

THE WORLD READINESS PROGRAM IN THE CULINARY ARTS, A CASE STUDY: CAN MOTIVATION AND ACADEMIC COMPETENCY BE IMPROVED BY TEACHING KIDS FOOD STUDIES ON A SHOESTRING BUDGET?

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ABSTRACT

A novel pedagogical approach using food as the vehicle was designed and implemented to gauge the effectiveness of the culinary arts to increase preparedness for college for 15 under-resourced high-school students. The curriculum was developed to improve competencies and increase students' self-confidence and academic proficiency. A mixed-method approach was used for analysis. Phenomenological and observational data revealed students' perceived high self-assessment of academic confidence, though these feelings were not supported by the pre and post quantitative 6th grade level math and science test results. We believe improved results could be obtained through this program with earlier intervention in the education process.

Keywords: culinary arts education, college prep, pedagogical innovation

INTRODUCTION

There are many obstacles that may hinder the future aspirations of under-resourced, minority students. Such challenges may include discrimination, poverty, less opportunity to partake in career exploration, and less opportunity to understand how an educational ethic helps to obtain future career goals (Turner & Conkel-Zielbell, 2011). The National Center of Educational Statistics reported that students from low-income and minority families were more likely to drop out of high school as compared to students from white middle or upper class families (Kaufman, Alt, & Chapman, 2004). As they are under-resourced, these students are faced with many barriers, both in and out of their control, that hinder their prospects for success in school and later on (Chaves et. al., 2004). In many circumstances, under-resourced minority students do not engage in career exploration during school, have a lower sense of self-efficacy and are challenged with discrimination and poverty (Chin & Kameoka, 2002; Turner & Conkel-Ziebell, 2011). Subsequently, under-resourced minority students are not adequately prepared to transition to higher tiers of education. Many of these adolescents have been tracked into vocational programs without the necessary fundamental components for career success (Turner, 2007). Others choose to directly enter the working environment without postsecondary or vocational education. As such, they have limited prospects and fewer choices to develop successful careers. This could have a consequent effect on motivation to pursue specific career options as well as self-efficacy to perform well in the working environment (Aldeman, 2010; Chin & Kameoka, 2002; Jackson & Nutini, 2002; Jackson, Kacinski, Rust, & Beck, 2006; Teranishi & Parker, 2010).

The literature has shown that early-on academic guidance has a significant impact on students' subsequent academic and career success (Turner, 2007). This support has been found to have a positive effect on the readiness and confidence scores of inner-city youth transitioning to high school (Turner, 2007). Developing caring and supportive relationships between teachers, students, and peers has been found to increase student motivation and positive perceptions of intent to attend college (Radcliffe & Bos, 2011). Unfortunately, under-resourced minority students are often not given ample opportunities to receive proper encouragement; either in-school or from positive familial inputs (Kirschner, Sweller, & Clark, 2006; Turner, 2007). To increase the success for high school and beyond, there has been a scholarly call to identify at-risk students to properly prepare them to transition into higher tiers of education. The need for this has been shown to be even more critical in inner-city environments where children often face greater challenges, barriers, and an increased rate of academic failure in schools (Williams & Sanchez, 2013). Efforts to enable students from these settings to seek advice on higher levels of education have been confounded by schools that redirect advisement funding to behavioral control or social services, therefore limiting the potential for advice and academic encouragement for the students who need it most (Rosigno, Tomaskovi, & Crowley, 2006).

Research has demonstrated that under-resourced minority students have a more positive attitude toward school and thus are more likely to succeed when they receive support from their family (Anderson, Sabatelli, & Kosutic, 2007; Rosigno, Tomaskovi, & Crowley, 2006). This engagement potentially increases confidence, which in turn influences a variety of factors including the amount of effort placed on performing academic tasks, as well getting better test scores and grades (Chin & Kameoka, 2002). However, many under-resourced minority students are not receiving the necessary supportive attributes that are inherent to educational success from their families due to variables impacted by a low socioeconomic status such as: lack of financial resources and the adults lack of educational experience both leading to low confidence in navigating the education system (Jeynes, 2007).

In consideration of the related issues and potential solutions presented in the literature, the World Readiness Program in the Culinary Arts (WRPCA), conducted at a university in New Jersey, was designed to better enable under-resourced students to succeed in upper level learning environments. The program was offered during the summer in the Food System culinary laboratory at the university. The objective was to expose under-resourced minority students to the college experience through a Food Studies education portal, to increase self-efficacy, academic skills, and thus transition students more effectively into a university milieu. Program administrators

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proposed the following research questions: a) If involving under-resourced minority high school students in a university sponsored Food Studies Program would enhance their confidence of attaining post-secondary education; b) If involving under-resourced minority high school youths in a university sponsored Food Studies Program would increase the academic competence of these students; and c) If involving under-resourced minority youths in a university sponsored Food Studies Program will increase their appreciation of the diversity of food and culture. The team also hoped to identify any specific academic barriers or self-limitations that the students may have perceived.

The academic genre of Food Studies has been described as not necessarily the study of only food. Rather, it has been explained to be the examination of food and its contexts within a broad range of topics and methodologies (Miller & Deutsch, 2009). Teaching academics through the venue of food or Food Studies in particular, has been used as a method to engage students in the learning process (Bonnekessen, 2010). Food has been shown to be a safe, common ground for learning among students (Cargill, 2005; Duffrin, et al., 2010). Further, it has been suggested that hands-on activities (such as cooking) provides students with an enjoyable opportunity to learn and improve their academic skills by encompassing a variety of activities (Bonnekessen, 2010; Calder, Brawley, & Bagley, 2003; Cargill, 2005).

Program History

In 2005, paying “gifted and talented” high school students took part in a culinary arts course housed in the Food Management (now called Food Systems) Program at the university. The course ran in two successive summers. After assessing the impact of the course, the course administrators recommended a similar but extended “program” during the academic year for under-resourced minority, inner-city students – a constituency ostensibly more in need of academic support. A partnership was subsequently formed between the Food Systems Program and a local church. The goal was to academically empower under-resourced, inner-city minority youths at no charge, by providing them with a path to post-secondary education through a culinary venue. A grant application was submitted to a local benefactor with ties to the church.

The original idea was to provide a 15-week (67.5 hours), after school, comprehensive academic program framed in a culinary setting. Visiting faculty from the university Mathematical Science, Nutrition, Biology, and History departments, academic and admissions advisors, and paid graduate students would round out a team led by the Food System faculty. The students would be bussed to campus and provided with uniforms. However, with only three months left until the program start date in the fall of 2012, the administrators were informed that the funding would be substantially cut to \$5,000. The decision was then made to continue with a scaled down version of the project, which would be implemented over 12 consecutive 3½ hour morning sessions (42 hours) during the summer. Due to the limitation of funds the revised program would be taught by just one faculty-member with periodic help from the program administrators. Students would have to find their own transportation to campus, which was a challenging task considering the limitations of bus service.

METHODOLOGY

A general request for applicants notice was sent to inner-city high schools and after school programs one month before the program start date. Guidance counselors, community leaders, and program directors were apprised of the inclusion criteria: The students must be

under-resourced, from a minority group, of high school age, and willing to find transportation to the school. Due to a lack of transportation resources, the pool of potential applicants was sparse. The students who did apply went through an interview process to assess their motivation level and were required to have various release and information forms signed by their parents or guardians. No students were rejected from the applicant pool. As such, the final tally was comprised of 15 eligible students coming from six underserved municipal areas in the state of New Jersey: Paterson, Orange, East Orange, West Orange and Montclair (both mixed socio-economic and ethnic communities) and Newark. The New Jersey Department of Education reported composite district high school graduation rates from these areas in 2012 were respectively: 66.8%, 66.6%, 70.8%, 85.6%, 92.5% and 68.7% (New Jersey State Department of Education, 2013). Five students were recruited from a local church program, 4 students were recruited from the local high school, 1 student was recruited from the local neighborhood center, 3 students were recruited from a shelter and 2 students were recruited from different, local inner city high schools. Nine female and six male students were enrolled. The mean age was 15.66 years old (± 1.24), the mean grade level was 10.5 (± 1.51). Eleven Black American students (74%), 3 Hispanic students (20%), and 1 white student (7%) started and completed the program. Two students (only) previously been part of a culinary program.

Program Curriculum

The curriculum was designed by the program administrators to include topics such as recipe and purchasing calculations, food safety and microbiology, nutrition and food and culture. The program consisted of an introductory class, and then 9, 3 ½ hour classes that included lecture, demonstrations as well as hands-on culinary learning opportunities (individually and in teams). An additional class was dedicated to an international fusion event with visiting Korean students designed to enhance the students’ exposure to diversity and cultural inputs. A final session was slated for the presentation of student culinary projects to family and friends. Students were loaned the necessary equipment, and supplies including uniforms and thermometers and they were given access to ingredients, equipment and materials. The classes took place in a culinary laboratory, which is regularly used by the Food Systems Program. On two separate occasions, the participating students were able to communicate face-to-face with volunteer college student mentors, who circulated with the students during prep time and breaks. The interaction with current students was designed to provide relatable models to help the participants envision themselves in the role of college student. The instructor provided further guidance and interaction during food preparation and cooking. The program featured components where teamwork was essential for completion of culinary projects.

Prior to each food production session, the students were given various recipes and food purchasing equations to encourage their math proficiency. Microbiology was addressed through two food safety lectures and ongoing instruction. Nutrition was taught at two sessions. For the latter, the students were instructed to go to the USDA My Pyramid (recently changed to My Plate) website (2005) to learn about age-specific nutrition information. The students were additionally instructed to complete a food diary and compare their inputs to USDA recommended dietary amounts, and use the FoodWorks® nutrition analysis computer program to assess the nutrition properties of the foods they cooked (USDA, 2005; The Nutrition Company, 2000).

The food and culture component was addressed through the cultural fusion event. In preparation for this, culinary teams of WRPCA

students drew on their cultural heritage to find recipes. The final selected recipes included food renditions from the Dominican Republic, Jamaica, Trinidad and Tobago, and Mexico. On the day of the event, twenty-one Korean college students who were on an international visit to the campus were integrated into the culinary teams. Each team was presented with the ingredients needed for a pre-determined heritage recipe, plus surprise Asian additions that included oyster sauce, fish sauce, tofu, sesame sauce, and fermented soy. The teams then went about creating “fusion” meals.

Parents, family and friends were invited to the final “Friend and Family” class to take part in a culinary presentation given by the students of the skills learned throughout the program. All students were given a completion certificate at the end of the last session.

Assessment

The researchers planned a mixed method approach to analyze the effectiveness of the program, including phenomenology and triangulated baseline and post statistical test results, instructor observational analysis and qualitative interviews (Jick, 1979; Mathison, 1988; Creswell, 2005; Mertens, 2010). This between-method methodology reportedly appeals to the strengths of qualitative and quantitative research while lessening the impact of the weaknesses (Johnson & Onwuegbuzie, 2004). Triangulation has been used as an analytical method for a number of studies that skirt the topics covered in the present intervention, including research in education (Johnson & Onwuegbuzie, 2004), counseling (Hanson et al., 2005; Mertens, 2010) and health (Morgan, 1998; Casebeer & Verhoef, 1997). The Institutional Research Board at MSU approved the assessment protocols.

To evaluate the baseline math skills at the start of the program, the students were given a quantitative math pretest adapted from AIMSweb M-Cap (math concepts and applications) and M-Comp (math computation) standard test for sixth-grade students (2012a&b). A quantitative pretest adapted from a sixth-grade reading level ServSafe® Food Handler test preparation questions, was administered as well to assess the students’ baseline food safety and microbiology skills (National Restaurant Association, 2011). The math assessment included questions such as, “How many ounces are in one pound?” as well as elementary math problems subsequently covered in the course. The food safety and microbiology assessment included questions such as: “What is the definition of a disease carried or transmitted to people by food?” and, “A single-cell organism that can cause foodborne illness is called?” The pretest math and science topics were also addressed within the course curriculum. During the final session, the same pre-tests, with rearranged question order, were re-administered to the students to evaluate statistical levels of change.

Four graded in-class quizzes connected to in-class projects were given over the course of the program, which tested the students’ knowledge on nutrition, food safety and microbiology, recipes and knife skills. The food safety and microbiology quiz questions were adapted from the ServSafe® course book (National Restaurant Association, 2011). The recipe quiz, covered food math topics that are related to recipe development such as yield percent and factoring as well as how to list ingredients and procedures. The knife skills quiz was based on the instructor’s lecture and handouts on the types and uses of knives and proper cutting procedures.

Eight qualitative interviews were also conducted with consenting students in an attempt to better understand the participants’ experience of the program and likelihood to continue their education. The 9 semi-structured interview questions were based on a phenomenological approach, focusing on the student’s experiences and their perceptions of these experiences (Eagleton, 2008; Smith, 2003). Phenomenology was chosen, as it is the lived experiences that inform these perceptions and subsequent actions. Phenomenology involves studying a small group of individuals deeply to develop patterns and reveal meaning (Creswell, J., 2009). The interviews lasted approximately 30 minutes and were recorded, with the participant’s permission. The data were analyzed by thematic immersion followed by open coding, where transcripts were indexed according to topics. Codes were then collapsed into larger research categories, which formed the main themes of the qualitative research and reviewed and coded by the participating researchers to attain consensus regarding the emergent themes (Table 1) and ensure the reliability of the findings. To ensure the validity of the responses, subject checks were conducted at the conclusion of each interview with the participants. The emergent major themes were validated through agreement among four inter-raters: The two interviewing researchers and two administrating researchers. The program instructor also reviewed the thematic findings.

Semi-structured (open-ended) interview questions were used in an effort to elicit responses that would lead to more specific questions. A lead interviewer conducted the interview sessions and notes were kept and observations recorded by another team member. Example interview questions include: “How likely is it that you will continue your education beyond high school?” “How confident are you in your ability to succeed in school now and in the future?” and “What do you think you learned from the course”. Follow-up questions were also utilized to elicit more revealing responses. The interviewing facilitator took notes on body language and other contextual data surrounding the participants’ responses. The interview data was recorded for accuracy, transcribed then sorted into thematic components. The program administrators periodically observed the students by looking at their actions, demeanor and attitude. The instructor also observed

Table 1: Emergent Themes (n=8)

Theme	n=8	Student Voice (selected quotes)
Confidence of Academic Success and Beyond	6	“Confident” “Very confident” “I guess it’s good”, “there are some setbacks...they make me want to achieve it more” “Like math-wise...not the greatest”
Enthusiasm with Tactile Projects for Learning	6	“It was hands-on...I loved the hands-on thing” “To be in here...it helps...it is easier now for me” (In explaining learning efficacy in the normal class experience) “NO! Because I don’t get no [hands-on] in [regular] classes”
Families and Barriers	5	(High level of discomfort in answering) “I cannot think” “My whole family is a barrier” “Certain people say I can’t do things” I’m going to prove them wrong”

the students peer interactions, ability to follow instructions correctly, and kitchen safety and knife skills. The Korean fusion event was video-recorded with consent of the students and also analyzed for actions, demeanor and attitude. Observational protocols developed by the researchers required the instructor and facilitators to take notations on participants' facial expressions, body language and informal physical and verbal interactions between the instructor and the students and among the students.

RESULTS AND DISCUSSION

Statistical pre and post-test results were analyzed using SPSS, Version 19 (IBM Corporation, 2010). Out of a potential of a 100% score for correct answers, pre-test math grades ranged from 0-50% with a mean of 23.3% (± 20.32), while post-test math scores ranged from 0-85% with a mean of 24.6% (± 22.23). The pre-test science scores ranged from 20-55% (± 8.63), with a mean score of 35.6%, while the post-test science scores ranged from 20-60% (± 11.96) with a mean of 38.2%. Though there was a slight increase in the second set numbers, a t-test between pre and post-test scores showed no statistically significant improvement for either math or science scores over the span of the program. The average grades for the four graded in-class quizzes on nutrition, food safety and microbiology, standardizing recipes and knife skills are as follows in respective order: 85.28 (± 12.79), 77.84 (± 8.62), 82.9 (± 18.74), 90.66 (± 15.36).

Three themes were culled from the interview data:

Theme 1: Confidence of Academic Success and Beyond. Most of the students expressed a low level of confidence in their academic skills, particularly math (75%). This lack of confidence was exemplified by one student who indicated that he had "discalcula [sic];" and another, who in reference to the recipe exercises noted that, "like math wise, some of the stuff that we did, like multiplying and different measurements...is not my greatest." However, lack of mathematic proficiency did not seem to diminish the students' overall confidence to succeed in school and beyond. Many of the students elicited high levels of surety of academic and future success, as they described their prospects by using terms such as "very confident" ($n=3$), "confident, really confident" ($n=1$), "pretty confident" ($n=1$) and "I guess it's good" ($n=1$). One student noted, "there are some setbacks but that doesn't mean it's going to stop me achieving my goals. They make me want to achieve it more."

Theme 2: Enthusiasm with Tactile Projects for Learning: The students clearly preferred tactile learning to other academic venues. Said one in reflection about the course, "It was hands-on. I loved the hands-on thing. I'm the type of person, like if you give me something to do with hands-on stuff, I'll be very entertained." Another student, in agreement with the unsolicited statements of most (75%) of the students, mentioned that applied "hands-on" learning appeared to be the best way to deliver the understanding of complex problems. Learning in a kitchen setting seems to help, as noted by another, because, "to be in here [a culinary kitchen] and for me to be like literally seeing it every day, it helps and increases the way I see it, the way that I like, it is easier now for me to like look at a measurement and multiply it, and instead of having to go through all of that trouble that I used to in the past." The lack of hands-on learning opportunities was an agreed deficit of the participants' present high school academic agendas, as exemplified by the following students' response to the researcher's query, "Do you think you have received the skills you need from school?" "Noooo!", the student replied, "Because I don't get no [hands-on learning] classes."

Theme 3: Families and Barriers: Six students were reluctant to answer questions about family support. For example in answer to the researcher's query on this subject, one female said, "I cannot think,"

and then shut down for the rest of the interview. On the surface, the other students expressed that they had familial support for their academic endeavors. Digging deeper however, the facilitator uncovered some participant concerns about the level of this encouragement. One student noted, "My whole family is a barrier... sort of a road block." Another stated, "Like...certain people in my family say I can't do things" while another emphatically said, "I think my whole family [is a barrier], yeah!" However, while one student noted discouragement from his family, he found the negativity to be motivating. Said he, "Like certain people in my family, they say I can't do things, but it's like, I am going to prove them wrong." Six students had difficulty conveying responses to the question "Do you see any barriers in the future for continuing your education?" While, two participants were able to articulate concern for their future prospects. Said one: "Um, kind of scared [about the future]... cause I'm not really ready to be out there and go on my own." Two other students noted that they were already tracked into technical colleges: One student will be focusing on electronics, the other on culinary skills. For the latter student, career tracking started early on. Said, he: "Um, my guidance counselor, my 8th grade year, told me about it [the high school culinary program]... I just got excited. I was like, 'I just want to do it.'" Working hands-on with new classmates provided a positive setting for the development of social skills for at least one student. Said she, "Being in this class you don't know anyone, so like your people skills are like amped up."

Observations

The program administrators and the instructor provided the observational data. Controlling for one student who at enrollment pre-arranged to miss four classes, attendance was remarkably 100%. Generally, the students were observed to be respectful, punctual, and have a high interest level in the subject as seen through their enthusiasm throughout the programs entirety. The interviewing facilitator noted that while two students were highly enthusiastic in their discussion of culinary skills, three students (as noted), "took a long pause," "became quiet," "looked at the door," and "at the floor," when discussing their academic abilities. The instructor noted that many students did not enjoy the math component of the program as they were seen to be very uncomfortable and overly cautious when calculating measures. On the other hand, many students excitedly told the instructor on numerous occasions throughout the program, that while they normally do not cook for their families, they successfully prepared class recipes at home. One parent affirmed to the instructor that her son cooked for the very first time for their family, duplicating one of the recipe procedures created in class. Peer support and collaboration was evident during the program as these attributes were necessary for completion of the team assignments.

The students appeared to the program administrators to be very excited and engaged with their Korean counterparts during the cultural fusion event. The event enabled the WRPCA students to mentor their Korean counterparts, as the visiting students were not familiar with the laboratory setting or the assignment at hand. The integrated WRPCA and Korean students were observed exchanging emails and Facebook contacts. In response to a voting query, the participating students (WRPCA and Korean) unanimously endorsed the addition of the Asian ingredients as important flavor enhancements to the WRPCA recipes.

Most of the students had parent representatives (or guardians, as was the case for the students in the foster home) at the final "Friend and Family" class. The program administrators noted the enthusiasm, pride and emotional response of these supporting representatives. A few parents personally thanked the instructor and explained that their son or daughter looked forward to coming to class each day.

Some parents became emotional with pride (more than one was observed to have tears in their eyes) during the final certificate presentation. "I never thought that he could do so well," said one parent who was particularly impressed by the culinary display created by the class. It was noted that none of the visiting parents sought out educational information about their child's academic competencies or prospects from the instructor or program administrators.

CONCLUSIONS AND APPLICATIONS

This study examined the possibility of increasing under-resourced students self-efficacy and academic skills by exposing them to the college experience through a venue of applied food studies. In regards to the first research question, many of the students brought to the program perceived high levels of confidence for future academic success. Though, this confidence was muted by the students' lack of confidence in academic skills (particularly math) and issues with family support. Contrary to the second research question, involving under-resourced high school youths in the WRPCA was not found to increase academic competence. Pre and post-test math and science scores revealed many students were significantly lacking in mathematics and science competency, with little improvement over the course of the program. This held true for the two students who had previous culinary class exposure. The students' low confidence in mathematic abilities corroborates with their low mathematical pre and post-test scores in this subject. Involvement with the Korean students during the cultural-fusion may have partially validated the third research question, which postulates increased student appreciation of diversity of food and culture.

Academic shortfalls for under-resourced and minority students have been noted in the literature as partly attributable to lapses in the educational framework, undemocratic tracking, advisement, low access to proficiency courses and course-tracking patterns among middle and secondary schools. Under-resourced and minority students have been particularly affected by diminished standards and practices for teaching; whether these students are taught as a group, or if they receive differential individual treatment within the classroom (Buckley, 2010). As the learning disparities start early on (Greene & Anyona, 2010), it may not be possible to erase academic deficits within the parameters of a short-term proficiency program. The fact that WRPCA students performed at the lower-end of sixth-grade level math and science tests (across the program) underlines the need for more supportive educational strategies at earlier learning stages. Certainly, a shortened 12-session program was not enough to make up deficits that were years in the making. In sum, the WRPCA may have provided too little, too late.

On the positive side, the researchers were encouraged by the students' performance on the in-class "applied" quizzes, which were tied to hands-on activities. The students were enthusiastic, as exhibited by their comments, attendance and administrator observations. The students appeared to be developing a cultural savvy, as demonstrated by the sharing of food, recipes and exchange of contacts with the Korean students. The WRPCA students reported contributions to family cooking tasks and recipes. They also received the support of their relatives during the Family and Friends day. This engagement with parents and families may have been the most important corollary outcome of the program, as family support has been found to be fundamental to academic achievement (Greene & Anyona, 2010).

The researchers make no attempt to generalize the findings from this exploratory study to diverse populations in various locations. The culinary fusion event with visiting Korean students is not likely replicable for other programs. However, culinary fusion events could

take place with visiting students from other schools with diverse or homogenous ethnic populations. The present study was limited by budget and time. It is possible more could be done with better outcomes. What was clear was the enthusiasm exhibited by the students to the tactile culinary learning experience. The researchers ask if the introduction of an extensive culinary-based teaching approach, perhaps in the middle-school years, might provide these students with an accessible means to develop basic math skills and scientific understanding in a non-threatening and enjoyable way. Basic math and science educational improvement at an early age may provide students with a platform from which higher order academic achievement may occur. Additional research is needed to determine whether an applied, hands-on food studies program could be an effective venue for promoting academic success for under-resourced high school students or, if such a program would be more successful if administered at earlier stages of learning.

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