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RESEARCH CONTRIBUTIONS:

Factors that Encourage/Discourage and Best Practices for Student-operated Restaurants

Barriers and Facilitative Practices Identified by School Nutrition Leaders during the COVID-19 Pandemic

Effectiveness of a Traffic Light Label Intervention in a Midwest College Dining Hall

Gender Differences in Digital Food Ordering Experiences: An Application of the Technology Acceptance Model and Self-congruity Theory

Food Production Courses in Accredited Dietetics Programs: Importance-Performance Analysis of Using Standardized Recipes

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ABSTRACTS

Research Manuscripts

Factors that Encourage/Discourage and Best Practices for Student-operated Restaurants

Dietetics education programs sometimes utilize student-operated restaurants (SORs) to teach foodservice and management principles. Forty-seven DPD directors were surveyed and 19 managers of SORs were interviewed in order to better understand the prevalence of SOR use in dietetics programs, factors that encourage/discourage SOR use, and SOR “best practices.” Fifteen (31.9%) surveyed programs utilized a SOR, and those that did not indicated the lack of faculty able to manage the SOR and the overall cost of operating a SOR discouraged SOR adoption. Interviews revealed a variety of SOR “best practices” related to coursework management, student experience, SOR organization/management, and student interactions.

Barriers and Facilitative Practices Identified by School Nutrition Leaders during the COVID-19 Pandemic

This study investigated barriers and facilitative practices impacting school foodservice meal preparation and distribution during the initial year of the COVID-19 pandemic. Seven self-operated non-contract service school foodservice leaders were interviewed. Participant responses were coded and analyzed, categorized, and themes identified. Barriers identified included: purchasing issues, communication issues, staffing, and equipment needs. Scarcity of ready-made products was the main barrier identified. Facilitative practices included: cooperation with governmental agencies, school districts, and the community, transparency with staff, USDA waivers, and departmental mission focus. Transparent and clear communication with staff was an important facilitative practice. The research identified no ready to use emergency preparedness plans related to pandemic response.

Effectiveness of a Traffic Light Label Intervention in a Midwest College Dining Hall

A repeated measures quasi-experimental design was utilized to examine the effect of traffic light labels on the amount of food served in a university dining hall in comparison to the control nutrition facts panels during the spring 2020 academic semester. There were no significant improvements in the healthfulness of foods served during the intervention compared to the control. Traffic light labels may not be more effective than nutrition facts panels in college dining halls to improve food choices.

Gender Differences in Digital Food Ordering Experiences: An Application of the Technology Acceptance Model and Self-congruity Theory

The purpose of this study was to examine the digital food ordering experience by applying the technology acceptance model and self-congruity theory. A research model was developed and examined, focusing on gender differences. Results showed that both perceived ease of use and perceived usefulness had significant positive effects on the certainty of the digital ordering process. Additionally, both certainty and self-technology congruence significantly influenced customer satisfaction. Multi-group analysis results revealed that the effect of certainty on customer satisfaction was significantly higher for females, while the effect of self-technology congruence was significantly higher for males.

Food Production Courses in Accredited Dietetics Programs: Importance-Performance Analysis of Using Standardized Recipes

The purpose of this study was to investigate the importance and performance of the use of standardized recipes in quantity food production (QFP) courses of Accreditation Council for Education in Nutrition and Dietetics programs. A web-based questionnaire was distributed to personnel responsible for teaching and/or overseeing QFP courses in 270 accredited didactic programs. From the total of 51 valid questionnaires returned, the pedagogical setting of the QFP laboratory was investigated. Among the institutions (n=40, 14.8%) that used standardized recipes in the QFP laboratory, standardized recipe use was assessed by importance-performance analysis. Seven attributes emerged from the data and were classified: ensuring food quantity, food quality, and food nutrition were classified as “keep up the good work”; sustainability and information as “concentrate here”; food safety as “possibly overkill”; and adaptability as “low priority”.

FACTORS THAT ENCOURAGE/DISCOURAGE AND BEST PRACTICES FOR STUDENT-OPERATED RESTAURANTS

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ABSTRACT

Dietetics education programs sometimes utilize student-operated restaurants (SORs) to teach foodservice and management principles. Forty-seven DPD directors were surveyed and 19 managers of SORs were interviewed in order to better understand the prevalence of SOR use in dietetics programs, factors that encourage/discourage SOR use, and SOR “best practices.” Fifteen (31.9%) surveyed programs utilized a SOR, and those that did not indicated the lack of faculty able to manage the SOR and the overall cost of operating a SOR discouraged SOR adoption. Interviews revealed a variety of SOR “best practices” related to coursework management, student experience, SOR organization/management, and student interactions.

Keywords: Dietetics; foodservice management; student-operated restaurant; dietetics education

INTRODUCTION

Dietetics is a multi-faceted profession with practitioners working in multiple practice areas including clinical nutrition, community, food and nutrition management, consultation and business, and education and research (Academy of Nutrition and Dietetics, 2020; Griswold & Rogers, 2020). Due to the expansive nature of the profession, it is important for Didactic Programs in Dietetics (DPDs) to educate students in all aspects of the dietetics field. The Accreditation Council for Education in Nutrition and Dietetics (ACEND) is the accrediting body for education programs that prepare students to become entry-level registered dietitian nutritionists (RDN) and to practice in these varied areas of the dietetics field (ACEND, 2021). ACEND develops and revises core Knowledge Requirements for Dietitian Nutritionists (KRDNs) and requires that each program demonstrate how the curriculum prepares students to know those topics (ACEND 2018). KRDNs cover a variety of curriculum topics encompassing all aspects of dietetics, including topics related to foodservice and management concepts.

Foodservice and management practice in dietetics provides unique opportunities for students. According to the Academy's Compensation and Benefits Survey 2019 (Academy of Nutrition and Dietetics 2020; Griswold et al. 2020), RDNs who work within the food and nutrition management practice area have a higher range of pay than those RDNs who work in clinical or community settings (e.g., 50th percentile pay rate for an inpatient clinical RDN is \$31.03/hour, 50th percentile pay rate for a community RDN is \$28.85/hour, and the 50th percentile pay rate for a RDN in food and nutrition management is \$39.02/hour). Furthermore, RDNs with a foundation in nutrition are uniquely qualified to manage and operate large scale foodservice operations in non-commercial settings like hospital systems, K-12 school districts, colleges/universities, and prison systems. These operations require managers with skills in foodservice, management,

and nutrition; all of which are unique to RDNs. Existing research has indicated that more dietetics students are aware of and interested in a clinical career in dietetics compared to other areas such as food and nutrition management (Hughes & Desbrow, 2005). Therefore, further research is needed to determine opportunities that encourage students to plan and prepare for a career in foodservice and/or management in dietetics.

Previous research has explored how dietetics programs are addressing specific curriculum topics such as food safety (Scheule, 2000), food science, (Deskins & Spicher, 1989), research (Hynak-Hankinson, Martin, & Wirth, 1997), multiskilling (Gates & Sandoval, 1998), and nutrition education (Short & Chittooran, 2004). Gregoire, Lafferty, and Dowling (2006) discussed the importance of foodservice management education for dietetics students and concluded that incorporation of active learning strategies and real-life experiences is essential. Management principles are often taught within dietetics programs as part of foodservice management courses. However, management in general is a skill that applies to all aspects of the dietetics industry and is essential for all dietetics professionals (Gould & Canter, 2008). Cluskey, Gerald, and Gregoire (2012) highlighted both the importance of teaching and valuing management skills in dietetics programs, and the idea that management skills can help dietetics professionals achieve advanced positions in the dietetics industry. Although the importance of management in dietetics is evident, there is a lack of research exploring how Didactic Programs in Dietetics (DPDs) are addressing foodservice and management curriculum.

One method that some programs are using to address foodservice and management curriculum, and prepare students to become food and nutrition management practitioners, is through the use of student-operated restaurants (SOR) (although the extent of use is not well known). Student-operated restaurants have been described as on-campus restaurants where students learn quantity food production and service principles as well as prepare and serve meals to paying customers (Josiam, Foster, Malave, & Baldwin, 2014; Nies, 1993). Although programs utilize other methods to address these educational concepts like culinary courses or externships in other foodservice facilities/operations, this study chose to focus solely on SORs due to the heavy resource investment required by SORs and the need to better understand their use in education. Furthermore, SORs allow instructors to tailor the learning experience to both meet the goals of the education program and also provide practical and real experiences with quantity food production and customer service which is not always the case in other teaching methods.

Previous research regarding use of SORs is limited but does indicate that SORs can be an effective tool in dietetics education. Nies, (1993) explored the use of SORs in Hospitality programs and found that programs with a SOR were more likely to have a higher percentage of graduates employed in foodservice and management positions. More

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recently Stokes, Patten, and Weight (2018) assessed the customer experience of a dietetic SOR and found that 77.6% (n = 294) of customers were aware the restaurant was a laboratory experience for students. Holik, Heinerichs, and Wood (2021) found that students in a foodservice management course in a dietetics program felt that experiential learning activities were beneficial and helped improve learning and application. It is clear that experiential learning opportunities (such as a SOR) increase learning and are beneficial to students. Therefore, more research is needed to better understand prevalence of SOR use in dietetics education, what would encourage/discourage education programs from utilizing a SOR, and best practices (from those who do use SORs) for those who might be wanting to refine theirs or initiate one.

The purpose of this study was to identify the prevalence of SOR use in DPDs and to explore “best practices” of SORs currently operating. The specific research objectives were to:

1. Identify the prevalence of SOR use among DPDs.
2. Identify factors that encourage or discourage DPD directors to use SORs as part of foodservice and management education.
3. Identify “best practices” of currently operating SORs.

METHODS

To meet the research objectives, two separate study phases were designed and completed. The methods for each phase are described below.

Phase One

For the first phase, a survey was developed using previous studies related to dietetics programs and SOR use (Deskins & Spicher, 1989; Gates & Sandoval, 1998; Hynak-Hankinson, Martin, & Wirth, 1997; Scheule, 2000; Short & Chittooran, 2004). Qualtrics (Provo, UT) survey software was then used to create an electronic version of the survey. To prepare the questionnaire for use, an expert review was conducted to test for content validity and then cognitive interviews were conducted to test for face validity (Dillman, Smyth, & Christian, 2009; Mackison, Wreiden, & Anderson, 2010). Five experts with multiple years of experience in SOR management, foodservice and management education, dietetics education program management, and/or proven records of accomplishment of publication using survey methodology were invited to participate in the review. They evaluated each survey item based on their importance, relevancy, and phrasing using a 10-point likert scale (10 = high importance, relevancy, and proper phrasing) (Mackison et al., 2010). Following the expert review, cognitive interviews were conducted with three DPD directors through Zoom videoconferencing. Cognitive interviews involve potential survey respondents completing the survey instrument while discussing their thought process to an interviewer. This allows the researchers to gain understanding of how questions are being interpreted and make adjustments to questions accordingly (Dillman et al., 2009). Feedback from the cognitive interviews resulted in minor changes in grammar and phrasing to improve the clarity of questions and overall flow of the survey. The final survey instrument consisted of 34 multiple choice and free response items which included questions exploring the use of SORs in DPDs, factors that

encourage/discourage SOR use, and general characteristics of DPD directors and their programs.

The survey link and an invitation to participate was emailed to 201 DPD directors of ACEND accredited DPDs in the United States and Puerto Rico using publicly available contact information from the Academy of Nutrition and Dietetics website. The informed consent was included at the beginning of the survey and completion of the survey indicated their consent to participate. In order to encourage completion of the survey, directors were offered a \$15 Amazon gift card. The study was approved by the Institutional Review Board at Brigham Young University prior to recruitment and data collection.

Data Analysis

Data from the survey were first downloaded to an excel spreadsheet from the survey software (Qualtrics, Provo, UT). Data were then cleaned by deleting four incomplete responses. The clean data file was then uploaded to SPSS version 24 for further analysis. Descriptive statistics including frequencies, percentages, mean scores (for Likert scale items), and standard deviations were calculated and then interpreted to identify significant findings.

Phase Two

Phase two involved conducting semi-structured interviews with managers of SORs to explore manager’s self-identified “best practices” of SOR management and operation. Emails were sent to 378 directors of dietetics and hospitality programs using contact information from the Foodservice Systems Management Education Council (FSMEC) listserv, the Accreditation Council for Education in Nutrition and Dietetics (ACEND) website, and the International Council on Hotel, Restaurant, and Institutional Education (ICHRIE) website. Researchers opted to extend beyond dietetics education in this phase to gather more information about SOR use in the university setting. Directors were asked to forward the study information to the manager of their SOR or the person best suited to answer interview questions regarding the SOR. After completing a short demographic survey, participants indicated their availability for an interview and a member of the research team reached out and scheduled an interview time.

An interview guide was developed using the foodservice systems model (Gregoire, 2017) and included questions related to the operational and management characteristics of the SOR. Table 1 provides interview guide question examples. Interviews were conducted and recorded via Zoom by two members of the research team who utilized a topical interview method where the interviewers use a list of topics to guide the interview (Marshall & Rossman, 2016). Interviews were transcribed verbatim by a professional transcription service for use in data analysis. Participants provided verbal consent prior to the interview and were sent a \$25 Amazon gift card as a thank you for participating. Participant comments indicating what they considered to be their SOR “best practice(s)” were used for this paper. Other participant comments related to nutrition and menu planning were published elsewhere (Mathews, Patten, & Stokes, 2021).

Table 1. Interview Guide Question Examples

Parts of the Foodservice Systems Model	Example of Related Interview Guide Questions
Input	How is the SOR at your facility funded?
Transformation	I see that you use _____ method of procurement. Please describe how this method is used.
Output	What do you feel the students overall satisfaction is regarding their experience in the SOR?
Control	What are your future plans for the SOR?
Feedback	Do you feel like the SOR has a best practice that other SORs could implement?

Data Analysis

Three researchers read and reread the sections of participant transcripts relevant to this study and discussed commonalities of the self-identified best practices for operating a SOR. Based on participant responses from the interviewing process, researchers summarized responses for each participant. One researcher summarized each “best practice,” and two additional researchers compared the summaries to the transcripts to verify the participants’ responses were accurately represented. Open coding of the summarized responses was then conducted, and the summarized responses were categorized in to four overarching themes (Marshall & Rossman, 2016) by the research team. Themes included (a) *Coursework management*, (b) *Providing a broad experience for students*, (c) *SOR organization/management*, and (d) *Interactions with students*.

RESULTS AND DISCUSSION

The phase one survey instrument was sent via email to a total of 201 DPD Directors from across the U.S. A total of 57 participants responded, but 10 responses were incomplete, for a total of 47 useable responses and a response rate of 23.4%. The majority of DPD directors had a professional focus in education (n=21) or clinical nutrition (n=20) and represented a broad range of years in their role as DPD director. The majority also indicated that management and foodservice in dietetics is “extremely important” or “very important” for student’s long-term career. All 47 programs were housed on a physical campus and the majority (n=34) were at public universities. Participating DPDs had as few as 5 to as many as 90 students graduating from their programs each year. Table 2 provides additional director and program characteristics.

Phase two consisted of interviews with 19 managers of SORs across several academic disciplines – seven programs were dietetics only, six were hospitality only, and six had majors from more than one academic program involved in the SOR. The majority of participants were at universities with more than 15,000 students (n=12). During the phase two interviews, managers of SORs were asked to share “best practices” that they felt they utilized in their SOR.

Objective 1: Prevalence of SOR Use in DPDs

Of phase one respondents, 15 DPDs operated a SOR and 32 DPDs did not at the time of data collection. Of those that did not, four indicated they had plans to open an SOR in the future, 23 had no plans for an SOR, and five previously had an SOR but no longer did. To date, there is no data about prevalence of SOR use in dietetics education. Interestingly, when evaluating hospitality programs, Nies indicated that 38 of the 77 programs surveyed had a SOR; though this research is now dated and was only conducted with hospitality programs. To our knowledge, the current study is the only study that has attempted to establish the prevalence of SOR use in DPDs. Unfortunately, the sample size is small, and further research should be conducted to verify the prevalence of SORs in dietetics education programs.

Objective 2: Factors that Encourage/Discourage SOR Use in DPDs

Programs without a SOR (n=32) were asked to indicate on a five-point Likert scale (1 = strongly discourage; 5 = strongly encourage), to what extent certain factors encouraged or discouraged the implementation of a SOR in their DPD (Table 3). Directors revealed the most discouraging factors (those with the lowest mean scores) to be “number of faculty to teach/manage lab experience” (M=2.12 ± 0.89), “upfront costs” (M=2.15 ± 0.94), and “university funding” (M=2.30 ± 1.26). The factors with the highest mean scores were “alignment with DPD goals” (M=3.24 ± 0.94), “credit hours available for students” (M=2.97 ± 0.85), and “number of students in the program” (M=2.94 ± 0.97). However, all of the listed factors fell in the

Table 2. Phase 1, Didactic Program in Dietetics (DPD) and Director Characteristics

DPD Format	n	%
On Campus	47	100.0
Distance/Online	1	2.1
Hybrid	0	0.0
Other	1	2.1
Average DPD Enrollment		
Less than 10	8	17.4
11-20	12	26.1
21-30	11	23.9
31-40	6	13.0
41-50	2	4.3
More than 50	7	15.2
University Type		
Private	9	19.1
Public	34	72.3
University Location		
Rural	14	29.8
Suburban	19	40.4
Urban	9	19.1
Number of Students Graduating from DPD Each Year		
Less than 10	8	7.4
11-20	12	26.1
21-30	11	23.9
31-40	6	13.0
41-50	1	2.2
51-60	4	8.7
More than 60	4	8.7
Number of years as DPD Program Director		
Less than 3 years	10	21.3
3-5 years	11	23.4
5-10 years	9	19.1
11-15 years	9	19.1
16-20 years	3	6.4
Greater than 20 years	1	2.1
Highest Degree Achieved		
Masters	20	42.6
Doctorate	20	42.6
Other	2	4.3
DPD Director Areas of Professional/Academic Focus		
Education	21	44.7
Clinical nutrition (acute, ambulatory, or long-term care)	20	42.6
Community	13	27.7
Food and nutrition management	9	19.1
Research	9	19.1
Other	6	12.8
Consultation and business	4	8.5
Directors’ perception of importance of management and foodservice for students’ long-term career success		
Not at all important	0	0.0
Slightly important	3	7.1
Moderately important	11	26.2
Very important	17	40.5
Extremely important	11	26.2

Table 3. Phase 1, Factors that Encourage or Discourage Use of Student-Operated Restaurants in Didactic Programs in Dietetics (DPDs)

	Mean ^a	SD	Discourage n (%)	Neutral ^b n (%)	Encourage n (%)
Alignment with DPD goals	3.25	0.94	5 (10.7)	15 (31.9)	13 (27.7)
Credit hours available for students	2.97	0.85	7 (14.9)	19 (40.4)	7 (14.9)
Number of students in the program	2.94	0.97	8 (17.0)	18 (38.4)	7 (14.9)
Expertise of faculty/staff	2.79	0.99	12 (25.5)	12 (25.5)	9 (19.1)
Administrative support	2.73	1.28	14 (29.8)	11 (23.4)	8 (17.0)
Other	2.67	0.82	1 (2.1)	5 (10.6)	0 (0.0)
Profitability	2.58	0.94	13 (27.6)	17 (36.2)	3 (6.4)
University funding	2.30	1.26	20 (42.6)	9 (19.1)	4 (8.5)
Available space	2.30	1.21	19 (40.4)	8 (17.0)	6 (10.8)
Upfront cost	2.15	0.94	21 (44.6)	11 (23.4)	1 (2.1)
Number of faculty to manage/teach lab experience	2.12	0.89	22 (46.8)	9 (19.1)	2 (4.3)

^a Scale of 1 to 5 was used as follows: 1= Strongly Discourages, 3= Neutral, 5= Strongly Encourages

^b Neither Encourage nor Discourage

discouraging range (1-2) except for one. None of the listed factors' mean scores fell in the range of encouraging (4-5).

Our study found that four programs have plans to implement a SOR in the future indicating the potential for use of SORs in DPDs to increase. In contrast, 23 programs had no plans for an SOR. Nies (1993) similarly found that of the 39 hospitality programs who did not have a SOR, only a small portion of these programs (n=8) indicated that they had plans to develop one at the time of the study. These results indicate that there are clearly challenges to implementing a SOR, but there are some DPDs considering it. From the current study, the factors that most discouraged DPDs from utilizing a SOR were the number of faculty needed to teach/manage lab experience, upfront costs, and university funding which all indicate a primary concern about resources. Nies (1993) also found that lack of resources was a difficulty that many programs both with or without SORs faced. Programs could consider partnerships with foodservice and management industry leaders to help ease the cost of starting an SOR. Programs could also consider utilizing graduate students to help manage SORs rather than relying solely on faculty members. Employing graduate students to help manage the SOR may reduce the cost of running the SOR, and would also benefit the graduate students as they gained additional managerial experience. Partnering with on campus dining services may also help reduce costs of operating a SOR, as it may give smaller SORs some purchasing benefits that they would not typically get based on size. Other foodservice and management industry partnerships, as well as partnerships at the University level, should also be considered by programs seeking to reap the benefits of utilizing a SOR. This would allow programs to better meet required education standards and prepare students for food and nutrition management positions post-graduation.

Objective 3: Self-Identified Best Practices within SORs

All phase 2 participants (n=19) responded to the "best practices" questions during their interviews. Phase 2 expanded to include information from SORs across several academic disciplines. Participant responses were categorized into 4 themes including (a) *Coursework management*, (b) *Providing a broad experience for students*, (c) *SOR organization/management*, and (d) *Interactions with students*. Each of these themes are described in greater detail below.

Table 4 presents the self-identified best practices of the SOR manager interviewed along with the number of students at the university, the students' majors, and the menu style for context. University size, student academic focus, and the menu all play a role in determining the type of SOR experience provided.

Coursework Management

Two participants described "best practices" related to methods used when managing the coursework related to the SOR experience. One participant discussed the importance of "grading all along," which included providing feedback to students throughout their experience rather than just at the end. Another participant felt that the "online format" was unique and effective. Rather than having a separate lecture course along with the SOR experience (as most programs do) they developed an online component that students completed as part of the SOR experience. They felt that this helped the students connect the course material with the lab experience more effectively. Managers of SORs have the unique responsibility of not only providing an academic experience for students but also running a business. This task demands efficiency to avoid instructor burnout and to make the business viable. Managers could utilize these course management "best practices" in order to increase efficiencies in how they manage the academic experience for students.

Providing a Broad Experience for Students

There were a total of five participants that discussed "best practices" related to providing a broad and comprehensive experience for the students. Three programs highlighted the importance/effectiveness of having students rotate through as many different positions as possible to gain a breadth of experience and knowledge, and to make sure that students were trained in all aspects of the SOR. One participant specifically mentioned the benefit of an overlapping rotation schedule, so that students could teach each other about the rotation responsibilities. It was also discussed that the more students produce, the more that they learn, so SORs should seek to provide opportunities for students to prepare large quantities of food. Dietetic students have previously indicated that experiential learning opportunities help with learning and applying material being taught (Holik et al. 2021). These "best practices related to providing a broad experience for students highlight the effectiveness of SORs as an

Table 4. Phase 2, Self-Identified Best Practices of Student-Operated Restaurants by Managers/Faculty Members

# of students at University	Majors of Participating Students	Menu Style	Self-Identified Best Practice
Theme 1: Coursework Management			
15,001-30,000	Nutritional Science, Dietetics, Food Science	Static menu, Single use/Catering	"Grading all along." Break up large menu projects so you can provide feedback to students along the way rather than just at the end.
>30,000	Hospitality Management	Cycle menu	Use an "Online format" for the coursework related to the lab rather than a separate in-person lecture in order to help students connect the course material with the lab experience. This helps keep material more succinct.
Theme 2: Provide Broad Experience for Students			
No answer	Dietetics	Single use/Catering	Make sure "students rotate through the positions" to cultivate ownership and be more invested in management roles.
5,000-15,000	Dietetics	Changed weekly	Have students "rotate through every possible position." When students know how to do the job they are better prepared to manage others in those positions.
>30,000	Hospitality Management	Cycle menu	Develop a gradual overlapping rotation schedule that allows students to work in each different position and learn their duties from the student who worked that position previously. "Students helping each other because they're more comfortable asking each other questions."
>30,000	Hospitality Management	Static menu, Single use/Catering	"Take the time to train" students in all aspects of the SOR (alcohol safety, food safety, proper dress, professionalism, how to talk to guests, kitchen safety etc). Even if it takes three weeks, go over everything to make sure students are set up for success.
5,000-15,000	Dietetics	Static menu	"The more students produced, the more they learned." Provide opportunities for students to repeatedly make items in large quantities.
Theme 3: Student-operated Restaurant Organization and Management			
>30,000	Dietetics	Students plan the menus	Go "over and above" baseline regulations and expectations. Our program is a model or template that other programs can use to get started.
15,001-30,000	Dietetics	Table d'hote	Modeled the SOR after a "benchmarked" or "verified" SOR program.
5,000-15,000	Dietetics	Single use/Catering	Have students take the "ServSafe certification exam." Have "a real Health Inspection twice a year" to provide real world experience. Utilize the restaurant as a recruiting tool to "share about the department."
>30,000	Dietetics	Cycle menu	Have a "two-tier system" where dietetic interns are upper level management overseeing undergraduate students in basic management roles. Interns can teach/proctor ServSafe, develop marketing tools, make production sheets, and hire/train employees.
15,001-30,000	Nutritional Science, Dietetics, Food Science	Static menu	In building a SOR it is "important to over-build" – plan for a little more space than you think you will need.
<5,000	Nutritional Science, Dietetics, Food Science	Custom menu each week	Make sure the "front of the house and the back of the house managers" [faculty] are "in sync."
15,001-30,000	Dietetics	Single use/Catering	"Allow the department to collect the money and be responsible for the budget"
>30,000	Hospitality Management	Menu changes weekly	"Try to limit the amount of food waste" because students notice. Take reservations and forecast as precisely as possible in order to not have left overs. Consider donating left over food.
Theme 4: Interactions with Students			
15,001-30,000	Hospitality Management, Culinary Arts	Static menu	"Building community in the classroom" by encouraging teamwork in class and interaction outside of class. Help them realize the network they have with each other.
5,000-15,000	Dietetics	Single use/Catering	"Independence with guidance." Allow the students to really take ownership to run and manage the restaurant with little supervision.
>30,000	Hospitality Management	Static menu	"Keep expectations very high" to ensure students are prepared for the high standards in the industry.
15,001-30,000	Dietetics	Single use/Catering	Try "not to intervene too much" especially towards the end of the semester. Allow students take ownership of their mistakes.
5,000-15,000	Hospitality Management	Pre-fix and Single use – changes weekly	Have a "360 degree full circle" reflection for students. Have students be evaluated frequently by the management team, each other, professors, and guests. This feedback will allow students to reflect all semester long on how to improve.

Note: the number of "best practices" exceeds the number of participants because several participants shared more than one.

experiential learning tool. Having a broad and realistic “job preview” of several SOR positions prepares them for management of multiple employees with different tasks in the future.

SOR Organization and Management

When discussing “best practices,” eight participants mentioned principles related to the general organization and/or management of the SOR. A couple of participants mentioned requirements such as having students complete ServSafe training, having students experience a health inspection, and going “over and above” baseline regulations and expectations. Having students with extra certifications and experience with regulations could open doors for future employment and also assures a comprehensive understanding of important foodservice and management concepts. One participant felt their best practice was in having a “two-tier system” of management where dietetic interns/graduate students act as upper-level management who oversee the undergraduate students in their more basic management roles. This type of system could increase the return on investment for the organization by introducing students to the SOR environment as an undergraduate student and then allowing them to use the skills they gained to manage other students at a higher level as a graduate student. Other organization and management best practices included overbuilding when starting an SOR, having effective communication between front-of-house and back-of-house faculty members, having the department responsible for the SOR budget, and forecasting effectively to minimize food waste. Having the business side of the SOR effectively and efficiently managed could allow for the manager to focus on mentoring students while still operating a viable business.

Interactions with Students

The fourth “best practice” theme was shared by five different participants and included comments related to interactions with students. A couple of the participants discussed the importance of allowing students to practice independence within the SOR by not intervening too much, but also providing sufficient guidance. This supports previous research which has indicated that dietetic students appreciate experiential learning opportunities and feel that they help to better learn and apply concepts (Holik et al. 2021). Another participant felt that it was important to “build community in the classroom” by encouraging teamwork and interaction in and out of the classroom. Having high expectations of students was also mentioned in order to make sure that they are prepared for the real world. Finally, one participant felt that their best practice was to have a full-circle reflection for students where they are evaluated by the management team, each other, professors, and the guests.

As programs adopt or consider adopting the use of SORs, knowing “best practices” and being aware of other programs’ approaches may ease and enhance the transition. Cross-university collaboration and discussion may create opportunities to benchmark and continue to refine the SOR experience for students and faculty/managers.

Limitations

Factors that encourage/discourage programs from implementing a SOR were only gathered from DPDs. Future research would be improved by exploring these factors amongst SORs in other educational program types such as hospitality management. Due to the relatively small sample size, results of this study are not generalizable to all foodservice and management education programs. Future research should focus on including a larger sample of education programs (e.g. hospitality management and culinary) that utilize SORs or could possibly benefit from the inclusion of a SOR. It may also be beneficial for researchers to try different incentives for

participation or to develop a database of foodservice and/or management educators that could be used in future studies so that researchers don’t have to rely on having the survey link forwarded from directors to potential participants. A larger and more diverse sample would allow for a better understanding of factors that encourage and discourage use of SORs in foodservice management education programs. Further, more data is needed to understand the student experience in SORs and how the learning in that setting influences their understanding of foodservice and management. It would also be helpful to know how and to what extent the experience influences students’ career aspirations.

CONCLUSIONS AND APPLICATIONS

Student-operated restaurants are utilized by some DPDs across the country in order to meet KRDNs specific to foodservice and management, and to provide real life foodservice and management experiences for students. However, most DPD programs are discouraged from utilizing SORs due to the large number of resources necessary. Nies (1993) surveyed programs with SORs and found that 86.8% utilized university support and 42.1% utilized support from industry partners. Education programs should seek collaborations with both foodservice management industry and University partners in order to alleviate the heavy resource investment required by SORs. For example, a partnership with equipment companies could be beneficial for both the SOR and the foodservice and management industry; as the foodservice and management industry donates equipment and SORs train students to be competent with that equipment. Then, as they enter the workforce, future practitioners may prefer use of that equipment brand. These collaborations could foster an environment where SORs are more feasible, resulting in students who are better prepared to more readily enter positions in food and nutrition management. Having the SOR aligned with the program goals was identified as the most encouraging factor. Programs considering use of a SOR should begin by discussing overall program goals and making sure that they align with the potential benefits of utilizing a SOR. Having well defined goals that are supported by SOR use could provide justification to encourage University and other stakeholder support. Haynes (2011) provided a justification for the creation of commercial kitchen in an academic program and emphasized the importance of creating support amongst key stakeholders and soliciting funds to support the project.

“Best practices” from 19 programs (dietetics and hospitality management) currently operating a SOR were identified as part of this study. These “best practices” can serve as a guide for both those programs who are seeking to start a SOR as well as those currently operating. In order to foster “best practices” across programs, programs should seek to increase their connection with other programs and share ideas and information. Increased use of SORs and increased effectiveness of SORs will benefit education programs as well as create better prepared students to enter the field of food and nutrition management.

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BARRIERS AND FACILITATIVE PRACTICES IDENTIFIED BY SCHOOL NUTRITION LEADERS DURING THE COVID-19 PANDEMIC

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ABSTRACT

This study investigated barriers and facilitative practices impacting school foodservice meal preparation and distribution during the initial year of the COVID-19 pandemic. Seven self-operated non-contract service school foodservice leaders were interviewed. Participant responses were coded and analyzed, categorized, and themes identified. Barriers identified included: purchasing issues, communication issues, staffing, and equipment needs. Scarcity of ready-made products was the main barrier identified. Facilitative practices included: cooperation with governmental agencies, school districts, and the community, transparency with staff, USDA waivers, and departmental mission focus. Transparent and clear communication with staff was an important facilitative practice. The research identified no ready to use emergency preparedness plans related to pandemic response.

Keywords: Covid-19, pandemic barriers, pandemic practices, remote school feeding

INTRODUCTION

The initial response to the COVID-19 pandemic included temporary shutdowns of most schools in the United States in March of 2020, resulting in students and staff transitioning to virtual education (Education Week, 2020). This transition spotlighted the issue of food insecurity and a continuing need for meal distribution. It was estimated one-third to almost one-half of households with children were food insecure during the COVID-19 pandemic (No Kid Hungry, 2020; Schanzenback, & Pitts 2020). School meals provided through the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) have a vital role in reducing food insecurity in the United States (Kinsey et. al, 2020).

The NSLP served over 30 million children in 2016. The NSLP and SBP is delivered through public and non-profit private schools. The oversight of the programs at the federal level is through the USDA. At the state level, the program is administered by state agencies who operate the NSLP and SBP through the schools. The schools receive cash subsidies and USDA foods from the USDA for each reimbursable meal they serve. For a meal to be reimbursable it must follow specific meal requirements (USDAa, 2017; USDAb, 2017).

The United States Department of Agriculture (USDA) recognized the necessity to continue providing meals to the country's children. This resulted in multiple waivers being granted for multiple regulations related to USDA school nutrition programs. Waiver impacted regulations included requirements for meals to be served to students in group settings, meals distributed within certain time periods, and meals distributed to families only if the student was present at time of pick-up (USDAa, n.d.). The waivers allowed for remote meal service which resulted in creating innovative methods to provide meals to students (Kinsey et al., 2020). Schools offered "drive-thru"

services, developed pick-up sites for meals, and delivery directly to students' homes (Patten et al., 2021).

Additional USDA waivers allowed for transition from the NSLP to the Summer Food Service Program (SFSP). This allowance provided school foodservice directors added flexibility (USDAa, n.d.). The meal composition requirements of the NSLP are more specific than those of the SFSP. Unique challenges in terms of ordering, purchasing, and receiving were issues for many school foodservice's ability to meet the NSLP meal guidelines (USDAa, n.d.). Waiving certain meal pattern requirements allowed school foodservice operators to create meals and menus based on food they could procure. Highly-sought-after food products included those that were prepackaged, needed minimal on-site packaging, and could be transported easily (Bulsaka, 2020).

The purpose of this study was to identify barriers and facilitative practices impacting school meal preparation and meal distribution during the initial school closures and several months into the COVID-19 pandemic as identified by school foodservice directors (SFSD)s. This information is useful in the planning and development of emergency response plans and in daily school foodservice operations.

METHODS

This was a qualitative study. A convenience, purposive sample of seven SFSDs participated in semi-structured interviews conducted between December 2020 and March 2021. The SFSDs oversaw small to mid-sized self-operated school foodservice district operations. School enrollments ranged from 670 students to 12,500 students. Institutional Review Board approval was obtained through the researchers' university.

Interview questions were developed by the researchers based on the research questions of the study. Interview questions were reviewed by a foodservice management professional. The interview protocol consisted of three introductory questions and thirteen open-ended questions designed to investigate departmental operations, meal preparation, emergency preparedness, and the distribution of student meals during the COVID-19 pandemic (Table 1).

Six SFSDs from Kentucky and one from Kansas completed an audio-recorded semi-structured 20-30 minute phone interview. After each interview, the researchers took field notes about the encounter. All audio recordings were transcribed, and transcriptions were reviewed for accuracy.

Three researchers individually analyzed each transcript, performed an initial analysis and preliminary coding of the responses obtained during the interview. Following the procedure outlined by Merriweather, Smith, and Walsh (2014) codes were subsequently compiled into themes and sub-themes. The three researchers, after individually coding and categorizing discussed their findings, agreed upon overarching themes and sub-themes. Once themes and sub-

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Table 1. Interview Guide Questions

Question #1	What is your name and job title?
Question #2	What are some of your responsibilities every day?
Question #3	What do you like about your job?
Question #4	How has the COVID-19 pandemic affected your foodservice operation?
Question #5	When schools closed in March, how did you modify your foodservice operations? (... how did foodservice production affect the ability to distribute meals?) <ol style="list-style-type: none"> Purchasing? Staffing?
Question #6	How have you been distributing meals to students that are doing schoolwork virtually (delivery, pickup, etc....)? <ol style="list-style-type: none"> How has this transformed over time?
Question #7	How often are you distributing meals?
Question #8	What would you say have been some of the biggest barriers that have slowed or inhibited the distribution of meals to students during this time?
Question #9	Prior to schools closing in March, did you have a disaster management plan in place? If so, what types of disasters did you have plans for?
Question #10	Have there been any barriers to meeting USDA requirements?
Question #11	How has the USDA provided support to your district during COVID-19?
Question #12	How has the (state of the school district) Department of Education supported your foodservice operations during COVID-19?
Question #13	Have you implemented any policies or quality improvement procedures to prevent issues from arising when distributing student meals? <ol style="list-style-type: none"> If you could go back to the beginning of COVID-19 and could anticipate the challenges faced, what would you have done differently? What would your advice be to other directors in your field? Are there any policies/procedures that have been put in place for future "disaster management?"
Question #14	Are there any food/products that you would like to be available to you that would improve your ability to provide meals to your students?
Question #15	What has been the hardest part of your job during the COVID-19 pandemic?
Question #16	Is there anything you would like to add about what you have learned during your adaptation to your meal production and delivery during the pandemic?

themes were agreed upon, the researchers contacted two participants by phone. The two participants were informed of the themes and subthemes as well as the researchers' interpretations of the results. The participants agreed with the researchers' findings.

RESULTS AND DISCUSSION

The COVID-19 pandemic response resulted in changes and additional requirements in the preparation and delivery of school foodservice meals to the children the schools served. Identified were barriers (Table 2) and facilitative practices (Table 3) to meal preparation and delivery as well as a lack of emergency preparedness plans useful to the response to the COVID-19 pandemic. Barriers identified included: purchasing issues, communication issues, staffing, and equipment needs. Facilitative practices included: cooperation between governmental entities, other school districts, and the community, transparency with staff, USDA waivers, and departmental missions.

Barriers

Purchasing

Six participants stated the lack of available pre-packaged menu items was a barrier to distributing meals during the pandemic. This barrier was described by Foodservice Director (FSD) A, "...it was hard to find prepackaged items because they were in such high demand."- FSD B indicated some items were not an option, "We have been on a search for pre-packaged, individually wrapped vegetables ... Having those portioned and pre-packaged would make the packing process much easier and more efficient." Patten, et al. (2020) noted a similar barrier through their qualitative study of 34 School Foodservice leaders. The participants indicated having difficulty procuring food and paper items.

Communication issues

Kenney (2021) noted poor communication between multiple levels of government and changing guidance as issues SFSDs identified that effected operational parameters. Likewise, three participants mentioned communication as a barrier. This was stated most often as a lack of transparency or prior notice from USDA. This barrier was described by FSD F, "The waivers have been tremendously helpful. But ...you have plans in place, and then there's a waiver...initially I do feel like there was a bit of a barrier in getting information from them (USDA) to us."

Lack of communication was also an issue within the district itself. This was illustrated by FSD E, "...they (school administration) feel like they have to have their hands so tightly wrapped around every single thing and are not necessarily dependent on their 'experts in house.'"

FSD G discussed the need to begin communicating the upcoming plans for the next school year, "We need to be thinking about what next year looks like. If I'm going to have to tell my families' 'Hey you're going to have to start paying for meals again if you don't qualify' ... That's a conversation we need to start having."

Staffing

Four participants identified labor issues as a barrier related to the pandemic, and their employees' fear of the unknown impacted operations. FSD F stated, "Staffing has been an issue I have never experienced before ... staff older in age don't want to risk exposure or potentially expose their spouse." FSD G noted that changes in menus and delivery changed staff's daily schedule, which resulted in budgetary complications as well "... (we) had to think about the safety of our staff ... and we also had to honor our staff's contract time. We

Table 2. Meal Preparation and Distribution Barriers identified by School Foodservice Directors

Identified Barriers	School Foodservice Director quotes
Purchasing	Foodservice Director A: "Obviously it was hard to find prepackaged items because they were in such high demand so that was tough...There were some issues with obtaining supplies such as packaging for food, to-go boxes, etc."
	Foodservice Director B: "Yes, we have been on a search for pre-packaged, individually wrapped vegetables that we can deliver to students. Having those portioned and pre-packaged would make the packing process much easier and more efficient."
	Foodservice Director E: "The issue for a lot of other school districts, they did not have the culinary capacity to do that (prepare and package foods for delivery), and they were dependent on convenience items in order to fulfill requirements"
	Foodservice Director G "I think one of the biggest things that every school district saw was the shortage around individually wrapped items."
	Foodservice Director E "We can't get the same type of glove and it's not that the inconsistency is bad, but ordering is more difficult. And the price of gloves is double."
Communication Issues	Foodservice Director F "The waivers have been tremendously helpful. But it's ironic because it's almost like you have plans in place, and then there's a waiver...but it was nice to eventually have them ... initially I do feel like there was a bit of a barrier in getting information from them to us."
	Foodservice Director E "People wouldn't listen to what we needed. Our sales were way down, involvement, number of meals served, the amount of people we were able to reach, how we could serve our community ... they (school administration) feel like they have to have their hands so tightly wrapped around every single thing and are not necessarily dependent on their 'experts in house'."
	Foodservice Director G "We need to be thinking about what next year looks like. If I'm going to have to tell my families 'Hey you're going to have to start paying for meals again if you don't qualify versus everyone getting fed for free this year. That's a conversation we need to start having."
Staffing	Foodservice Director A "A lot of our staff too was also high risk so it was scary to have them working during this time when we had no idea what could happen."
	Foodservice Director D "We were actually short-staffed in the beginning of all of this due to employees not wanting to come back to work because of COVID. So, finding help was one of the biggest barriers we faced in the beginning."
	Foodservice Director F "Staffing has been an issue I have never experienced before but this year it presented as an issue ... staff older in age don't want to risk exposure or potentially expose their spouse."
	Foodservice Director G "... now all of a sudden, (we) had to think about the safety of our staff ... and we also have to honor our staff's contract time. We don't have the space in our budget now to pay people to stay extra."
Equipment	Foodservice Director C "It is just a piece of equipment that will be able to seal packed meals that we have made. This equipment will make things much easier when transporting it to students. So, I am hoping that is something that we will be able to get soon."
	Foodservice Director G "We don't have enough storage space. When we have kids in the building, we have to obviously have the food we are going to serve to them. And then doing the meal pick up bags ... we use a lot of freezer items, and our freezers are only so big so when you've got both of those things going on, we don't have enough space in our freezer."
	Foodservice Director E "The issue for ... school districts, they did not have the culinary capacity to do that, and they were dependent on convenience items ... for us it was the aluminum containers or plastic bags."
	Foodservice Director F "We didn't have the equipment to prepare that amount of food."

don't have the space in our budget now to pay people to stay extra." Other research investigating school foodservice during COVID-19 also identified safety of the school foodservice staff as a concern of school foodservice leaders (Kenney et al., 2021; Patten et al., 2020).

Equipment

Four participants discussed equipment issues as a barrier. FSD C shared their equipment need: "It is just a piece of equipment that will [enable] us to seal packed meals... This equipment will make things much easier when transporting it to students." FSD G stated, "We don't have enough storage space ... our freezers are only so big."

FSD E provided added insight: "The issue for ... school districts, they did not have the culinary capacity to do that, and they were dependent on convenience items ... for us it was the aluminum containers or plastic bags."

Facilitative practices

There were also common themes that were identified as facilitative practices the SFSDs used as they navigated their way through meal production and delivery during the pandemic response.

Cooperation with governmental agencies, school districts and the community

FSD B discussed the importance of reaching out to other school districts, "One of the biggest pros ... was that we were able to partner up with other school districts and help each other." FSD B stated, "The Department of Education has been very helpful in the transition from The National School Lunch Program to the summer feeding program." FSD C added, "we were given USDA dollars that we have been able to use for processing and produce." FSD D sought assistance due to staffing shortages: "finding help was one of the biggest barriers...It got to a point where I was asking for help from churches, other schools, etc." FSD E found assistance through software: "I bought a subscription to *Survey Monkey* and that is our

Table 3. Meal preparation and distribution facilitative practices identified by school foodservice directors

Identified Facilitative Practices	School Foodservice Director quotes
Cooperation with governmental agencies, school districts, and the community	Foodservice Director B “One of the biggest pros that came from this was that we were able to partner up with other school districts and help each other.” Food Service Director B “The department of education has been very helpful in the transition from The National School Lunch program to the Summer Feeding program.” Foodservice Director C “we were given USDA dollars that we have been able to use for processing and produce.” Foodservice Director D “finding help was one of the biggest barriers...It got to a point where I was asking for help from churches, other schools, etc.” Foodservice Director E “I bought a subscription to Survey Monkey and that is our RSVP system. We could already have the meals built and when they call, they say the name and we take out their meals.” Foodservice Director G “The summer feeding section of KDE (Kentucky Department of Education) have been really amazing, and I have felt very supported by them. I feel like they are like ‘just get your kids fed’”.
Transparency with Staff	Foodservice Director A “I also learned that it is important to be honest and transparent with your staff. If there is a situation where you have no idea what you are doing, be honest about it.” Foodservice Director F “Strong leadership is important. Good communication. I make sure as soon as I get information to relay it to my ‘employees’. Even if it is not set in stone.” “It just works better when we are transparent about things.”
USDA Waivers	Foodservice Director B “Since the transition to the summer feeding program it has been much easier to meet USDA requirements...I don’t know what we would have done if we were still on the National School Lunch program.” Foodservice Director G “they have worked pretty quickly at getting those waivers out.”
Departmental Mission Focus	Foodservice Director G “It’s okay to not know what you are doing, but that is not an excuse to give up...” Foodservice Director B “what I have learned during this time is that our foodservice workers are the most adaptable, flexible, and dependable group of folks...they were always ready to work with a good attitude.”

RSVP system.” The software was used to notify the kitchen staff when a family had arrived to pick up their meals.

Transparency with Staff

Most of the school foodservice leaders discussed the importance of being open and transparent with their staff, including delivering difficult messages. FSD A explained, “I also learned that it is important to be honest and transparent with your staff. If there is a situation where you have no idea what you are doing, be honest about it.” Similarly, FSD F stated, “Strong leadership is important. Good communication. I make sure as soon as I get information to relay it to my ‘employees’. Even if it is not set in stone.”

USDA Waivers

The USDA waivers gave the school foodservice leaders increased flexibility to provide meals to their students. “Since the transition to the summer feeding program it has been much easier to meet USDA requirements...I don’t know what we would have done if we were still on-the National School Lunch Program.” noted FSD B. FSD F agreed. “The waivers have been tremendously helpful.”

Departmental Mission Focus

Most of the FSDs reflected positively on their department’s mission and focus to feed their students. FSD B praised her staff and their willingness to meet the needs of the students, “...our foodservice workers are the most adaptable, flexible, and dependable group of folks. They have had to learn how to pack food and basically change the entire way they work.”. Most of the FSDs discussed their department’s mission and focus to feed their students. Kenney et. al (2021) found a similar sentiment in their research. Noting staff members’ commitment to their work and the feeding of students.

Emergency Preparedness

Though not identified by the participants as a barrier, researchers noted there were no emergency preparedness plans in place that were useful in response to the pandemic. Most of the emergency management plans were written to be used in response to a weather disaster or when the school is used as a shelter. FSD C explained “it (emergency plans) was mostly for tornados and earthquakes. We try to keep all kinds of non-perishables just in case of an emergency. There was nothing [for] this pandemic though.” FSD A made a similar observation “there really is no handbook on how to handle this...truly flying [by] of the seat of our pants...We had plans for like tornados, a flood...we never had anything that covered something like COVID...”

CONCLUSIONS AND APPLICATIONS

Conclusions

Some of the barriers, such as shortage of prepackaged products and paper goods, discussed by participants were issues that naturally evolved out of an emerging situation. These probably could not have been prevented, though the impact of the barriers may have been minimized with more comprehensive emergency management plans and in place agreements with vendors.

Government agencies with oversight of school nutrition programs received both praise and censure related to their communication and response. This was consistent with Patten et al. (2021) finding that school foodservice leaders indicated that governmental agencies provided important guidance, but at times were slow with their guidance or that the communication was confusing. In such a dynamic time, communication is key to keeping organizations up to date with what is being proposed and initiated. The transparency the school foodservice leaders provided to their staff was key in keeping the staff motivated and engaged. This lesson should not be a

surprise, as transparency and open communication are generally found in well-run organizations (Gregoire, 2017).

This study uncovered a lack of emergency policies regarding pandemic preparedness. Emergency management procedures were in place for natural disasters but did not translate to COVID-19 pandemic response. Kenney et al. (2021) concluded that school foodservice is a critical aspect in the nutritional wellness of millions of children, but the structures in place at the beginning of the pandemic were not responsive in an emergency. Barriers identified through this research could be minimized in the future by designing menus and delivery practices for remote meal service needed in disaster response. Some toolkits and emergency processes related to COVID-19 have been developed to help SFSDs navigate the process of providing meals during remote learning (SNA, n.d.). These toolkits are an important resource that can continue to be developed and expanded using the practices implemented by the SFSDs and the lessons they learned and continue to learn while navigating through the COVID-19 pandemic.

Applications

This research highlighted the need for access to easy to produce and package menu items for food delivery and pick-up. Though schools are opening across the United States and on-site feeding is occurring once again, a new expectation may develop for meal provision when school is not in session or when non-traditional instructional days are utilized. SFSDs may be called upon to provide remote meals more often and on short notice.

The SFSDs noted specific equipment needs to help them manage expectations the school districts had in providing food to students. Several of the SFSDs were able to obtain equipment requested including a \$13,000 blast chiller. The need for increased storage and freezer space was not easily remedied during the pandemic; however, the proposed School Food Modernization Act of 2021 as well as current USDA equipment grants available, may provide monetary assistance in the acquisition of identified equipment needs (GovTrack.us, 2021; USDAb, n.d.).

It would be beneficial if lessons learned from the modifications in meals for school children during the COVID-19 pandemic be systematically documented and incorporated into written policies, procedures, and menus for use during similar responses. Patten et al. (2021) found school foodservice employees want to share their expertise from what they learned through COVID-19 and from previous experiences to assist in developing improved and broader disaster response plans. The lessons learned can be used to develop emergency management plans for the school foodservice departments or can also become a separate plan related to remote feeding. In addition, lessons learned in menu development and streamlined packaging and transport during this emergency could benefit the delivery of the SFSP. Kenney et. al (2021) recommended to include in a comprehensive emergency management program a written plan to coordinate communication between the different stakeholders involved in the production and distribution of meals during an emergency.

Much was learned by each SFSD during the pandemic. These lessons should not be forgotten but documented and used to help in the continuing provision of meals. As stated by FSD G, "It (the response to the pandemic) allowed me to see... how can I use this going forward to make my program better, my managers stronger, better leaders, how can I make myself a better leader? What can I do to make lunch fun again and get kids excited about coming back to see us?"

Study Limitations and Future Research

This study did not include participants who are part of a contract foodservice company. It would be beneficial to see if SFSDs who are employed through a contract foodservice management company identify similar barriers. The study's participants were from small to mid-sized school districts; thus, barriers and facilitative practices may be different for large school systems.

Another limitation to this study was the low number of participants and the lack of geographic diversity in the study participants. It would be beneficial to investigate barriers and facilitative practices identified by a larger and more geographically diverse group. Barriers and facilitative practices could be different in urban and or coastal areas.

Future research could include documenting the techniques that lessened the impact of the identified barriers and collecting information regarding the processes and procedures used by SFSDs followed during the pandemic. This information can be used to develop or improve toolkits with aligned training for SFSDs and frontline staff to include menus, recipes, packaging processes, and distribution practices for remote food delivery. As the pandemic has evolved, different barriers and facilitative practices may be impacting school FSDs such as prolonged staffing and supply chain issues. Continued investigation into how operations have evolved over time would be beneficial and provide additional information to provide more comprehensive emergency response plans and toolkits.

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EFFECTIVENESS OF A TRAFFIC LIGHT LABEL INTERVENTION IN A MIDWEST COLLEGE DINING HALL

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ABSTRACT

A repeated measures quasi-experimental design was utilized to examine the effect of traffic light labels on the amount of food served in a university dining hall in comparison to the control nutrition facts panels during the spring 2020 academic semester. There were no significant improvements in the healthfulness of foods served during the intervention compared to the control. Traffic light labels may not be more effective than nutrition facts panels in college dining halls to improve food choices.

Keywords: Traffic Light Labels, College Students, Dining Halls, Nutrition Labeling

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INTRODUCTION

Generally, diet quality improves from childhood to adulthood (Thiele et al., 2004), with the exception of the transition between adolescence and adulthood. Diet quality may decrease during this period (Forshee & Storey, 2006) due to the major life changes that occur when a young adult begins college. When young adults move out of their childhood homes, they gain independence as well as a new set of responsibilities, including making healthful eating choices on their own (Nelson, et al., 2008). Unfortunately, without the guidance of their parents, young adults often make poor dietary choices (Nelson et al., 2008).

Making healthy food choices can also be challenging in college dining halls. The wide variety of food choices may lead students to plate themselves large serving sizes and overeat (Rolls, 1986; Rolls et al., 2002), which can contribute to the development of chronic diseases (Nelson et al., 2008; Papadaki et al., 2007; Steffen et al., 2014; Winkleby & Cubbin, 2004). These negative eating and dietary habits are likely to persist throughout one's life and can contribute to the development of chronic diseases (Nelson et al., 2008; Papadaki et al., 2007; Steffen et al., 2014; Winkleby & Cubbin, 2004). Therefore, individuals must learn to make sound nutritional decisions in a college dining environment. Unfortunately, college students may struggle to understand the nutrition information presented on labels (Baltas, 2001; Cowburn & Stockley, 2005; Drichoutis et al., 2006; Mhurchu & Gorton, 2007) or fail to use labels (Graham & Laska, 2012; Ollberding, 2010). Thus, the lack of nutrition label use among college students suggests that changes to the label should be explored in order to increase user-friendliness, and therefore, label use (Ollberding, 2010). One promising alteration is the use of Traffic Light Labels (Seward et al., 2016).

The Traffic Light Label was developed as a user-friendly format because even the most health-conscious consumers found nutrition information difficult to understand and use (Cowburn & Stockley, 2005; Graham et al., 2015; Grunert et al., 2010a; Sharf et al., 2012). The design of the traffic light label uses red (nutrient poor choice), yellow (nutrient neutral choice), and green (nutrient rich choice) labels on packaging to get the attention of consumers and aid them in making better nutritional decisions (Grunert et al., 2010b). Traffic light labels may be especially promising in cafeteria settings. At Harvard University, researchers labeled all of the foods and beverages found in the dining halls with traffic light labels for seven weeks (Seward et al., 2016). A majority of students reported that the traffic light labels were helpful, altered the foods they chose to consume, and should remain in the dining halls (Seward et al., 2016). However, these results were based upon student reports, and studies are needed to evaluate if food decisions change with traffic light labels. Therefore, the purpose of this study was to examine the effect of traffic light labels on the amount of food served in a university dining hall in comparison to the control nutrition facts panels.

METHODS

Study design

This study utilized a repeated measures quasi-experimental design with a control (nutrition facts panel) and an intervention period (nutrition facts panel + traffic light labels) each lasting 28 days at a Midwestern midsize, private university dining hall.

This study was performed in the dining hall of the university during lunch and dinner hours. The dining hall used for this study is one of two on-campus dining halls that students have access to. Normally, about 460 and 439 students eat lunch and dinner in this dining hall, respectively. Only the main buffet line was used for the purposes of this study, as it has the most food options, and is the most frequently used by students. On average, there were between four and ten items present on the main buffet line for lunch and dinner.

This dining hall employs a 28-day cycle menu each semester. Prior to the start of this study, each item served on the main line in the dining hall was assigned either a red, yellow, or green color depending on its nutritional value. The nutritional information for all items was provided by dining services. The quality of the items was assessed using a nutritional criteria evaluation system previously developed and used in a similar study (Seward et al., 2016). This system evaluates food items using five positive criteria and six negative criteria (Table 1). Foods with net positive scores are designated as green labels, those with net negative scores are designated as red labels, and those with neutral scores are designated as yellow labels. During the control, 120 items were labeled as red, 66 items were labeled as yellow, and 140 items were labeled as green. During the intervention, 110 items were labeled as red, 44 items labeled as yellow, and 133 items labeled as green.

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Table 1. Traffic Light Label Nutritional Criteria Utilized to Assign Colors to Each Menu Item in a Dining Hall

Positive Criteria	Negative Criteria
Source of fruit or fruit juice (greater than 80% juice)	Saturated fat content greater than 5g
Source of vegetables	Added sugar: has a total sugar content of more than 8g, contains added sugar
Source of whole grains with a carbohydrate-fiber ratio less than 10	High sugar: has a sugar content greater than 20g
Lean protein source: must have less than 5g saturated fat and 12g or more of protein	High sodium: has a sodium content greater than 600mg
Low-fat dairy source: at least 200mg calcium and less than 2g saturated fat	Source of red meat
	Source of refined starch with a carbohydrate-fiber ratio greater than 10

Adapted from: Seward, M. W., Block, J.P., & Chatterjee, A. (2016). A traffic-light label intervention and dietary choices in college cafeterias. *American Journal of Public Health, 106*(10), 1808-1814.

During the spring 2020 semester, the first 28 days of the semester served as a control period in which no changes were made. This dining hall presents nutrition information to students using an index card that displays a nutrition facts panel and a list of ingredients. The nutrition facts panels on these index cards included the serving size, calories, total fat, saturated fat, trans fat, calories from fat, cholesterol, sodium, total carbohydrate, dietary fiber, total sugars, and protein. Then, during the intervention period, traffic light labels were added to this current labeling scheme present in the dining hall. The same index cards and nutrition facts panels remained in the dining hall; however, for this period of time a large, circle color card was added behind the index card to represent one of the three traffic light conditions: red, yellow, or green. Explanatory signage was also added next to the main line to help guide students in using the new labeling system. Some research suggests that signs explaining how to analyze nutrition labels are very helpful to consumers, and consumers are more likely to view and utilize nutrition labels when explanatory signage is present (Graham et al., 2015). Originally, a 28-day follow-up period was included in the design of this study; however, this follow-up period could not be implemented due to the COVID-19 pandemic.

Data collection

This study was approved by the Bradley University Committee on the Use of Human Subjects in Research prior to data collection. The main variable of interest was servings taken, and these data were collected by university dining services. Using the serving size for each item, dining services counts the number of servings taken at the end of the meal period (i.e. lunch). The amount served for each red, yellow, and green item in the main line was collected at both lunch and dinner during both periods of the intervention: control and intervention.

Additionally, dining hall patrons who took food from the main line were asked to fill out a voluntary survey following informed consent. Participants ages 18 and older were recruited to take this survey on randomly chosen (11th and 25th) days of the cycle in each intervention time point. The survey asked questions about participant demographics and other characteristics (i.e. dining hall usage, nutrition label usage, etc.) to compare differences across the intervention time points.

Data Analysis

After testing for outliers among the items, 6 food items from various days were removed from final analysis (3 red foods each from control and intervention). Number of servings taken by color (dependent variable) was combined for both lunch and dinner each day during the control and intervention period. The final sample size was 28 days during the control and 26 days during the intervention. To compare the servings taken per day of the food item for each color during

control and intervention, a one-way analysis of variance (ANOVA) was used with significance set at $p < 0.05$. Bonferroni post hoc tests were utilized for multiple comparisons. For the survey data, a Chi-Square or t-tests were performed to examine differences in participant characteristics between the control and intervention.

RESULTS AND DISCUSSION

A majority of the survey participants ($n=261$) were white (64.4%), male (56.3%) freshmen or sophomores (82.4%) who had never taken a nutrition class (92%). Most of the participants (58.6%) identified as non-dieters, meaning they were not currently watching their diet. In general, a majority of the participants used the dining hall 6 times per week or less (61.5%), never or rarely use nutrition panels in the dining hall (59.1%), and never or rarely use the dining services website to view nutrition information (57.1%). Except for website use, no significant differences were discovered among the survey data between control and intervention (Table 2). However, after adjusting the p-value for multiple comparisons, none of the p-values were low enough to reach significance. While this helps present a generalization of the sample population of the dining hall patrons, surveys were not collected every day of the control and intervention, nor tied to actual food consumption.

The one-way ANOVA for color and time point was significant ($F(5, 150) = 4.75, p < 0.001$). There were no significant differences at control and intervention between red labeled items, yellow labeled items, and green labeled items (Table 3). However, the amount served of food labeled as yellow during the intervention ($M = 341.9, SD = 275.9$) was significantly lower than the amount of food labeled as red served during control ($M = 654.6, SD = 286.4, p < 0.0001$) and intervention ($M = 604.9, SD = 295.9, p = .008$).

The results of this study suggest that traffic light labels were not effective for this population as there were no differences in the frequency that red food items were chosen between control and intervention or the frequency that green food items were chosen between control and intervention. There are several reasons why the traffic light labels may not have been effective. The students may have attempted to follow a diet for their New Year's resolutions during the control period (no difference in red and yellow-labeled foods served), but their habits declined by the time the intervention period began (yellow significantly less than red at intervention). Usually, when individuals are looking to make a lifestyle change, they wait for a "temporal milestone" such as the start of a new week, month, year, or school semester, or following a holiday, school break, or birthday. At the beginning of a new year, interest in dieting increases by 82.1% (Dai et al., 2014) but New Year's resolutions do not last. According to the results of one study, 77 percent of

Table 2. Summary & Comparison of Characteristics of Dining Hall Patrons During Control & Intervention

Characteristic	Control		Intervention		p-value
	M	SD	M	SD	
Age	19.3	1.3	19.3	1.1	0.74
	N(%) ^a				
	Control	Intervention	Total		
Year in School					0.40
Freshman	71(50)	63(53)	134(51)		
Sophomore	40(28)	41(34)	81(31)		
Junior	18(13)	12(10)	30(12)		
Senior	9(6)	3(3)	12(5)		
Graduate Student	3(2)	1(1)	4(2)		
Gender					0.40
Male	83(59)	64(53)	147(56)		
Female	58(41)	55(46)	113(43)		
Other	0(0)	1(1)	1(0.4)		
Race					0.16
Asian or Asian American	7(5)	10(8)	17(7)		
Black or African American	13(9)	16(13)	29(11)		
Hispanic or Latino/a/x	16(11)	10(8)	26(10)		
White or Caucasian	96(68)	72(60)	168(64)		
Multiracial	9(6)	12(10)	21(8)		
Diet Status					0.53
Dieter	59(42)	47(39)	106(41)		
Non-Dieter	81(58)	72(61)	153(59)		
College Nutrition Course					0.16
Yes	8(6)	11(9)	19(7)		
No	133(94)	107(89)	240(92)		
I don't know	0(0)	2(2)	2(1)		
Dining Hall Use per Week					0.30
1-2 times	17(13)	18(16)	35(14)		
3-4 times	29(21)	30(26)	59(23)		
5-6 times	30(22)	31(27)	61(24)		
7-8 times	20(15)	18(16)	38(15)		
9-10 times	18(13)	9(8)	27(11)		
More than 10 times	22(16)	10(9)	32(13)		
Nutrition Panel Use					0.83
Never	46(34)	33(28)	79(31)		
Rarely	34(25)	36(31)	70(28)		
Sometimes	35(26)	30(26)	65(26)		
Often	12(9)	9(8)	21(8)		
Always	9(7)	8(7)	17(7)		
Website Use					0.03
Never	57(42)	42(36)	99(39)		
Rarely	19(14)	31(27)	50(20)		
Sometimes	23(17)	17(15)	40(16)		
Often	26(19)	11(9)	37(15)		
Always	12(9)	15(13)	27(11)		

M, mean; SD, Standard Deviation

^a Not all frequencies add up to 261 due to skipped questions

participants had maintained their resolutions one week into the new year, but this decreased to 55 percent after one month (Oscarsson et al., 2020). In the present study, when the control period began, several temporal milestones were overlapping. It was the start of a new year and a new school semester, and the holidays and a school break had just ended. This suggests that students may have been dieting for their New Year's resolutions during the control period, but stopped pursuing their resolutions by the time the intervention period started.

Because the intervention period of this study overlapped with the university's midterm exams, students' food choices may also have been driven by stress. Although stress levels are frequently elevated among college students, exams are the most substantial source of their stress and college students experience greater stress during exam periods (Michels et al., 2020). Students also report that they struggle to maintain a healthy diet more during exam periods than at other points in the school year, which leads them to consume more unhealthy food items and fewer healthy items (Michels et al., 2020). The unhealthy items used to cope with stress tend to be those higher in sugar and fat (Michels et al., 2020) and high stress levels among college students are associated with a lower consumption of fruits and vegetables (Ansari et al., 2014). The students in the present study may have experienced these effects of stress as they plated their meals during the intervention period by selecting red-labeled less healthy items instead of healthier yellow-labeled items as a way to cope with their stress.

Previous studies using traffic light labels in cafeteria settings have shown mixed results (Seward et al., 2016; Thorndike et al., 2014). Traffic light labels were successful in changing food choices in a hospital cafeteria setting (Thorndike et al., 2014). However, these labels were unsuccessful in a college dining hall setting. Even though students reported that the traffic light labels were helpful and altered their behavior, no statistically significant behavior changes were observed (Seward et al., 2016). This disparity may have occurred because the study was not long enough to elicit behavior changes from the students. In general, a longer time period may be necessary to observe changes from traffic light labels in a cafeteria setting, especially if students are making gradual, small changes. The present intervention and the study by Seward et al. (2016) were both less than 2 months, while the intervention by Thorndike et al. (2014) observed changes at 12 and 24 months. Because individuals must be exposed to labeling interventions repeatedly in order to make behavior changes (Roy & Alassadi, 2020), a longer intervention may be necessary to observe changes in a college dining hall.

Furthermore, traffic light labels may also be less effective for the college age population. According to the United States Department of Agriculture (2014), 42 percent of working age American adults and 57 percent of older American adults report using nutrition labels when making food decisions. However, in a survey among college students, only 35 percent reported that they frequently examined nutrition labels prior to buying and consuming foods and beverages (Graham & Laska, 2012). Instead, taste has been identified as the main factor that influences young adult food purchases (Hebden et al., 2015; Roy & Alassadi, 2020). In one study, nutritional value was selected as the fourth most important influence on young adult food choices behind taste, convenience, and cost (Hebden et al., 2015). Since taste drives food choices, it is not a surprise that young adults tend to consume foods prepared with high levels of fat, sugar, and sodium instead of more nutritious items (Roy & Alassadi, 2020). If the food selection of young adults is mostly guided by taste instead of nutrition, they may not have noticed or utilized the traffic light labels at all. Furthermore,

Table 3. Mean Differences of Number of Servings between Control and Intervention by Color

	M	SD	1	2	3	4	5	6
1. Control Red	654.6	286.4		49.7	194.6	312.7**	182.5	191.2
2. Intervention Red	604.9	295.8			144.0	263.0*	132.9	141.6
3. Control Yellow	459.0	295.3				118.1	-12.1	-3.4
4. Intervention Yellow	341.9	274.9					-130.2	-121.5
5. Control Green	472.0	195.5						8.7
6. Intervention Green	463.4	192.4						

* $p < 0.01$ ** $p < 0.0001$

according to the survey results in the present study, a majority of the participants never or rarely used nutrition panels in the dining hall or used the dining services website to view nutrition information, both of which are always available to students. Therefore, if students were not already using the nutrition information offered to them, providing another method of delivering this information likely was not helpful, even if it was simpler.

The colors used in the traffic light labels could have also discouraged students from using the labels. While many consumers find color coding to be beneficial, others dislike the colors red and green (Grunert & Willis, 2007). Some consumers find red and green to be overly pushy when used on nutrition labels because they feel that they are being coerced to eat certain foods (Grunert & Willis, 2007). Also, young adults gain a significant amount of independence when they attend college, and selecting what they would like to eat in dining halls is one way to exercise independence (Nelson et al., 2008). Therefore, if the students in the present study felt forced to make a particular food choice by the traffic light labels, they may have decided to ignore the labels.

Although this study adds to the literature regarding traffic light labels in a cafeteria setting, it is not without limitations. This study was conducted at one dining hall line during one time point on a particular college campus. Also, there was a lack of racial diversity amongst the survey participants. As a result, the findings may not be generalizable or representative of all campuses. Additionally, individual behavior changes could not be assessed for each student as the total amount served for each food item at each meal was supplied by dining services. For example, even though there were no significant differences in diet status between the two time points, all students did not complete surveys, the impact of diet status on student dining hall choices could not be investigated, and participants may have interpreted the question in different ways.

The lack of a post-intervention period is an additional limitation of this study. Due to the study being cut short by COVID-19, the researchers were unable to administer a post-intervention survey. The planned post-intervention survey would have asked students if they noticed and used the traffic light labels when plating their food. Lastly, the intervention was relatively short, and may not have exposed the students to the labels for long enough to elicit any behavior changes.

CONCLUSIONS AND APPLICATIONS

Traffic light labels may not work in a college dining hall setting, thus other options may be more effective in promoting healthy eating among college students. For example, expanding the number of healthier items that would be labeled as green or yellow offered in dining halls as well as limiting unhealthy, red items might be more effective. During this study, most of the entrées served were labeled with red traffic lights. On the contrary, green labels were often

reserved for vegetable side dishes like broccoli, cauliflower, and green beans. The disproportionate amount of red entrées in comparison to green and yellow entrées may make it difficult for students to eat healthfully. University wellness policies may be worthwhile to explore opportunities for dining hall menu nutrition standards. By making a wider variety of nutritious items readily available to students, this may increase the consumption of healthy items among college students, and will overall encourage healthier habits within this population (Hebden et al., 2015; Roy & Alassadi, 2020). Menu reformulation may be necessary as many of the menu items in this study were flagged as having high sodium and high saturated fat. For example, high sodium and saturated fat levels oftentimes pushed items with neutral scores (yellow label) into the negative score (red label) category. This led to fewer foods being labeled as green or yellow. Therefore, sodium and saturated fat contents could be targets to allow for greater variety of healthy items in university dining halls.

Additionally, universities may need to take action to prevent students from stress eating. Students use eating as a coping mechanism to help control their stress (Elshurbjy & Ellulu, 2017), which stems from the aforementioned academic stress, but also related to relationships, finances, and separation from one's family (Lyzwinski, 2018). Thus, to reach more students universities could offer classes that students could earn credit hours, especially first-year students to help students manage their stress and transition to college. Relaxation training, cognitive behavioral therapy, coping skills training, psychoeducation, and social support programs have been found to be effective in reducing perceived stress and/or anxiety among undergraduate students (Yusufov, 2019). Half-semester courses are feasible and affordable for universities as short programs (8 weeks or less) have been successful across campuses (Yusufov, 2019).

In conclusion, traffic light labels were not effective in this study. According to the results of the present study, college students may not utilize nutrition labeling in any format as a majority of survey respondents reported never or rarely using the standard nutrition facts panels. Instead, the food choices of college students may be influenced by factors other than nutritional value. As a result, future studies should focus on how college students can be guided to eat nutritious meals without requiring nutrition labels. Specifically, future studies should examine how to increase the variety of would-be green labeled items beyond vegetable sides, as these made up a large portion of the green labelled items served during this study. Since repeated exposure is necessary for behavior changes to be made, having a longer study period may help to elicit behavior changes among participants more effectively than the length of the present study. Future studies should also ask college students for feedback about traffic light labels and how they use nutrition information, if at all, to make food choices.

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GENDER DIFFERENCES IN DIGITAL FOOD ORDERING EXPERIENCES: AN APPLICATION OF THE TECHNOLOGY ACCEPTANCE MODEL AND SELF-CONGRUITY THEORY

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ABSTRACT

The purpose of this study was to examine the digital food ordering experience by applying the technology acceptance model and self-congruity theory. A research model was developed and examined, focusing on gender differences. Results showed that both perceived ease of use and perceived usefulness had significant positive effects on the certainty of the digital ordering process. Additionally, both certainty and self-technology congruence significantly influenced customer satisfaction. Multi-group analysis results revealed that the effect of certainty on customer satisfaction was significantly higher for females, while the effect of self-technology congruence was significantly higher for males.

Keywords: digital food ordering; gender difference; technology acceptance model; self-congruity theory; certainty

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INTRODUCTION

The U.S. restaurant industry, in 2020, was projected to grow continuously, with \$899 billion in sales in more than 1 million locations (National Restaurant Association [NRA], 2020). Technology advancement has brought changes to many industries including the restaurant industry. Restaurateurs need to continually adapt and innovate to stay competitive in the fast-changing business environment (NRA, 2019). On the other hand, consumers are more comfortable using technology and are adopting it, especially Millennials and Centennials who live for social engagement and experience online (NRA, 2019). This consumer trend is driving changes in the restaurant industry (NRA, 2019).

Digital ordering, as one form of technology that triggered various changes in the restaurant industry, was favored by a growing number of customers because of its fast and convenient features (He *et al.*, 2019; Kimes, 2011). According to a NRA report, 44% of customers surveyed had placed digital food orders in the past year (NRA, 2020). Digital ordering for takeout or delivery of food has grown tremendously in the past decade and is expected to drive growth in restaurant sales for the next decade (Nunes, 2019). Many quick-service restaurants have adopted various digital ordering methods for their operations (Kimes, 2011). Pizza was the most frequently ordered food via digital platforms (Kimes, 2011). Examples of popular platforms for placing digital food orders include restaurant apps, restaurant websites, and smart speakers.

Restaurateurs enjoyed the benefits of adopting digital food orders, such as increased revenue, increased productivity, reduced labor costs, improved capacity management, increased accuracy of orders

placed, and improved customer relationship management (Kimes, 2011; Kimes & Laqué, 2011). However, restaurant managers have expressed concern over declining service quality associated with the reduced interaction between customers and restaurant staff (He *et al.*, 2019; Kimes & Laqué, 2011). The traditional human-to-human interactions between customers and restaurant staff have been replaced with human-computer interactions or human-to-robot interactions (Atkinson, 2018). In other words, how customers interact with the digital platform influences their perceptions of the service quality of the restaurant. Therefore, research is needed to examine the impact of such interaction on customer digital ordering experience.

With the increasing adoption of digital food ordering platforms in the restaurant industry, it is important to understand the customer experience when placing orders. During the COVID-19 pandemic, customers placed more digital food orders than ever before. Previous studies about digital food ordering mainly focused on food quality, service quality, and customer satisfaction (Alalwan, 2020; He, Han, Cheng, Fan, & Dong, 2019; Suhartanto, Helmi Ali, Tan, Sjahroeddin, & Kusdiby, 2019). However, no research has been conducted to examine consumers' food ordering experience through the perspectives of certainty and self-congruence. Therefore, this study aimed to investigate customers' digital food ordering experience by proposing and testing a research model. As gender differences were frequently mentioned in previous studies related to technology adoption and user experience (Gefen & Straub, 1997; Kim, 2016; Park, Kim, Cho, & Han, 2019; Venkatesh & Morris, 2000; Zhang, Nyheim, & Mattila, 2014), the study will further explore whether there are gender differences in the proposed relationships in the research model.

In the next section, the literature review and development of hypotheses are described. A research model is proposed based on the technology acceptance model and the self-congruity theory. The methodology of the current study, results, discussions, and conclusions are presented afterward.

Technology Acceptance Model

Technology Acceptance Model (TAM; Davis, 1985; 1989) has been frequently used by researchers to evaluate the attitudes and behaviors of customers when adopting technology in the hospitality industry (Morosan, 2011; Salehi-Esfahani & Kang, 2019; Zhang, Seo, & Ahn, 2019). TAM identified that the perceived usefulness and the perceived ease of use of technologies are two basic factors that influence an individual decision to adopt the technology (Davis, 1985; 1989). Perceived usefulness measures an individual subjective evaluation of the utility provided by certain technology (Zhang & Mao, 2008). An individual is more likely to adopt the technology if he or she perceives it as useful in achieving goals (Premkumar, Ramamurthy, & Liu, 2008). The perceived ease of use refers to an

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individual's subjective evaluation of the efforts required to learn and use the technology (Ko, Kim, & Lee, 2009; Zhang & Mao, 2008). Similarly, an individual is more likely to adopt the technology if he or she perceives that it is easy to use (Davis, 1989).

Both constructs of perceived ease of use and perceived usefulness have been found to influence consumer attitudes, emotions, intentions, and behaviors in terms of technology adoption and usage (Morosan, 2011; Salehi-Esfahani & Kang, 2019; Zhang, Seo, & Ahn, 2019). Certainty refers to an individual subjective sense of conviction in their attitudes (Rucker, Tormala, Petty, & Briñol, 2014). It is also considered a dimension of customer attitude or emotion in marketing research (Rucker, Tormala, Petty, & Briñol, 2014; Tiedens & Linton, 2001). This concept can also be interpreted by its synonymous terms such as "confidence", "commitment", and "correctness" (Gross, Holtz, & Miller, 1995). In addition, the impact of certainty on consumer brand loyalty and satisfaction was proved in previous consumer studies (Tuu & Olsen, 2012; Tuu, Olsen, & Linh, 2011). Based on the above-mentioned literature, we proposed in this study that:

H₁: Perceived ease of use has a positive impact on the certainty of the digital ordering process.

H₂: Perceived usefulness has a positive impact on the certainty of the digital ordering process.

H₃: Certainty of the digital ordering process has a positive impact on customer satisfaction.

Self-congruity Theory

Self-congruity refers to the degree to which an individual's self-perception matches their perception of a product or the brand image of a product (Sirgy, 2015; Sirgy & Su, 2000). In specific, self-concept is defined as the "totality of the individual thoughts and feelings having reference to himself as an object" (Rosenberg, 1979, p. 7). Thus, the self-congruity theory is developed based on the assumption that consumers will prefer a product or service that matches their self-perception (Sirgy, 1982). The self-congruity theory has been widely applied in hospitality and tourism studies (Boksberger, Dolnicar, Laesser, & Randle, 2011). For example, researchers found that self-congruity had positive influences on tourist satisfaction toward the destination (Kumar & Nayak, 2014), hotel guest satisfaction (Sop & Kozak, 2019), and customer satisfaction with service quality in restaurants (Shamah, Mason, Moretti, & Raggiotto, 2018). In an attempt to study the influence of such congruence between consumers themselves and the technology on consumer satisfaction in the digital ordering experience, the following hypothesis was proposed:

H₄: Self-technology congruence has a positive impact on customer satisfaction.

Gender, a fundamental aspect of culture, was frequently tested in information technology studies to understand consumer behaviors. In early studies, researchers suggested that males and females perceive technology differently and further called for future studies to examine the impact of gender on TAM (Gefen & Straub, 1997). In response to the call, Venkatesh and Morris (2000) identified that perceived usefulness had a stronger effect on the technology adoption decisions of males, while the decision-making processes of females were more influenced by subjective norms and perceived ease of use of the technology. When applying TAM in hospitality and tourism studies, the role of gender was also explored. Zhang, Nyheim, and Mattila (2014) found that males had higher computer self-efficacy and tended to find the information systems easier to use and more enjoyable when compared with females. Using TAM to study hotel tablet apps, Kim (2016) claimed that gender did not moderate the relationships between predictors and consumer behavioral intentions. However, gender differences were found in consumer preferences toward

specific tablet app functions (Kim, 2016). As limited previous research has examined the gender differences in digital food ordering experience, this current study also used the multi-group analysis method to explore the gender differences in the proposed research model. Thus, the last hypothesis was proposed:

H₅: Hypothesized relationships will be different between female consumers and male consumers.

Figure 1 presents the research framework with all hypothesized relationships among the constructs.

METHODS

Data Collection

The study was approved by the Institutional Review Board (IRB) at a large public university located in the southern region of the United States before data collection. Data were collected between March 2019 and May 2019. Traditional lab studies have used students as the pool of valid participants (Druckman & Kam, 2011). In the marketing field, Wang and Yang's (2008) study identified that the effect sizes of studies using college student samples and regular consumer samples are very similar. In addition, young consumers with higher education levels are more likely to adopt digital food ordering methods (Leung & Wen, 2020). Therefore, although with limitations, undergraduate student samples in this study can still represent the restaurant customer population who are inclined to place digital food orders. Researchers posted study flyers in the student union and major academic buildings to recruit undergraduate students with a food voucher incentive. Undergraduate students who were interested in this study were invited to go to a research lab to participate in the research project. Upon arriving at the lab, students were first asked to choose one of the three digital ordering methods (mobile app, website, or chatbot) to make a test takeout food order with a real restaurant (TGI Friday). The real menu from the restaurant was used in the study. The purpose of the test takeout food order is to ensure that participants had digital food experiences before they took the survey. Then all participants were required to complete an online survey.

A total of 211 participants completed the survey. In the study sample, 34.6% of them are males, and 65.4% are females. The age ranged between 18 and 49, with the average age being 21.8 years old. In terms of ethnicity, more than 41% of the participants are White, 25% of them are Hispanic or Latino Americans, 16% of them are African Americans, and 14% of them are Asian Americans. More than 97% of the participants have placed orders, and almost half of the participants placed takeout orders once every week.

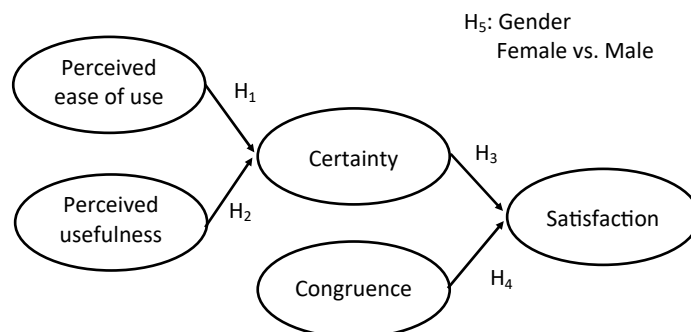


Figure 1. Research Framework

Measurement

The online survey questionnaire consisted of two sections. The first section contained questions regarding all the constructs in the proposed research model. The measurements of all the constructs were adopted from the previous literature to fit the context of this study. Perceived ease of use and perceived usefulness were measured using four items adopted from the study of Davis (1989). Certainty was measured using three items borrowed from Smith and Ellsworth (1985). Self-technology congruence was measured using four items borrowed from Sirgy et al. (1997). Satisfaction was measured using three items borrowed from Westbrook & Oliver (1991). All measurement items are listed in Table 1. A seven-point Likert-type scale anchored from one (strongly disagree) to seven (strongly agree) is used for all items. The second section collected demographic information from the respondents, including gender, age, ethnicity, academic standing, and past restaurant takeout order experience. A pilot test was conducted with over 20 study participants. The wording of some questions was slightly modified according to the feedback from the pilot study.

Data Analysis

Before data analysis, the collected data were cleaned and checked for missing data in SPSS Version 24.0. No missing data were identified. The proposed model was then examined through partial least squares structural equation modeling (PLS-SEM) using the SmartPLS 3 statistical software package. When measuring the survey data, many hospitality researchers considered the PLS-SEM method as a robust and reliable method (Ali, Rasoolimanesh, Sarstedt, Ringle, & Ryu, 2018); therefore, this method was also used in the current study. According to Hair et al. (2017), our proposed model with a 5% significance level and 80% statistical power requires 110 minimum sample size for PLS-SEM analysis. A three-step PLS-SEM process was used to analyze data. First, using the full sample in the outer (measurement) model, all the constructs were assessed for the indicator loadings, reliability, and validity in the measurement model.

Second, the inner (structural) model was validated again using the full sample for the overall model fit, path coefficients significance, and the coefficient of determination (R^2 value; Hair et al. 2017). Third, the full sample was divided into two groups: females versus males. Multigroup analysis in PLS-SEM was conducted to compare the path coefficients between the two groups. Statistical significance was determined at $p < 0.05$.

RESULTS AND DISCUSSION

Measurement Model

The PLS-SEM algorithm using a path-weighting scheme was run to evaluate the reliability and validity of the construct measures in the outer model. The solution of the PLS-SEM algorithm was obtained in five iterations. Table 1 summarizes the results of the measurement model. First, the construct convergent validity was tested by examining the factor loadings and the average variance extracted (AVE). All factor loadings of the five constructs were above the minimum threshold value of 0.708 and were all kept for further analysis (Hair et al., 2017). The value of AVE for the constructs all exceeded the minimum threshold value of 0.5 (Hair et al., 2017). Therefore, convergent validity was met.

Moreover, the internal consistency (reliability) of all the constructs was tested by composite reliability (Fornell & Larcker, 1981). The composite reliability of all constructs was well above the minimum threshold value of 0.708 (Hair et al., 2017). Discriminant validity was examined using both the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT). As shown in Table 2, the square root of AVE values for each construct were higher than the correlation coefficient between a pair of constructs (Fornell & Larcker, 1981). In addition, the HTMT values for all constructs were below the threshold value of 0.85 (Hair et al., 2017), demonstrating good discriminant validity. In summary, the construct validity and reliability of the measurement model were met.

Table 1. Results Summary for The Measurement Model

	Outer Loadings	Composite Reliability	AVE
Perceived ease of use		0.963	0.866
1. Using digital methods to place a to-go order was easy for me.	0.941		
2. I found it easy to get digital ordering methods to do what I want it to do.	0.939		
3. My interaction with digital ordering methods was clear and understandable.	0.899		
4. It was easy for me to become skillful at using digital methods to place a to-go order.	0.943		
Perceived usefulness		0.963	0.868
1. Using digital methods enabled me to place a to-go order more quickly.	0.927		
2. Using digital methods enhanced my effectiveness on food ordering.	0.923		
3. Using digital methods made it easier to place a to-go order.	0.949		
4. I found digital methods useful in placing a to-go order.	0.927		
Certainty		0.931	0.818
1. I had a good understanding of what was happening in the ordering process.	0.918		
2. I was certain about what was happening in the ordering process.	0.938		
3. I was able to predict what was going to happen during the ordering process.	0.855		
Self-technology congruence		0.962	0.864
1. I am very much like the typical user of digital food ordering.	0.924		
2. I can identify with the typical user of digital food ordering.	0.943		
3. The image of the typical user of digital food ordering reflects the kind of person I am.	0.927		
4. I feel my personality is similar to a digital food ordering user.	0.923		
Satisfaction		0.965	0.903
1. I am happy with the digital ordering process.	0.969		
2. I am satisfied with the digital ordering process.	0.965		
3. The decision to use the digital ordering method to place a to-go order was a wise one.	0.916		

Table 2. Discriminant Validity

	Perceived ease of use	Perceived usefulness	Certainty	Congruence	Satisfaction
Perceived ease of use	0.931				
Perceived usefulness	0.827	0.931			
Certainty	0.806	0.726	0.904		
Congruence	0.670	0.671	0.538	0.929	
Satisfaction	0.861	0.836	0.745	0.682	0.950

Structural Model

A path analysis was then conducted using the bootstrapping method with 5000 iterations of resampling to examine the goodness-of-fit index, the significance of path coefficients, and the coefficient of determination (R^2 value). As suggested by Henseler et al. (2014), the standardized root mean square residual (SRMR) was used as the goodness-of-fit measure of PLS-SEM. The proposed model had an SRMR value of 0.038, lower than the threshold value of 0.08 (Hu & Bentler, 1998), suggesting a good model fit.

The tested structural model with path coefficients is shown in Figure 2. All the proposed relationships were significant, supporting hypotheses H_1 to H_4 . Both perceived ease of use and perceived usefulness had significant positive effects on the certainty of the digital ordering process ($\beta = 0.65$ and 0.19 , $p < 0.001$ and < 0.05 , respectively). Additionally, both certainty and self-technology congruence significantly influenced customer satisfaction levels when placing orders ($\beta = 0.53$ and 0.40 , $ps < 0.001$, respectively). The tested model demonstrated that 65.9% of the variance of certainty was explained by both perceived ease of use and perceived usefulness, while 66.6% of satisfaction was accounted for by both certainty and congruence, well above the minimum threshold R^2 value of 25% (Hair et al., 2017).

The study findings are consistent with previous literature. First, the extensive application of the TAM model in the hospitality field all tested positive effects of perceived ease of use and perceived usefulness on the attitude toward adopting technology, such as mobile apps (Zhang, Seo, & Ahn, 2019), biometric systems in restaurants (Morosan, 2011), or restaurant review websites (Salehi-Esfahani & Kang, 2019). In marketing research, certainty is considered a dimension of customer attitude or emotion (Rucker, Tormala, Petty, & Briñol, 2014; Tiedens & Linton, 2001). Thus, the result of this study indicates that both perceived ease of use and perceived usefulness significantly impact certainty, resonant with previous TAM studies. Additionally, Watson and Spence (2007) found that certainty is relevant to consumer decision-making, including satisfaction and post-purchase behavior, supporting the positive relationship between certainty and satisfaction demonstrated in this study result. Moreover, the self-congruity theory (Sirgy, 1985) posits that self-image congruence is a strong predictor of post-purchase behavior, including customer satisfaction (Sirgy et al., 1997). The application of self-congruity theory in the technology field also suggests self-image congruence as an essential indicator of customer attitude (Antón, Camarero, & Rodríguez, 2013) and satisfaction with technology adoption (Cowart, Fox, & Wilson, 2008). Thus, the positive relationship between congruence and satisfaction found in this study corroborates the self-congruity theory.

Multigroup Analysis

To test H_5 , a multi-group analysis was conducted to investigate whether and how the hypothesized relationships vary between female customers and male customers. The PLS-MGA test in SmartPLS 3 was run, and the results of the multi-group analysis are presented in Figure 3 and Table 3. For female consumers, the path model showed

similar relationships as the full sample model. However, for male consumers, the proposed relationship was not significant. Perceived usefulness did not significantly impact certainty for males.

The results of the multi-group analysis revealed that two paths differed significantly between males and females, partially supporting H_5 . Specifically, the effect of certainty on customer satisfaction was significantly higher for females, while the effect of self-technology congruence was significantly higher for males. However, no significant gender difference was found in the relationships between perceived ease of use and certainty and between perceived usefulness and certainty.

The multi-group comparison results contribute to the ongoing debate on the gender effects on consumer behaviors and decision-making. Previous literature regarding gender differences in the relationships between perceived ease of use/perceived usefulness and technology adoption decisions revealed mixed findings. Some studies identified significant gender differences in relationships between perceived ease of use/perceived usefulness and traveler UGC usage or mobile payments (Acheampong et al., 2018; Assaker, 2020). However, many studies did not find any gender differences in relationships between perceived ease of use/perceived usefulness and mobile shopping adoption or hotel tablet app usage (Kim, 2016; Lian & Yen, 2014). Similarly, this study did not identify any gender difference in the relationships between perceived ease of use/perceived usefulness and certainty, indicating that the type and nature of the technology studied may lead to different gender difference findings (Assaker, 2020).

In a meta-analysis study of gender differences in risk-taking, Byrnes, Miller, and Schafer (1999) indicated that males are more likely to take risks than females. This finding approved the proposition that risk-taking is an attribute of masculine psychology (Wilson & Daly, 1985). The current study found that females were impacted more strongly by certainty than males, suggesting that females prefer certainty

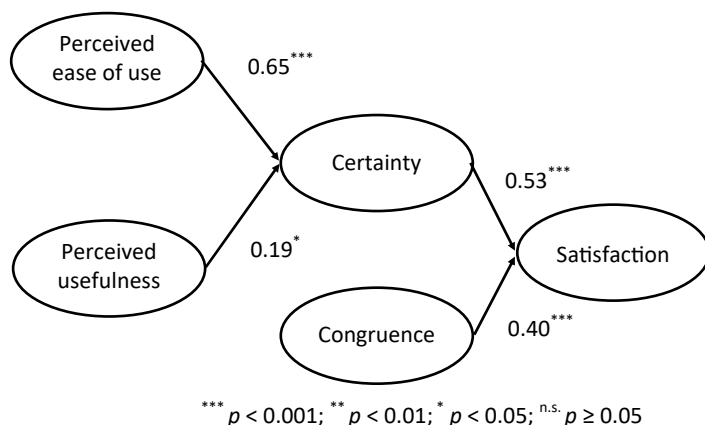


Figure 2. Path Model of Digital Food Ordering Experience

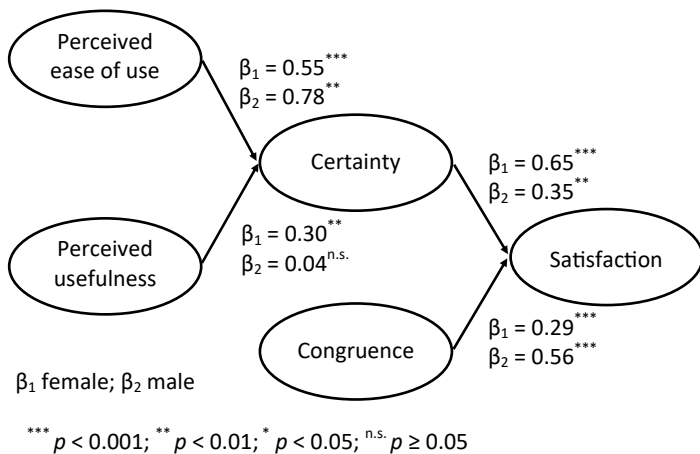


Figure 3. Multigroup Path Models of Risk Perception in Online Food Delivery Orders

more than males. This result supports previous findings that females are inclined not to take risks (Byrnes et al., 1999). In addition, the study revealed that male satisfaction with digital food ordering was more strongly impacted by self-technology congruence than females. The previous results on the effects of self-image congruence were contradictory. Although Das (2014) found that female shoppers value self-image congruence more than male shoppers in terms of retail brand loyalty, Fugate and Phillips (2010), on the other hand, demonstrated that males are more likely to seek product-gender congruence than females. In this study, we focused on how consumers feel congruent with the digital ordering process. As Lie (1995) indicated, products with technology (here as digital ordering) are always associated with masculinity. Therefore, the result is consistent with Fugate and Phillips's (2010) study to indicate that in the context of technology, male customers are impacted more strongly by self-technology congruence as they view technology as a high masculinity product (or experience).

CONCLUSIONS AND APPLICATIONS

Built upon the technology acceptance model and the self-congruity theory, this study proposed and tested a research model to examine the digital food ordering experience and the role of gender in this process. Results suggested that perceived usefulness and perceived ease of use both positively influenced consumer certainty toward using digital methods to order foods. Furthermore, consumer certainty and self-technology congruence significantly influenced their satisfaction regarding the digital ordering process. The impacts of gender on the proposed path model are significant. In specific, when placing digital food orders, female consumers value certainty more, while male consumers tend to focus on self-technology congruence more. On the other hand, the effects of perceived usefulness and

perceived ease of use did not differ by gender. According to the results, the theoretical and practical implications of this study were discussed.

Theoretical Implications

This study contributes to the existing literature in two ways. First of all, even though gender differences were well-noticed in studies related to technology adoption, this study confirmed its impacts in the context of digital food ordering processes. The gender differences revealed in this study advanced our understanding of consumer behaviors in the foodservice field. Additionally, although the TAM model has been applied extensively in the hospitality literature, this study innovatively combined it with the self-congruity theory to develop a research framework. The study provides empirical evidence (the significant relations in the proposed research model) to support the application of the proposed theoretical framework in the foodservice context. The successful combination of the two theories and the proposed research model offers guidance for future researchers when studying information technology in the foodservice industry.

Practical Implications

Digital ordering has recently triggered many changes in the restaurant industry. With a short history and wide application, this technology is still evolving. Therefore, it is imperative to understand consumer attitudes and behaviors when placing digital food orders at restaurants. The study findings provide restaurateurs and digital application developers with several suggestions to improve the digital food ordering experience. First, perceived ease of use and perceived usefulness are both important for consumers when using digital food ordering methods. When restaurateurs are developing or adopting digital applications for consumers to order online or on mobile devices, a special focus should be placed on the efficiency and effectiveness of the digital application. Second, smartphone application developers may incorporate functions in digital applications to cater to the needs of male consumers and female consumers. As certainty had a greater impact on female consumers, the design of digital applications should focus on triggering positive emotions and attitudes from female consumers. Examples include presenting a colorful flow chart to show customers what to expect in the ordering procedure and giving instructions on the main page to help customers better gain control in the ordering process. Third, this study did not identify any gender differences in the relationships between perceived ease of use/perceived usefulness and certainty, indicating that this technology is suitable for both males and females. Restaurant operators and app/website designers do not need to differentiate their strategies on this aspect. Fourth, in the context of the COVID-19 pandemic, the role of digital food ordering played a more critical role than ever before in restaurant businesses. Restaurant operators should take the time during the pandemic as an opportunity to advance their digital food ordering platforms to attract and retain customers. With the increasing amount of pickup and delivery orders, digital food ordering methods help restaurant operators to increase productivity and order accuracy while reducing labor costs (Kimes, 2011; Kimes & Laqué, 2011) and decreasing the risk of COVID from person-to-person interactions. While human interactions are reduced, customer satisfaction toward the digital food ordering process will have a greater impact on customer overall satisfaction with the restaurant.

Limitations and Future Research

The current study is not free from limitations. Because a convenience sample of undergraduate students attending a public university was recruited to participate in the present study, results should be

Table 3. Multigroup Comparison Test Results

Path Name	Difference (Female - Male)	p-Value
Perceived ease of use → Certainty	-0.23	0.127 ^{n.s.}
Perceived usefulness → Certainty	0.26	0.126 ^{n.s.}
Certainty → Satisfaction	0.30	0.034 [*]
Congruence → Satisfaction	-0.27	0.039 [*]

Note. ^{*} p < 0.05; ^{n.s.} p ≥ 0.05

interpreted with caution. In addition, a self-administered online survey instrument was used, and results may be impacted by social desirability bias. In this study, we used an anonymous online survey with carefully worded questions to combat social desirability bias. Future studies may explore other methods, such as analyzing actual user data, to avoid social desirability bias. Considering that digital ordering methods are still evolving, the results of this study may not represent the most recent state of consumers' experience, though the practical implications are still meaningful for practitioners. Lastly, this study was conducted in the U.S. and the results may not be generalizable to consumer digital ordering experience in other countries.

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FOOD PRODUCTION COURSES IN ACCREDITED DIETETICS PROGRAMS: IMPORTANCE-PERFORMANCE ANALYSIS OF USING STANDARDIZED RECIPES

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ABSTRACT

The purpose of this study was to investigate the importance and performance of the use of standardized recipes in quantity food production (QFP) courses of Accreditation Council for Education in Nutrition and Dietetics programs. A web-based questionnaire was distributed to personnel responsible for teaching and/or overseeing QFP courses in 270 accredited didactic programs. From the total of 51 valid questionnaires returned, the pedagogical setting of the QFP laboratory was investigated. Among the institutions (n=40, 14.8%) that used standardized recipes in the QFP laboratory, standardized recipe use was assessed by importance-performance analysis. Seven attributes emerged from the data and were classified: ensuring food quantity, food quality, and food nutrition were classified as “*keep up the good work*”; sustainability and information as “*concentrate here*”; food safety as “*possibly overkill*”; and adaptability as “*low priority*”.

Keywords: Dietetics, importance-performance analysis, quantity food production, standardized recipes

INTRODUCTION

Dietetics Education and Standards

According to the Academy of Nutrition and Dietetics Quality Management Committee, dietetics is defined as “*the integration, application, and communication of practice principles derived from food, nutrition, social, business, and basic sciences, to achieve and maintain optimal nutrition status of individuals and groups*” (2018, p. 18). As described in Standard Three of the Accreditation Council for Education in Nutrition and Dietetics (ACEND) Accreditation Standards for Nutrition and Dietetics Didactic Programs, the accredited program must include “*food science and food systems, food safety and sanitation, environmental sustainability, global nutrition, principles and techniques of food preparation, and development, modification and evaluation of recipes, menus and food products acceptable to diverse population*” (ACEND, 2021, p. 9).

Even though this study was based on the 2017 ACEND standards (i.e., knowledge requirements for dietetics and nutrition programs [KRDN] 4.4., 4.5., and 4.6), the main focus of this study would be aligned with the updated 2022 ACEND standards. Through this study, researchers focused on the use of standardized recipes (SRs) in quantity food production (QFP) courses as one of the key factors in achieving “*food science and food systems, food safety and sanitation, environmental sustainability, global nutrition, principles and techniques of food preparation, and development, modification and evaluation of recipes, menus and food products acceptable to diverse population*” (ACEND, 2021, p. 9). As outlined in Domain Four of 2022 ACEND standards for Didactic Programs (ACEND, 2021, p. 11), the following learning objectives can be achieved within QFP laboratory experiences: “*apply the principles of human resource management to different situations (KRDN 4.4), apply safety and sanitation principles related to food,*

personnel and consumers (KRDN 4.5), explain the processes involved in delivering quality food and nutrition services (KRDN 4.6), and evaluate data to be used in decision-making for continuous quality improvement (KRDN 4.7).”

Standardized Recipes

Recipes are important tools in allocating the ingredients, equipment, and preparation plans for cooking (Johnson and Wales University, 2010). The first written recipe that described the process of preparing food was composed around 1,400 B.C. by ancient Egyptians (Johnson and Wales University, 2010). In 1896, the model of the modern recipe book was introduced by Fannie Merritt Farmer, author of the Original Boston Cooking-School Cook Book (Farmer, 1896), who introduced the concept of using standardized measurements. Thereafter, a (SR) was defined by the United States Department of Agriculture ([USDA] 1995, p. 37) as “*one that has been tried, adapted, and retried several times for use by a given foodservice operation and has been found to produce the same good results and yield every time when the exact procedures are used with the same type of equipment and the same quantity and quality of ingredients.*” Given that SRs provide consistent quality and yield, many foodservice establishments employ SRs to ensure consistency of food quality and nutritional content (Hussain, 2017).

Benefits and Barriers to Using Standardized Recipes

SRs are extensively used in non-commercial (a.k.a., onsite) foodservice establishments (e.g., healthcare, education, military, and transportation) as well as commercial foodservice establishments (Gregoire, 2017). According to a project funded by the USDA (Institute of Child Nutrition, 2017), the benefits of using SRs include providing consistent food quality, predicting desirable yield, maximizing customer satisfaction, ensuring nutrient content, controlling food cost, facilitating efficient purchasing procedures, overseeing inventory control, planning labor cost, increasing employee confidence, reducing record-keeping, abiding by food safety practices, and participating in sustainability.

While a variety of benefits are recognized, barriers to using SRs have also been identified (Parsa & Kwansa, 2002). For example, even though SRs are used to prepare food items based on the ingredients, such recipes may not be used appropriately due to a lack of kitchen equipment or tools specified within the recipes (Parsa & Kwansa, 2002). A similar barrier to using SRs was identified among schools participating in the National School Lunch Program and School Breakfast Program (Echon, 2014) as the failure to coordinate information among different market forms of ingredients, such as processed or prepared from scratch, resulted in varying product quality when following SRs. Additional arguments against using SRs included the time-consuming nature and the need for employee competence to follow SRs, the lengthy process of constructing an SR along with the need to potentially share “secret” ingredients, and the possibility of expected results. Moreover, SRs can be challenging to review during food production because of wordy information,

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especially when language barriers exist among users (Dopson & Hayes, 2015). Despite these barriers, using SRs is recognized as one of the best ways to control consistency in the foodservice industry (Gregoire, 2017; Hayes & Ninemeier, 2009).

As no known study has investigated the key performance attributes of using SRs in dietetics education programs, this study aimed to investigate the importance and performance of SRs used in QFP laboratory courses in ACEND accredited didactic programs. Thereby, the specific research objectives of this study were to (1) assess the magnitude of SRs' importance and performance by applying importance-performance analysis (IPA), (2) examine the pedagogical setting of the QFP laboratory in ACEND accredited didactic programs, and (3) investigate the use of SRs in dietetics education programs. The findings of this study would be practically beneficial for reinforcing SRs' effectiveness and students' performance by adding more specific information by adapting the findings from IPA.

METHODS

The target population of this study was comprised of educators in ACEND accredited didactic programs in the US. The study examined ACEND accredited didactic programs because ACEND delineates education standards including specific knowledge requirements for dietetics education programs.

Sample Selection

The Academy of Nutrition and Dietetics website (2019) listed 270 universities having didactic programs in dietetics accredited by ACEND. Contact information for the sample population was obtained from the list of didactic programs in dietetics (The Academy of Nutrition and Dietetics, 2019). The list included the contact information of the director or chair of the program, so direct contact information (email) was obtained from institution websites by searching for appropriate contact persons through related keywords (e.g., QFP laboratory coordinator, QFP instructor, and chef instructor). A description of the study's purpose, an informed consent, and a link to the web-based questionnaire were sent via email to the identified contact at each institution. In order to contact the most appropriate individual, a request to forward the study invitation to personnel responsible for the QFP laboratory in didactic programs in dietetics was included in the email.

Questionnaire Content

The questionnaire was posted on Qualtrics®. The questionnaire was modified from a study by Smith and Costello (2008) to align with the specific purpose of this study and was composed of six sections. The first section contained ten items related to general course information about the QFP laboratory. The second section contained five items related to the environmental setting of the QFP laboratory course for their dietetics program. The third section contained nine items concerning food safety guidelines in the QFP laboratory. The fourth section contained 12 items associated with foodservice procedures offered by the QFP laboratory. The fifth section included 21 items that examined the magnitude of importance and performance of implementing SRs using a five-point Likert-type scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree). Its internal reliability was examined using Cronbach's alpha (Ary, Jacobs, & Sorensen, 2010). Finally, the sixth section contained nine demographic items (Dillman, Smyth, & Christian, 2014).

Pilot Study

A pilot test was conducted in two steps to ensure the content, construct, and face validity of the questionnaire (Dillman et al., 2014).

In the first step, experts in foodservice management (n=3) and instructors (n=2) of the QFP laboratory in U.S. universities reviewed the questionnaire. In the second step, the questionnaire was reviewed by RDNs (n=2) in didactic programs in dietetics, and graduate teaching assistants (n=2) of a QFP laboratory course. Feedback obtained from these reviewers was used to modify the questionnaire and administrative procedures. From the feedback, the contextual meaning of the questions associated with IPA used to assess the key performance attributes of using SRs in laboratory experiences was revised more clearly to assess the key performance attributes of using SRs in laboratory experiences of QFP management courses. Also, as a result of reviewer comments, questions about the pedagogical setting of the QFP laboratory were added to obtain more precise data. Following modification, the questionnaire and research protocol were approved by the university's Human Subjects Review Board.

Questionnaire Distribution

This study utilized an online survey method due to its ease of distribution, timesaving value, and reduced cost (Dillman et al., 2014). The web questionnaire as distributed to ACEND accredited program personnel followed the guidelines for conducting online surveys outlined by Dillman et al. (2014). The email requested that the recipient complete the questionnaire or forward it to the most appropriate person. Reminder emails were sent for three consecutive weeks. Participants were assured they would be provided a summary of the findings. No other compensation was given. Confidentiality of participant information was ensured during the distribution and collection of questionnaires.

Importance-Performance Analysis

IPA is a technique for assessing the elements of a marketing program (Martilla & James, 1977). Through IPA, the satisfaction levels of customers are connected to the level of their beliefs, which present how each attribute's importance matches with the corresponding expectation (Martilla & James, 1977). IPA uses mean scores to compare and display results in a two-dimensional grid representing high importance/high performance (i.e., "keep up the good work"), high importance/low performance (i.e., "concentrate here"), low importance/low performance (i.e., "low priority"), and low importance/high performance (i.e., "possible overkill") (Martilla & James, 1977). On the basis of the influential research of Martilla and James (1977), numerous researchers have employed IPA from various disciplines, such as examining tourists' shopping behavior in a retail environment (Kinley, Kim, & Forney, 2002), exploring tourists' perceptions of Ireland with a pre-and post-visit survey (O'Leary & Deegan, 2005), examining users of tour guide operations in the United States (Duke & Persia, 1996), and investigating perceived satisfaction with a culinary event (Smith & Costello, 2008). In this study, IPA was used to assess the key performance attributes of using SRs in laboratory experiences in QFP management courses in dietetics education programs.

Data Analysis

Data obtained from Qualtrics® were transferred to Microsoft Office Excel® and then to the Statistical Package for Social Sciences version 24.0. The data were coded and entered in accordance with the guidelines outlined by Salant and Dillman (1994). Descriptive statistics including mean, percentage, frequency, and standard deviation were computed to allow for data distribution analysis. Questionnaire scale reliability was assessed using Cronbach's alpha (Ary et al., 2010). As this study included multiple dependent variables, multivariate analysis of variance (MANOVA) test was conducted to examine the overall difference between importance and performance effects. To

examine individual effects, univariate analysis of variance (ANOVA) test was conducted. Finally, a post hoc test was conducted to determine differences within specific groups. A 0.05 level of significance was used for analysis.

RESULTS

Demographic Characteristics and QFP Laboratory Course Information

A total of 270 web questionnaires were distributed to personnel (e.g., instructor and laboratory coordinator) associated with QFP courses in ACEND accredited didactic programs. A total of 51 (18.9%) completed responses were used for the analysis. The number of female and male participants was 39 (95.1%) and two (4.9%), respectively (Table 1).

Of the 51 programs represented, 47 (92.2%) required completion of a QFP laboratory course, while four (7.8%) stated that a QFP laboratory course was not required (Table 2). Thirty-five programs indicated that the QFP laboratory course was offered to a variety of disciplines: “food science” (11.4%, n=4), “hospitality management” (14.3%, n=5), “culinary science” (8.6%, n=3), “nutrition” (42.9%, n=15), and “other” (22.9%, n=8). Fill-in responses for the “other” selection included: “two other concentrations besides dietetics-foodservice management and nutrition and wellness,” “four-year culinary degree,” “food and nutrition in business and industry degree,” and “family and consumer sciences teacher certification.”

According to the 51 responses, a majority of the QFP laboratory courses had more than 21 enrolled students (70.6%, n=36), while 11 institutions (21.6%) had 20 or fewer enrolled students in their QFP laboratory course in Didactic Program in Dietetics (DPD) programs. (Table 2). According to the instructors’ credentials (Table 2), a majority of the QFP courses (61.2%, n=30) were taught by an RDN with a master’s degree, while ten (20.4%) institutions’ QFP courses were taught by an RDN with a doctoral degree. The course was taught by professional chef instructors with doctoral degrees (4.1%, n=2) and a non-RD instructor with a master’s degree (2.0%, n=1) at other institutions.

Environment of the QFP Laboratory Course

Of 49 responses to the question of the setting for the QFP course, 37 (75.5%) institutions utilized an industrial kitchen setting (e.g., a kitchen setting found in restaurants, cafeterias, hotels, hospitals, and similar foodservice establishments) for the QFP laboratory courses, while 12 (24.5%) institutions did not have a commercial-type kitchen (Table 3).

In terms of the provision of food safety practices, 45 (93.8%) institutions provided disposable gloves for handling food items (e.g., ready-to-eat food items), while three (6.3%) institutions did not provide disposable gloves for students’ hands-on practices in their QFP laboratory (Table 3). To avoid cross-contamination, 30 (76.9%) institutions provided color-coded cutting boards, while nine institutions (23.1%) did not provide color-coded cutting boards. To ensure the pH level of the sanitizing solution, 24 (57.1%) institutions used pH strips, while 18 institutions (42.9%) did not use pH strips to check the pH level of the sanitizing solution. To monitor perishable food safely, 19 (45.2%) institutions used dissolvable day dots or labels, while 23 (54.8%) institutions did not use either (Table 3).

Foodservice Procedures in QFP Laboratory

The majority (69.6%) of respondents’ institutions served cooked food items to the public, while the remaining respondents’ institutions indicated foods were consumed by internal customers (i.e., enrolled students, teaching assistants, and instructors). Of 32 respondents’ institutions that served the prepared food items to the public, most

Table 1. Demographic Characteristics (n= 51)

Demographic Characteristic	n	(%)
Gender ^a		
Male	2	(4.9)
Female	39	(95.1)
Age ^a		
30 years or younger	1	(2.5)
31-40 years	8	(20.0)
41-50 years	9	(22.5)
51-60 years	13	(32.5)
Over 60 years	9	(22.5)
Highest education level ^a		
High school	0	(0.0)
Associate degree	0	(0.0)
Bachelors	0	(0.0)
Masters	23	(56.1)
Doctoral	18	(43.9)
Official title ^a		
Clinical instructor/lecturer	9	(25.0)
Food production manager/coordinator	3	(8.3)
Adjunct professor	2	(5.6)
Assistant professor	4	(11.1)
Associate professor	5	(13.9)
Didactic Program in Dietetics (DPD) director/professor	13	(36.1)
Total number of years worked in the current department ^a		
5 years or under	8	(20.0)
5-10 years	15	(37.5)
Over 10 years	17	(42.5)
Total number of years worked in the current role ^a		
5 years or under	16	(40.0)
5-10 years	12	(30.0)
Over 10 years	12	(30.0)
Certified food safety educator ^a		
Yes	22	(53.7)
No	19	(46.3)

^aTotals may not equal 51 due to missing data.

institutions (78.1%) sold the food items. Among the respondents’ institutions that prepared food in QFP laboratories, 40 (90.9%) institutions responded to the use of SRs during students’ practices (Table 4).

To conduct foodservice operations, 25 (55.6%) respondents’ institutions rotated students’ job assignments (e.g., kitchen manager, chef, and front-of-house manager), while 20 (44.4%) respondents’ institutions did not rotate students’ position. Twenty (46.5%) respondents’ institutions prepared nutrition labeling or nutrient analysis for all the menus offered, whereas two (4.7%) respondents’ institutions prepared it only for the entrée. Twenty-one (48.8%) of respondents’ institutions did not prepare any nutrition information for the food made.

Among the respondents’ institutions that served food to the public, 19 (65.6%) used a table d’hote menu that was served at a set price, while six (20.7%) respondents’ institutions used an a la carte menu with pricing based on the food item. Moreover, four (13.8%) institutions employed both table d’hote and a la carte menu for their QFP laboratory courses. Menus were distributed to customers through various delivery methods. Sixteen (53.3%) institutions

Table 2. QFP Laboratory Course Information (n=51)

QFP Laboratory Course	n	%
Is the QFP laboratory course required for graduation?		
Yes	47	92.2
No	4	7.8
Disciplines offering the QFP laboratory course ^a		
Food science	4	11.4
Hospitality management	5	14.3
Culinary science	3	8.6
Nutrition	15	42.9
Other	8	22.9
Number of enrolled students in DPD program		
10 or less	1	2.0
11 to 20	10	19.6
21 to 30	9	17.6
31 to 40	9	17.6
Over 40	18	35.4
I don't know	4	7.8
Number of enrolled students in a single section ^a		
Less than 10	6	12.2
10 to 15	14	28.6
16 to 20	15	30.6
21 to 25	4	8.2
26 to 30	1	2.0
Over 30	9	18.4
Number of day(s) of meeting per week ^a		
One day	33	66.0
Two days	13	26.0
Three days	2	4.0
Four days	1	2.0
Five days	1	2.0
Length of each section per week ^a		
Up to 2 hours	12	24.5
Up to 3 hours	22	44.9
Up to 4 hours	6	12.2
Up to 5 hours	2	4.1
Up to 6 hours	5	10.2
Over 6 hours	2	4.1
Academic credit(s) per each QFP laboratory course ^a		
1 credit	10	20.8
2 credits	9	18.8
3 credits	13	27.1
4 credits	13	27.1
Other	3	6.3
Instructor's Credential of the QFP laboratory courses ^a		
Registered Dietitian Nutritionist (RDN) with a doctoral degree	10	20.4
RDN with a master's degree	30	61.2
Non-Registered Dietitian Nutritionist (RDN) with a doctoral degree	1	2.0
Non-Registered Dietitian Nutritionist (RDN) with a master's degree	1	2.0
Professional chef with a doctoral degree	2	4.1
Professional chef with a master's degree	2	4.1
Other	3	6.1

^aTotals may not equal 51 due to missing data

IPA Analysis of the Use of Standardized Recipes

Participants were asked to rate the degree of the seven attribute items (i.e., production, quality, nutrition, adaptability, food safety, sustainability, and information on the use of standardized recipes) that represented the importance and performance independent variables on a five-point Likert-type scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree). By assessing the magnitude of importance and performance of the seven attribute items, the attributes were classified by IPA. For the classification of the seven attributes, this study provided practical suggestions and improvements to reinforce the effectiveness of the use of SRs. The mean score of importance items was 4.16 ± 1.06 on a five-point Likert-type scale with a Cronbach's alpha of 0.91, while the mean score of performance items was 3.07 ± 0.77 with a Cronbach's alpha of 0.74. The mean score for both importance and performance items was 3.41 ± 0.81 on a five-point Likert-type scale, with a Cronbach's alpha of 0.88.

MANOVA for the omnibus test was found to be statistically significant (F-ratio= 17.487 with 6 and 18 df, $p < 0.05$), supporting the proposition of a significant difference between importance and performance measures. The results of the ANOVA test (Table 5) presented significant differences between importance and performance items at $p < 0.05$ level. For all the seven attribute items identified, importance measures were higher than their subsequent performance (Table 5). This finding could be interpreted as slight dissatisfaction with the performance toward the seven attribute items. Using the identified attributes, recommendations may be made for QFP laboratory instructors to maximize the performance of SRs in the QFP laboratory. However, determining which attribute QFP laboratory instructors should focus on to significantly improve the overall performance of using SRs is difficult. Therefore, Figure 1 presents the practical results by using a graphic of four quadrants to classify dependent variables by comparing the means of performance and importance measures (Deng, 2007).

Quadrant one (i.e., "concentrate here") included *sustainability* and *information*. These items related to reducing food waste by using SRs, practicing sustainability in QFP laboratories, and barriers to using SRs such as a lengthy process to follow SRs and wordy information for comprehending SRs. Even though SRs' lengthy process and wordy information were grouped as *information*, both following the SRs' procedures and comprehending the information on SRs are important to ensure food quality and students' performance.

Three IPA attributes emerged in the "keep up the good work" (i.e., quadrant two): *production*, *quality*, and *nutrition*. These related to consistency in food quantity, consistency in food quality, timeliness in food production, students' satisfaction with food quality, and ensuring nutrition facts and customer satisfaction.

One attribute was classified in quadrant three (i.e., "low priority"). In this quadrant, the *adaptability* attribute, which was about SRs' versatility for any type of kitchen setting, was captured. This can be interpreted as the adaptability of using SRs would be limited by different types of kitchen settings.

One attribute, food safety, emerged in quadrant four (i.e., "possibly overkill"). This attribute was about the importance and performance of food safety practices while using SRs. Even though the information on food safety compliance was stated on SRs, actual food safety practices may not be followed because users of SRs focus more on food production procedures than food safety compliance.

presented information about the menu through a website or social media, while six (20.0%) institutions explained the menu at the table to the customers. Eight (26.7%) institutions required students to prepare a sign or poster to promote and explain the menu to the public.

Table 3. Environmental Setting of QFP Laboratory (n= 51)

Environmental Setting of QFP Laboratories	n	%
Industrial kitchen setting for the QFP laboratory ^a		
Yes	37	75.5
No	12	24.5
Existence of handwashing sink in the QFP laboratory ^a		
Yes	44	89.8
No	5	10.2
Number of certified handwashing sink(s) in the QFP laboratory ^a		
Certified by National Science Foundation, Underwriter's Laboratories	24	54.5
Certified by health inspector, local health department	3	6.8
No	9	20.5
I don't know	8	18.2
Number of existing handwashing sink in the QFP laboratory ^a		
One handwashing sink	13	34.2
Two	13	34.2
Three	5	13.2
Four	4	10.5
Over four	2	7.9
Dishwashing equipment in the QFP laboratory ^a		
Industrial dishwasher indicating water pressure and temperature	10	20.4
Three-compartment sink (i.e., washing, rinsing, and sanitizing)	7	14.3
Both industrial dishwasher and three-compartment sink	28	57.1
No	4	8.2
Blast chiller in the QFP laboratory ^a		
Yes	8	18.6
No	35	81.4
Adequate refrigerated space (e.g., a walk-in refrigerator) ^a		
Yes	42	85.7
No	7	14.3
Providing disposable gloves for the QFP laboratory ^a		
Yes	45	93.8
No	3	6.2
Types of disposable gloves provided in the QFP laboratory ^a		
Latex, powdered	8	16.7
Latex, powder-free	13	27.1
Nitrile	13	27.1
Vinyl, powder-free	14	29.1
Required elements of student attire in the QFP laboratory (select all that apply) ^{a,b}		
Uniform	25	53.2
Apron	26	55.3
Hair restraint	42	89.4
Non-slippery kitchen shoes	41	87.2
Color-coded cutting board(s) in the QFP laboratory ^a		
Yes	30	76.9
No	9	23.1
Number of different types of color-coded cutting board ^a		
Two different types	4	14.9
Three	7	25.9
Four	7	25.9
Five	6	22.2
Six	3	11.1
Over six	0	0.0
Using pH test strips to check the sanitizing solution in the QFP laboratory ^a		
Yes	24	57.1
No, but using hot water	10	23.8
Neither using a pH strip nor hot water	8	19.1

Table 3. Environmental Setting of QFP Laboratory (n= 51) (Cont.)

Environmental Setting of QFP Laboratories	n	%
Using dissolvable day dots or labels in the QFP laboratory ^a		
Yes	19	45.2
No	23	54.8
Placing a first-aid kit in the QFP laboratory ^a		
Yes	45	95.7
No	2	4.3
Presenting a sign for emergency care for choking in the QFP laboratory ^a		
Yes	16	38.1
No	26	61.9
Placing non-slip rubber floor mats in the QFP laboratory ^a		
Yes	25	55.5
No	20	44.5

^aTotals may not equal 51 due to missing data

^bPercent is greater than 100, as respondents selected all that applied; thus, multiple responses.

DISCUSSION AND CONCLUSION

Pedagogical Setting of QFP Laboratory: Time Allocations

Different time allocations for QFP laboratory courses were identified in this study. As Gilmore and Robson (1990) claimed, assigning different academic credit-hour settings for QFP laboratory courses can be employed to maximize both educational effectiveness and students' learning satisfaction. Similarly, the institutions participating in this study presented different time allocations (i.e., from a two-credit hour setting to over a six-credit hour setting) in QFP laboratory courses. Given the lack of a widely accepted model for the QFP laboratory course setting, pedagogical settings of QFP laboratory courses could be established by considering methods to achieve course learning objectives and reinforce students' career selection (Gilmore & Robson, 1990). Even though the credit hours of the QFP laboratory course are set by each program's curricula processes, programs could consider adjusting time allocation based on different cooking methods within SRs. For example, leavened bread would take more time to make than unleavened or quick bread; adjusting the time allocation for the QFP allow students to benefit from experiencing the entire process of food production. Educational effectiveness and students' learning satisfaction in QFP laboratory courses could be affected by how students select, prepare, make, and assess the food made from scratch. Thereby, adaptable time allocations as per different cooking methods could be considered. Furthermore, time allocations in QFP laboratory courses could be determined by considering the extent of kitchen facilities, required academic hours, students' class schedules, availability of instructors and staff, and foodservice fulfillment to the public. Therefore, to maximize the effectiveness and achievement of QFP laboratory courses, programs should thoroughly assess the aforementioned factors.

Pedagogical Setting of QFP Laboratory: Management skills

The results of this study found that almost half of the institutions participating in the survey reported rotating schedules to facilitate the student experience of a variety of management skills. Reynolds and Rajagopal (2016) showed that having students experience different roles within QFP is helpful to develop practical thinking for problem-solving. Gilmore and Robson (1990) stated that varied experiences in QFP laboratory courses allow students to develop and hone their skill sets for future careers. Similar to these findings, the current study found that many institutions used education in dining services to improve students' management and problem-solving skills. Practicing technical and conceptual skills through the "real-world" concept of a

Table 4. Foodservice Procedures in QFP laboratory (n= 51)

Foodservice Setting of QFP Laboratories	n	%
Using standardized recipes in the QFP laboratory ^a		
Yes	40	90.9
No	3	6.8
I don't know	1	2.3
Serving the cooked foods to the public ^a		
Yes	32	69.6
No	14	30.4
Selling the cooked foods to the public ^a		
Yes	25	78.1
No	7	21.9
Rotating students' schedule to practice foodservice roles ^a		
Yes	25	45.5
No	20	36.4
Providing nutrition information when serving foods ^a		
Yes, for all the menu items	20	46.5
Yes, but only for entrée	2	4.7
No	21	48.8
Types of menu used in the QFP laboratory ^a		
Table d'hote menu (i.e., pre-set menu served at a set price)	19	65.6
A-la-carte menu (i.e., single menus served at different prices)	6	20.7
Both table d'hote and a-la-carte menu	4	13.8
Systems of informing menu information to customers ^a		
Through the web or social media	16	53.3
At the table by a student serving foods	6	20.0
Through a poster/sign made by students	8	26.7
Serving special dietary requests (e.g., gluten-free, lactose-intolerance) ^a		
Yes	26	83.9
No	5	16.1
Teaching table service in the QFP laboratory ^a		
Yes	25	80.6
No	6	19.4
Collecting customers' satisfaction survey ^a		
Yes, from paper-based questionnaires	23	76.6
Yes, from online reviews	3	10.0
Yes, from verbal feedback	2	6.7
Yes, through instructor's feedback	2	6.7

^a Totals may not equal 51 due to missing data

QFP laboratory course is beneficial for students in foodservice-related as well as dietetics majors. Onsite foodservice at hospitals focuses on improving patient satisfaction through varied services, such as menu selection and spoken menu (Folio, O'Sullivan-Maillet, & Touger-Decker, 2002; Williams, Virtue, & Adkins, 1998). Advanced technology systems in foodservice (e.g., point-of-sale systems, food waste data tracking systems, and recipe software) may also be adopted to enhance educational effectiveness in foodservice management and increase the adaptability of future students' careers by practicing technical and conceptual skills. Chandler, Weber, Finley, and Evans (2007) claimed that technical and conceptual skills should be in the foreground in QFP courses, and educating both technical and conceptual skills beneficial for increasing students' career adaptability.

IPA Analysis of Using SRs: "Keep up the Good Work"

This study explored the magnitude of importance and performance of using SRs in QFP laboratory courses by using IPA. Through the identified IPA attributes, educators practically reinforce SRs to enhance the effectiveness and performance of students' practices. Three IPA attributes that emerged in quadrant one (i.e., "keep up the

good work") could be interpreted as the use of SRs ensuring consistency in *food production, quality, and nutrition*. Thus, yields of food products could be accurately converted by the desired numbers of servings, and food quality could be ensured by following SRs. The concept of food quality encompassed service quality because SRs generally describe the best method of serving foods to maximize food quality. Furthermore, this study found that 40 (78.4%) educators of QFP laboratory courses believed that using SRs could ensure accurate nutrition information. Therefore, educators would be able to continue using SRs to comply with rigorous quality and quantity standards, including assurance of nutrition facts.

IPA Analysis of Using SRs: "Concentrate Here"

Two IPA attributes (i.e., *information and sustainability*) emerged in quadrant two (i.e., "concentrate here"). In terms of the sustainability attribute, educators recognized this as an important subject to teach, however, some practices about sustainability might not be easily conducted, and/or SRs might not contain detailed information for sustainability practices. Even though SRs present detailed information on making foods, SRs might not fully describe the steps needed to reduce food waste or handle perishable foods for leftovers. In particular, students from dietetics or nutrition-related majors would likely abide by the portion size suggested by the SR because not following it strictly would impact the nutrition facts. For example, for SRs that indicate the desired portion size (e.g., 6 oz of cooked pasta per portion), either educators or students would use the SR's suggested portion size even though they might be able to serve a slightly larger serving of pasta (e.g., 6.4 oz or 6.6 oz cooked pasta per portion) to reduce food waste. Thus, educators prioritizing this attribute may be able to develop and utilize a chart that contains nutrition facts reflective of adjusted portion sizes.

Similar to the aforementioned barriers (Abraham et al., 2002; Parsa & Kwansa, 2002), even though using SRs was recognized for ensuring food quality and quantity production, the unwillingness of using SRs may be due to restrictions within the class time allocations. Time spent reading wordy SRs could be one of the barriers. Likewise, to address some of the barriers, educators could make students prepare plans with graphic workflow diagrams based on their comprehension of SRs (Gregoire, 2017). Graphic workflow diagrams would facilitate students following the common information of SRs.

IPA Analysis of Using SRs: "Low priority"

One attribute, *adaptability*, emerged in quadrant three (i.e., "low priority"). This study showed a belief that SRs might not work well in a kitchen environment not equipped with SR requirements (e.g., required kitchen tools, equipment, and specific ingredients), therefore, educators responded being reluctant to use SRs when working in a kitchen environment that did not satisfy minimum SR requirements. Also, since brands are not specified on SRs, (Echon, 2014), utilization may not result in consistent quality with different brands of common food ingredients. Therefore, entries of food brands on SRs could be considered to increase the acceptance of using SRs. To address the reluctance of using SRs due to a lack of SR requirements, educators could develop recommended substitutions for tools, equipment, and ingredients. For example, if a big steam-jacketed kettle is required, batch cooking can be used to divide the portions into small batches for preparation in a small steam-jacketed kettle or an appropriate pot on a cooking stove.

Moreover, SRs in QFP laboratory courses were mainly constructed for quantity production (e.g., more than 25 serving yields), so educators may assume that using SRs for small yields would be inappropriate. To overcome this assumption, verified conversion factors for each

Table 5. Mean Scores for Importance and Performance of Using Standardized Recipes (n=40)

Pull attribute	Related questions	Importance	Performance	Mean Diff.	F-ratio	Sig.
Production	Consistent quantity & timeliness <ul style="list-style-type: none"> Using standardized recipes is always important to ensure consistent quantities of food production. Using standardized recipes is always important to keep food production on time. 	4.48	3.98	0.50	9.134	0.004*
Quality	Consistent quality & food satisfaction <ul style="list-style-type: none"> Using standardized recipes is always important to ensure consistent quality of food production Using standardized recipes always ensures internal customers' (i.e., students) satisfaction. 	4.45	3.28	1.17	41.933	0.001*
Nutrition	Nutrition facts & customers' satisfaction <ul style="list-style-type: none"> Using standardized recipes is always important to ensure the nutrition facts of menu items. Using standardized recipes always ensures external customers' satisfaction. 	4.38	3.35	1.03	42.518	0.001*
Adaptability	Quantity production & kitchen equipment <ul style="list-style-type: none"> Standardized recipes are always convenient for the commercial kitchen. Using standardized recipes is always important for any type of kitchen (i.e., home and commercial kitchen). 	3.30	1.62	1.68	55.487	0.001*
Food Safety	Food handling & production procedures <ul style="list-style-type: none"> Using standardized recipes is always important to follow food safety guidelines. Using standardized recipes is always important for safe dishwashing procedures. 	3.88	3.56	0.32	21.341	0.001*
Sustainability	Saving energy & food waste <ul style="list-style-type: none"> Using standardized recipes is always important for fulfilling sustainability practices (e.g., kitchen equipment schedule to save energy) Using standardized recipes is always important to reduce and control food waste. 	4.18	2.95	1.23	33.348	0.001*
Information	Lengthy process & wordy information <ul style="list-style-type: none"> Using standardized recipes always takes a long process to follow Reading and understanding standardized recipes always takes time. 	4.56	2.82	1.74	156.623	0.001*

* p<0.05

ingredient for SRs could be developed by the educators. Recipe software (e.g., XtraCHEF™, MasterControl®, AVEVA®) could be used to convert the yields of SRs to ensure consistency in food quality and nutrition facts of each modified SR. As seen from the IPA analysis (Figure 1), SRs' adaptability should be practically improved by stating alternative production methods to address kitchen equipment and tools shortages. Also, equivalent ratios for ingredient conversions should be mentioned in the recipe. For example, students may not be familiar with converting the ingredient volume to weight, and vice versa. As one of the practical improvements of this study's findings, either equivalent weight or volume of raw products can be stated on SRs. For example, one large egg in the recipe would be equivalent to two ounces and one clove of fresh garlic would be equivalent to one teaspoon of minced garlic. By conveying more specific information on SRs, students' application and performance would be enhanced. The enhanced SRs that contain more specific information would be beneficial for reinforcing students' hands-on practices by maintaining consistent quality and conversion.

IPA Analysis of Using SRs: "Possibly Overkill"

An unexpected finding was that of the attribute, *food safety*, which emerged in quadrant four (i.e., "possibly overkill") since food safety is one of the most important teaching criteria in foodservice

management. According to Martilla and James (1977), the attribute in this quadrant could be interpreted as food safety practices not being performed well because students who were aware of food safety would focus on ensuring food production, rather than rigorously abiding by food safety practices. This was consistent with previous studies (Stein, Dirks, & Quinlan, 2010; Yarrow, Remig, & Higgins, 2009; Sanier & Konaklioglu, 2012), which found that college students might not demonstrate proper food safety practices even though they had sufficient food safety knowledge. It is important for educators to regularly review these practices with hands-on activities to reinforce their significance (McArthur, Holbert, & Forsythe, 2006). Moreover, educators' proper behaviors and leadership can impact students' attitudes and intentions to perform safe food handling practices (Lee et al., 2013). Assessment of safe food handling practices should be performed consistently in QFP courses to provide evidence of students' ability to apply classroom knowledge of food safety information. As students conduct safe food handling practices, they could recognize that food safety should be as important as other attributes that resided in quadrant one, "keep up the good work". During the QFP labs, instructions for proper food handling practices should be implemented to reduce the gap between food safety knowledge and actual food safety practices.

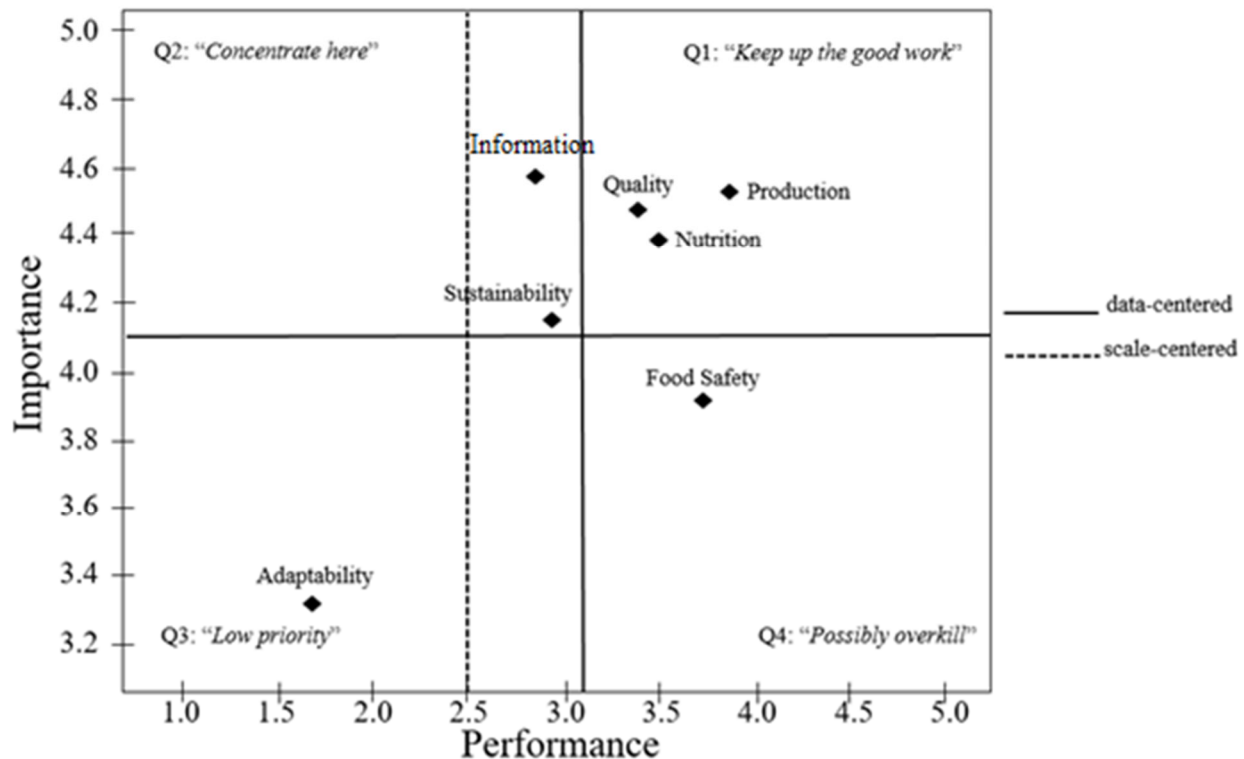


Figure 1. IPA Analysis for Using Standardized Recipes in Quantity Food Production Laboratories (n=40)

Respondents rated their level of importance and performance of using SDs in the QFP laboratory with five-point Likert scale items: 1=strongly disagree to 5=strongly agree.

Limitations and Future Studies

This research had several limitations. Findings from this study associated with IPA analysis could not be generalized to other QFP laboratory courses due to variances in products, services, and yields of SRs. However, IPA analysis of using SRs could be useful to many ACEND accredited didactic programs to reinforce the learning objectives of QFP laboratory courses. The findings of this study contribute to enhancing SRs' importance and performance by adding specific information about food production and guidelines for food safety. This study found that SRs would not adequately describe the information about sustainability practices such as how to handle the leftover food and control portions to reduce food waste. Thereby, despite the limitation in generalization, this study would contribute to SRs' improvement by reinforcing all important aspects such as portion control, food quality, food safety, and food production manuals.

The response rate was another limitation of this study. Future studies could utilize different approaches to access the population (e.g., obtaining contact information from the Food and Nutrition Conference & Expo[®]). Other educational institutions that use SRs (e.g., culinary schools, hospitality majors) could be considered for future studies to increase sample sizes. Also, future studies could focus on how to share the common and best practices of using SRs to ensure the quantity, quality, and nutrition of foods and services for QFP laboratory courses. Moreover, differences in the environmental settings of QFP laboratory courses could be identified. The last limitation is due to a lack of standards for generally accepted SRs. Despite the use of common SRs, food quality could be inconsistent due to differences in food handlers' level of competency and the variability of convenience food brands, quality in fresh produce, and

desired yield of SRs. Therefore, a future investigation could target the identification of specific SR attributes and how they impact food quality and nutrition facts.

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