity prevalence in Mississippi: Role of socio-demographic characteristics and physical activity. *International Journal of Environmental Research and Public Health*, *14*(3), 258.

Report: Obesity Rates Will Continue to Grow, Health Care Costs Will Follow. (2012, September 19). Retrieved January 2, 2020, from https://khn.org/morning-breakout/obesity-report/.

Scaglioni, S., Cosmi, V. D., Ciappolino, V., Parazzini, F., Brambilla, P., & Agostoni, C. (2018). Factors influencing children's eating behaviours. *Nutrients*, *10*(6), 706.

Skinner, A. C., Ravanbakht, S. N., Skelton, J. A., Perrin, E. M., & Armstrong, S. C. (2018). Prevalence of obesity and severe obesity in US children, 1999–2016. *Pediatrics*, *141*(3)

Stapp, A. C., Knight, K.B., Valliant, M.W., & Howell, S. (2018, July 13). About. Retrieved January 11, 2020, from https://fueltolearn.wordpress.com/about/.

Stapp, A. C., Valliant, M. W., Knight, K. B., & Goldthorpe, L. (2019). Teachers' Perceptions of Nutrition-Integrated Curriculum and its Impact on Development and Sustainability. *Research Journal of Food and Nutrition*, 3(1), 18–27.

State Briefs. (n.d.). Retrieved January 11, 2020, from https://stateofchildhoodobesity.org/states/ms/.

Statistical Fact Sheet 2014 Update. (2013). Retrieved March 30, 2020, from https://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm_462025.pdf

Thibaut L, Knipprath H, Dehaene W, Depaepe F. (2018). How school contexts and personal factors relate to teachers' attitudes toward teaching integrated STEM. *International Journal of Technology and Design Education*, 28(3), 631-651.

U.S. Census Bureau. (2012) State and County Quickfacts. http://quickfacts.census.gov/qfd/states/28000.html (last accessed 2 June 2014).

Wright, C. M., Benton, K. S., Massey, J., Oakley, N., Green, T., Clemmons, W., & Johnson, V. (2016). 2016 Mississippi College- and Career Readiness Standards for English Language Arts. *2016 Mississippi College- and Career Readiness Standards for English Language Arts*. Jackson, MS.

Wright, C. M., Benton, K. S., Massey, J, Oakley, N, Green, T, & Davis, M (2016). 2016 Mississippi College- and Career-Readiness Standards for Mathematics. *2016 Mississippi College- and Career-Readiness Standards for Mathematics*. Jackson, MS.

Appendix A: Letter to the Principal

Dear Duncan,

Thank you for talking to me about my Honors College student's study. Basically, we would like to get between 5 to 10 fifth grade teachers together to see if they would use these plans. I am sharing the website for the plans, supporting materials and videos with you. Please do not share it with anyone else. We will give the teachers select examples.

http://fueltolearn.wordpress.com/

You will see that most of the lessons are for 4th grade. Dr. Stapp, our education person says that they are all appropriate for 3rd to 6th grade, and only need tweaking to make them fit the standards for a particular grade. We would give your fifth-grade teachers lesson plans that had been modified for 5th grade. The videos were done by the marketing firm that represents Ole Miss athletics and include several of our athletes.

Here is what we are asking: That 5 to 10 teachers stay after school one day for an hour and let us ask them 3 questions:

1. Would you use these lesson plans in your classroom?
2. Why or why not?
3. If not, could changes be made that would make you use the lesson plans?

They would each get a $20 Visa gift card for participating.

Thank you!

Sincerely,

Kathy B. Knight, PhD, RD, LD
Associate Professor

Appendix B: Consent to Participate

Consent to Participate in Research

Study Title: *Fuel to Learn*, a pilot project to promote healthy eating

Investigator	**Co-investigator**	**Co-investigator**
Janiya Davis	Kathy Knight, PhD, RDN	Alicia Stapp, EdD
Nutrition & Hospitality Mgmt. (NHM)	NHM	School of Education
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☐ **By checking this box, I certify that I am 18 years of age or older.**

The purpose of this study

The goal of this project is to provide Mississippi schools with a fun nutrition education curriculum for Mississippi elementary schools, which will include lesson plans that use nutrition-related content to teach the currently tested areas of reading, writing, and math.

What you will do for this study

1. Review the attached lesson plans.
2. Complete the three-question survey attached to each lesson plan.
3. Participate in a focus group to discuss how to make the lesson plans better.

Time required for this study

The requirements for this study will take approximately 1 hour.

Possible risks from your participation

There are no anticipated risks from participating in this study.

Benefits from your participation

Participating in this study may provide you with some beneficial teaching strategies. You might also experience satisfaction from contributing to scientific knowledge.

Incentives

You will receive a $20 gift card for participating in the survey and focus group.

Confidentiality

Research team members will have access to your survey responses, but no names will be on the surveys so we will not know how each of you answered.

Members of the Institutional Review Board (IRB) – the committee responsible for reviewing the ethics of, approving, and monitoring all research with humans – have authority to access all responses. However, the IRB will not be able to associate any results of the study with any individual.

Right to Withdraw

You do not have to volunteer for this study, and there is no penalty if you refuse. If you start the study and decide that you do not want to finish, just tell the researchers or your principal. Whether or not you participate or withdraw will not affect your current or future relationship with your school or with the University of Mississippi, and it will not cause you to lose any benefits to which you are entitled.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions or concerns regarding your rights as a research participant, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, then decide if you want to be in the study or not.

Statement of Consent

I have read the above information. I have been given an unsigned copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study.

Furthermore, I also affirm that the experimenter explained the study to me and told me about the study's risks as well as my right to refuse to participate and to withdraw.

_____ _____

Signature of Participant Date

_____

Printed Name of Participant

Appendix C: Survey

Teachers Perceptions of a Nutrition- Integrated Curriculum					
	Completely Disagree (1)	Disagree (2)	Neutral (3)	Agree Completely (4)	Agree (5)
I think teachers find it difficult to align the core standards with health/nutrition standards. (PD-Integrate)					
I think teachers find it hard to teach a class in which students are involved in an integrated learning environment. (PD-Design)					
I think teachers find it hard to ensure that all students are actively involved during integrated learning. (PD-Cooperative Learning)					
I find it stressful to align the content of my course with other non-academic standards such as health/ nutrition. (A-Integration)					
I find it stressful to teach a class in which students are involved in integrated learning (A-Design)					
I find it stressful to ensure that all students are actively involved in integrated learning. (A-Cooperative Learning)					
I feel capable of aligning the content of my course with that of health/ nutrition standards. (SE-Integration)					
I feel capable of teaching a class in which students are involved in integrated learning. (SE-Design)					
I feel capable of ensuring that all students are actively involved in the integrated learning process. (SE- Cooperative Learning)					

I like aligning the content of my course with that of other non-academic areas. (E-Integration)					
I like teaching a class in which students are involved in integrated learning. (E-Design)					
I like ensuring that all students are actively involved in integrated learning. (E-Cooperative Learning)					
Linking nutrition, mathematics, and ELA standards increases students' understanding of all subject areas. (PR-Integrated)					
An integrated design helps students to develop real world skills. (PR-Design)					
Students acquire real world skills by working in hands on integrated lessons. (PR-Cooperative Learning)					
I would use this integrated lesson plan in my classroom. Why or why not?					
I like this integrated lesson plan, but probably would not use it in my classroom. Why or why not?					
I would not want to use this integrated lesson plan in my classroom. Why or why not?					