

AN INVESTIGATION OF COMPETENCY-BASED TEACHING METHODS AND TECHNOLOGY INTEGRATION IN FOODSERVICE MANAGEMENT COURSES IN DIETETICS PROGRAMS

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ABSTRACT

This study investigated foodservice educators' current teaching methods and technology integration in the classroom. A total of 41 faculty members teaching foodservice management courses in dietetics programs completed the online survey for this research. The findings indicated that the lecture-based method was the most common teaching method used to teach foodservice management competencies, followed by discussions and case-based learning. Most participants perceived themselves as beginners in technology integration. Technology integration in the classroom was infrequent. Technology was mostly used for lecture preparation. This study provides suggestions for using various teaching methods and technology tools to teach foodservice management courses.

Keywords: Foodservice Management, competency, teaching methods, technology integration, dietetics programs

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INTRODUCTION

The number of registered dietitians/nutritionists (RDs) who work in foodservice management is far lower than other practice areas within dietetics (Griswold & Rogers, 2020). Data from the Compensation and Benefits Survey 2019 showed that 60% of the RDs (n = 7,092) worked in a clinical setting, for instance acute care, inpatient, ambulatory care, and long-term care, while only about 9% worked in food and nutrition management (Griswold & Rogers, 2020). A similar trend was observed in Australia, where only 3% of dietitians were in the foodservice management workforce (Wright, 2017). These discrepancies may be a result of foodservice management being perceived as less interesting compared to clinical nutrition (Cluskey et al., 2012; Kuhn, 2014). Additionally, a career as a foodservice dietitian is challenging due to its ever-expanding roles (Hussain, 2017). A foodservice dietitian is expected to demonstrate excellent communication skills as well as understand financial and sustainability management, food production, and procurement systems (Lafferty & Dowling, 1997).

As the accrediting body for the Academy of Nutrition and Dietetics (The Academy), the Accreditation Council for Education in Nutrition and Dietetics (ACEND) outlines various standards and competencies to ensure students learn, master knowledge, and develop skills to work as entry-level dietitians while still in college (ACEND, 2016). Among these ACEND standards, Domain 4: "Practice Management and Use of Resources: Strategic application of principles of management and systems in the provision of services to individuals and organizations" encompasses various knowledge/competency

areas (e.g., management theories, budgeting, principles of human resource management, food safety principles, etc.) that are commonly taught in foodservice management courses (ACEND, 2016). In line with this development, competency-based education has emerged as a common approach in the foodservice management courses to produce competent graduates.

Competency-based education can be described as an approach which maps competencies to courses, teaching methods, and learning outcomes (Carraccio et al., 2002; Johnstone & Soares, 2014), with the objective of enhancing the students' knowledge and skills to achieve specific competencies and curricular goals (Frank et al., 2010). Previous literature has found that competency-based education has positive impacts on the professional practice of students. For example, Ash et al. (2018), found that competency-based education improved graduate dietitians' competencies in the areas of communication, scientific inquiry, critical thinking, scientific argumentation, and professionalism. To achieve the goals of competency-based education, various teaching methods should be used to enhance the students' exposure to these competencies (ACEND, 2016).

Teaching methods are a set of principles, procedures, and practices implemented by educators to achieve intended learning goals (Westwood, 2008). Mocinic (2011) defined teaching methods as teaching practices that can be systematically organized to improve learning outcomes. It is believed that the educators will be directly involved in selecting and implementing a teaching method, after a careful consideration of the fields of study and target groups (Henson, 1980). In particular, active teaching methods have been proven to encourage reflective learning, improve hard and soft skills among students, and develop students' competencies in a subject area (Mocinic, 2011). Seminars, service-learning, workshops, case-based learning, problem-based learning, collaborative learning, and game-based learning (Bierne, et al., 2017; Mocinic, 2011; Winter et al., 2002) are some examples of active teaching methods.

Workshops involve training of practical skills and presenting individual or joint project to enhance students' competencies (Bierne et al., 2017). In case-based learning, students do research and analyze a case, identifying its roots causes, influencing factors, barriers and possible solutions (Bierne et al., 2017). Problem-based learning focuses on exploration of real-world challenges, where students investigate and solve problems (Bierne et al., 2017). In dietetics programs, problem-based learning has been found to improve dietetic students' clinical competencies, such as reading medical records and managing diet plans (Winter et al., 2002). On the other hand, service-learning allows students to achieve the learning goals of a course through participation in activities that fulfil the needs of a community partner (Daugherty, 2015). In foodservice management courses, service-learning involves purposeful integration of content

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knowledge and practice, theories and real-life career-oriented learning experience to develop students' competencies (Bringle & Hatcher, 1995). For example, in a research by Honeycutt and Sullivan (2003), students learned how to create vegan recipes based on the knowledge competencies of the dietetics programs when they underwent service-learning in a campus dining facility.

Despite continuing critics and efforts to call for active teaching methods, lower retention and faculty-driven teaching methods still dominate competency-based education (Calhoun et al., 2011; Mocinic, 2011). The aforementioned active teaching methods were seldom implemented in classrooms (Calhoun et al., 2011). To date, research that investigates different methods used in teaching competency-based foodservice management courses is limited. Therefore, the first objective of this study was to explore current teaching methods used by foodservice management instructors in dietetics programs to teach various competencies in foodservice management courses. In this context, teaching methods was defined as teaching practices, including technology-assisted practices, used by foodservice management instructors in the classroom.

Technology has transformed many aspects of education and provided a means to reenergize student engagement (Gould, 2016). Technology integration in classrooms has been showed to enhance students' skills and stimulate their interest in scientific activities in competency-based education (Shoikova et al., 2019). Technology is integrated in the classroom to serve three main functions. First, technology is used for instructional preparation. Educators use technology for a wide array of class-related activities, such as preparing for instructional materials, designing lesson plans, and communicating with students. Second, as a delivery method, technology has been used by the educators to present course content via different channels, such as Zoom, Microsoft Teams, and course management platforms. Third, technology also serves as a leaning tool for students (Inan & Lowther, 2010). For example, virtual reality simulation support student learning by adding vitality to the classroom (Plump & LaRosa, 2017). Additionally, game-based learning can stimulate students' thinking and develop their problem-solving skills (Plass et al., 2015). In foodservice management courses, educators have used different software (e.g., Computrition, Nutricomp) to teach students about inventory management, production planning, and employee scheduling (Shah et al., 1999).

Despite the prevalent use of technology, research related to technology integration in foodservice management was published nearly two decades ago (Shah et al., 1999). Thus, the extent to which foodservice management instructors in dietetics programs have followed this paradigm and incorporated technology into their teaching approaches remains unknown. This led to the second objective of this study, which was to explore technology integration in foodservice management courses, in the three function as previously stated.

METHODS

Prior to conducting the study, the research protocol was approved by the Institutional Review Board of a university located in the southern region of the U.S.

Participant Selection

The participants of this study were faculty members teaching foodservice management courses in dietetics programs of a higher education institution in the U.S. To recruit the participants, the researchers first visited the ACEND website to identify universities that offer Didactic Programs in Dietetics (DPD) and/or Coordinated Programs in Dietetics (CP). Next, the researchers identified the specific departments that offered such programs, reviewed each

faculty member's biography or resume (if available) to identify the specific educators teaching the foodservice management courses. Their contact information, including names, job titles, email addresses, and mailing addresses, was then compiled into a database. If the researchers could not identify the foodservice instructors, the contact information of the dietetic program directors was included. Additionally, the researchers obtained a roster of current Foodservice Systems Management Education Council (FSMEC) members to expand the participant population. This list was carefully examined to exclude those who were ineligible (i.e., hospitality management program faculty, retired faculty members, etc.) and duplication within the existing database. The final database contained contact information for 285 potential participants, including 252 from DPD or CP and 33 from the FSMEC roster.

Instrument Development

An online questionnaire was developed based on the review of the literature (Gu et al., 2013; Okeiyi et al., 1994; Reid, 2014). The questionnaire included a screening question to identify the participants currently teaching a foodservice management course in an institution of higher education in the U.S. The rest of the questionnaire was divided into three sections. Section 1 collected the demographic information of the participants (e.g., gender, age, classes taught, and years of teaching in an institution of higher education, etc.). Section 2 required the participants to select one or more teaching methods (e.g., lecture, service-learning, role play, case study, simulation, and independent learning, etc.) they used to teach each competency in the foodservice management courses. One open-ended question asked the participants to further describe the teaching methods or projects they used to teach these foodservice competencies. Section 3 asked the participants to self-report their perceived skills and frequency of integrating technology in foodservice management courses. The perceived skill in technology integration was measured using a 5-point Likert scale, ranging from Novice (1) to Expert (5). The frequency of using technology was also measured using a 5-point Likert scale, ranging from Never (1) to Always (5).

The initial questionnaire was reviewed by a panel of four experts for content validity. These experts either had extended experience teaching in the foodservice management fields or had been directors of DPD, and therefore, were familiar with topics related to competency standards. Feedback was received from these experts in terms of the wording of certain items, length of the questionnaire, and relevance of the questions. The online questionnaire was revised based on the experts' suggestions.

Pilot Study

The online questionnaire was pilot-tested with 16 instructors teaching food-related classes, who were not part of the final sample, to evaluate the clarity of the questionnaire. The participants of the pilot study made several comments regarding the clarity and formatting of some questions (e.g., multiple selections versus single selection). The questionnaire was revised based on these comments.

Data Collection

The questionnaire was uploaded to an online survey site (Qualtrics survey system). The invitation email that explained the purpose of the study and provided the survey link was emailed to each of the contacts in the database. If the email recipient was not currently teaching a foodservice management course, it was requested that the invitation be forwarded to the colleague who took over teaching the course. To increase the participation rate, two reminder emails were sent to the participants over the course of one month, with a two-week gap between each reminder email (Dillman et al., 2014).

Data Analysis

IBM® SPSS, version 25.0 was used for data analyses. Descriptive statistics were used to describe the demographics, teaching methods, frequency and perceived skills of integrating instructional technology, and types of technological support used. The Pearson correlation coefficient was used to investigate the relationship between frequency and perceived skills of using instructional technology. A *p* value of <.05 was considered statistically significant. Responses to open-ended questions were coded, organized, and analyzed based on foodservice knowledge/competencies and teaching methods. The data was first coded independently by two researchers involved in this study to ensure coding reliability (Kurasaki, 2000). The codes were then compared against each other to identify areas of agreement and disagreement. Any disagreements in coding were discussed until a consensus was achieved.

RESULTS AND DISCUSSION

Demographics and Job Profiles of the Research Participants

A total of 285 invitation emails were sent to the potential participants. After eliminating ineligible participants and incomplete surveys, 41 usable surveys were used for data analysis, resulting in a response rate of 14.4%.

The majority of the participants were female (*n* = 34, 82.9%) and Caucasian (*n* = 36, 87.8%). More than one-third (*n* = 14, 34.1%) of the participants were years of age or older. An approximately equal number of participants had master's (*n* = 20, 48.8%) and doctoral degrees (*n* = 19, 46.3%). Most participants indicated their current position to be assistant professor (*n* = 10, 24.4%), followed by instructor (*n* = 7, 17.1%) and associate professor (*n* = 6, 14.6%). One participant who selected the "other" option indicated a position of assistant professor of practice. Thirty-nine percent of the sample (*n* = 16) had been in their current position for less than five years. Close to 80% (*n* = 34) of the participants held the RDN credential. The participants were members of a wide variety of professional organizations, for instance, The Academy (*n* = 32, 74.4%), Foodservice Systems Management Education Council (FSMEC, *n* = 14, 32.6%), School Nutrition Association (SNA, *n* = 7, 16.3%), and National Restaurant Association (NRA, *n* = 7, 16.3%). Tables 1 and 2 present additional details describing participant demographics and their job profiles.

DPD (*n* = 36, 83.7%) was the most common program offered at the participants' institutions, followed by Dietetic Internship (*n* = 23, 53.5%), CP (*n* = 7, 16.3%), and Individualized Supervised Pathway Program (*n* = 4, 9.3%). Nearly half of the programs were offered entirely on campus (*n* = 20, 48.8%) and the remainder as a combination of on-campus and online instruction (*n* = 21, 51.2%).

Methods for Teaching Foodservice Competencies

For the fall and spring semesters, the participants taught two to three foodservice management courses per semester; for summer, they taught up to two of these courses. The average class size of each course was 26.47 ± 13.60, ranging from 8 to 65 students.

The participants were asked to indicate one or more teaching methods (i.e., lecture, service-learning, role playing, case study, group discussion, and instructional technology) used to teach each foodservice competency category: management theories; budget and financial data; regulatory system related to billing and coding, principles of human resource management, safety principles related to food, personnel, and consumers, and sustainability, waste reduction and environmental protection (Table 3). Additionally, a total of 30 comments related to examples of the assignments used to

Table 1. Demographics of the participants (N = 41)

Items	Frequency (n)	Percentage (%)
Sex		
Female	34	82.9
Male	7	17.1
Ethnicity		
Caucasian/White	36	87.8
African/Black	1	2.4
Hispanic/Latino origin	1	2.4
Asian	1	2.4
Prefer not to respond	2	4.9
Age group		
Less than 30	0	0
30-39	12	29.3
40-49	4	9.8
50-59	10	24.4
60 and above	14	34.1
Prefer not to respond	1	2.4
Highest degree earned		
Master's Degree	20	48.8
Doctoral Degree	19	46.3
Other	2	4.9

teach various foodservice competencies were collected through the open-ended question (Table 4).

Management Theories

Lectures (*n* = 38, 92.7%) was the most common teaching method used to introduce management theories to students. The participants also used case-based learning (*n* = 18, 43.9%), group discussion (*n* = 19, 46.3%), and service-learning (*n* = 4, 9.8%) to teach this particular competency category. Two participants explained that service-learning gave the students an opportunity to put their foodservice management theories into practice. One participant wrote, "Our students run a restaurant, allowing hands-on practice for all management skills." Another participant explained, "The students complete laboratory work with University Dining Services. In upper level Foodservice Management courses, students complete service-learning."

Budget and Financial Data

The participants integrated a few methods, including lecture (*n* = 41, 100%), case study (*n* = 22, 53.7%), and group discussion (*n* = 19, 46.3%) to teach courses on budget and financial data. One participant explained, "I used worksheets (quizzes) and lectures that lead to a case study scenario, which each student team work on, then they discuss as a class." Another participant also commented that "I have them (the students) complete a personal budget (for an industry kitchen). I utilize the discussion board to report findings and interact with other students." Besides, only seven participants used technology to teach this competency.

Regulatory System Related to Billing and Coding

A total of 27 (65.9%) participants indicated that they did not teach the competency related to regulatory system and billing, mainly because this topic was covered in Medical Nutrition Therapy. Of those who taught this competency, the use of lectures (*n* = 13, 31.7%) was the most common teaching method. One participant used service-learning and another used technology to teach this competency.

Principles of Human Resource Management

Similar to other competencies, the participants used lectures (*n* = 39, 95.1%) most frequently to teach the principles of human resource management. Furthermore, 26 participants (63.4%) selected case

Table 2. Job Profile of the Participants (N = 41)

Items	Frequency (n)	Percentage (%)
Current position		
Full Professor	2	4.9
Associate Professor	6	14.6
Assistant Professor	10	24.4
Instructor	7	17.1
Clinical Professor	5	12.2
Lecturer/ Senior Lecturer	5	12.2
Adjunct faculty	5	12.2
Other	1	2.4
Years of instructing courses in post-secondary education		
3 or less	5	12.2
4 – 9 years	14	34.1
10 – 12 years	8	19.5
13 - 15 years	2	4.9
16 - 19 years	4	9.8
20 years or more	8	19.5
Years in current position		
5 years or less	16	39
6-10 years	13	31.7
11-15 years	5	12.2
16-20 years	3	7.3
20 years or more	4	9.8
Professional credential ^{ab}		
Registered Dietitian Nutritionist (RD or RDN)	34	82.9
I don't have any professional credentials	5	12.2
Other	4	9.8
Membership of professional organization(s) ^{ab}		
Academy of Nutrition and Dietetics (The Academy)	32	78
Foodservice Systems Management Education Council (FSMEC)	14	34.1
School Nutrition Association (SNA)	7	17.1
National Restaurant Association (NRA)	7	17.1
School Nutrition Dietetic Practice Group	6	14.6
Food and Culinary Professionals Dietetic Practice Group	6	14.6
Institute of Food Technologists (IFT)	2	4.9
Association of Nutrition and Foodservice Professionals (ANFP)	1	2.4
Other: International Council on Hotel, Restaurant, and Institutional Education (ICHRIE), World Food Travel Association (WFTA), Institute of Food Technologists, (IFT), Nutrition and Dietetic Educators and Preceptors (NDEP), Society for Nutrition Education Behavior (SNEB), Food Service Management Dietetic Practice Group, and Dietetics in Health Care Communities Dietetic Practice Group	8	19.5

^aTotal number of responses (n) was more than 41 as multiple selections were allowed.

^bThe total percentage was more than 100 as multiple selections were allowed.

study as the method of teaching for this competency. In the open-ended question, one participant stated, “[I] use *job descriptions, schedules, and discipline documents to develop a case for human resources.*” Additionally, role playing (n = 14, 34.1%) was identified as a popular teaching method for human resource management, as explained by one participant, “*Human Resource Directors were invited to class to guest lecture and to provide role-playing opportunities.*”

Safety Principles Related to Food, Personnel, and Consumers

Lectures (n = 39, 95.1%), group discussion (n = 21, 51.2%), and case study (n = 21, 51.2%) remained the most common teaching methods for the competency pertaining to safety principles related to food, personnel, and consumers. In addition, service-learning (n = 15, 36.6%) was widely used. One participant provided an example how service-learning was used to teach this competency: “*Students do rotations at the local food bank kitchen to learn food safety principles.*”

Sustainability, Waste Reduction, and Environmental Protection

Most participants used lectures (n = 39, 95.1%) and group discussion to teach sustainability, waste reduction, and environmental protection. Role play (n = 5, 12.2%) was less commonly used compared to other teaching methods. A total of eight participants integrated instructional technology to teach this competency. Two of them provided specific examples of how technology was used. For instance, one of them explained, “Students used an infographic tool to prepare a group presentation on sustainability and present their findings to their classmates.” Another participant stated, “For sustainability in foodservice, we visit a local university who is an area leader in sustainability in foodservice. We see the technology in use and discuss the impact on the environment. We also discuss facilitators and barriers to implementation.”

Other Teaching Methods for Foodservice Competencies

The participants provided brief descriptions of other methods used to teach the foodservice management competencies. These methods

Table 3. Teaching Methods Used by the Participants to Teach Foodservice Knowledge/Competency (N = 41)

Competency	Teaching methods (n, %)						
	Lecture	Service-learning	Role Playing	Case-based Learning	Group Discussion	Instructional Technology	I did not teach this competency
Management theories	38 (92.7)	4 (9.8)	7 (17.1)	18 (43.9)	19 (46.3)	2 (4.9)	4 (9.8)
Budget and financial data	41 (100.0)	5 (12.2)	3 (7.3)	22 (53.7)	19 (46.3)	7 (17.1)	0 (0)
Regulatory system & billing	13 (31.7)	1 (2.4)	3 (7.3)	4 (9.8)	2 (4.9)	1 (2.4)	27 (65.9)
Human resource management	39 (95.1)	4 (9.8)	14 (34.1)	26 (63.4)	23 (56.1)	6 (14.6)	3 (7.3)
Safety principles related to food, personnel and consumers	39 (95.1)	15 (36.6)	12 (29.3)	21 (51.2)	21 (51.2)	7 (17.1)	1 (2.4)
Sustainability, waste reduction and environment protection	39 (95.1)	9 (22.0)	5 (12.2)	14 (66.7)	18 (85.7)	8 (19.5)	1 (2.4)

Percentage was calculated by frequency of teaching method used to teach each category of foodservice competency divided by the total number of participants (N = 41)

included worksheets, reflective papers, seminars, project-based learning, and problem-based learning. Worksheets were used during lectures to teach lessons on budget and financial data (n = 2, 4.9%) and to introduce the foodservice management terms to students (n = 1, 2.4%). Reflective papers (n = 1, 2.4%) were used to help students learn various management theories and identify their own management style. Two participants explained that they hosted seminars and guest speaker sessions to expose students to real-world practice in foodservice and human resource management. Project-based learning was used to teach a combination of competencies. For example, participants who used this approach explained: "I assign a problem related to starting a new food-related business where two students work together to create a proposal to address this problem" and "I use problem-based learning, which allows students to think more critically and enhance their abilities to analyze and solve real-world problems." Furthermore, flipped classroom was also used as explained by one participant: "I utilize the flipped classroom, where lectures are recorded via Panopto and Voice Thread and students attend class with an activity to reinforce the learning." Tables 3 and 4 illustrate the methods used to teach various foodservice competencies and the direct quotes from the participants.

Technology Integration in Foodservice Management Courses

The majority (n = 36, 97.8%) of participants agreed that an in-class policy for using electronic devices depended on the types of classroom activities. For instance, laptops were allowed for note taking only and cell phones were used for online games and polls. Seven participants indicated having no in-class policy for using electronic devices, and another two participants only allowed students to use electronic devices based on special accommodation requests.

For the types of technology used in the classroom, the participants indicated that they either always (n = 26, 63.4%) or often (n = 12, 29.3%) used presentation software, such as PowerPoint and videos. Online collaboration tools (e.g., Google classroom), simulation, student assessment tools (e.g., Kahoot! online quiz), and lecture capturing tools (e.g., Panopto) fell into the categories of being used "rarely" or "sometimes". Meanwhile, gamification (e.g., Minecraft), digital field trips, clickers and smartphone apps, and social media were almost "never" or "rarely" used.

The participants were also asked to indicate their skill levels for integrating technology in the classroom. Overall, the participants perceived their skills as being "proficient" only when using presentation software (4.00 ± 0.73). Online collaboration tools (2.55 ± 0.93), clickers and smartphone apps (2.26 ± 1.04), simulation (2.38 ±

1.02), online student assessment tools (2.95 ± 1.18), lecture capture tools (2.23 ± 1.25), and social media (2.10 ± 1.31) all had "beginner" to "competent" scores. The two instructional technology tools the participants felt the least skillful in integrating were gamification (1.38 ± 0.67) and digital field trips (1.67 ± 0.84). Results from Pearson correlation showed that there was a statistically significant positive relationship between perceived skills and frequency of use for each type of instructional technology (r values ranged from .319 to .764), with the exception of social media (r = .301, p = .063). Those with higher perceived skill levels used technology more frequently (Table 5).

Discussion

RDNs play important roles not only in clinical settings, but in foodservice management as well (Hussain, 2007). ACEND[®] established various competencies that ensure entry-level RDNs are knowledgeable in various areas of foodservice management. Most of the articles related to teaching initiatives in foodservice management were published decades ago (Fellers & Weese, 2001; Fraser & Rock, 1996; Honeycutt & Sullivan, 2003). Very few studies have been conducted in recent years to identify teaching methods and technology integration in foodservice management courses in dietetic programs. This current study closes the gap in the literature by providing empirical data in these research fields.

The results of this study indicated that lectures, group discussion, and case studies, dominated classroom practices. These findings were similar to the research by Vickery and Cotugna (2005) that showed that lectures (n = 67) and case studies (n = 26) were favorable forms of instruction to teach lessons on human genomics in dietetics curriculum. The participants in this study also complemented their lectures with group discussion. In addition, the study by Lieux (1996) that compared lecture-based and problem-based methods in quantity food production classes indicated that students gained more factual knowledge from lecture-based teaching methods, but problem-based learning stimulated higher intellectual efforts. Group discussions allowed instructors to monitor their students' progress and encourage them to be active learners (Goubeaud & Yan, 2004).

Service-learning was also found to be a common teaching method among the participants. The participants explained that this method provided opportunities for students to gain professional knowledge and skills by doing community service in the industry. Service-learning can enhance students' professional experience and self-reflective skills through their involvement in practical opportunities (Chabot & Holben, 2003).

Table 4. Quotes from Participants related to Various Teaching Methods Used to Teach Foodservice Competencies

Knowledge/Competencies	Teaching Methods	Direct Quotes
Budget and financial data	Worksheets	<p><i>"I use a Healthcare Worksheet to practice billing with appropriate diagnosis code and CPT codes. I also created a financial calculations worksheet with 25 problems that allow the practice of foodservice calculations such as ratios, meals per employee hour, etc."</i></p> <p><i>"For financial competencies I typically lecture on the topic which includes some examples that we work through together as a class. I then have a worksheet for students to complete during class."</i></p> <p><i>"I use worksheets for them to learn terminology and uses of the practices."</i></p>
Management theories	Reflective papers	<i>"Students write a reflective paper of past experience with managers using the management theories and develop their own management theory of what type of manager they hope to be."</i>
Human resource management	Seminars/ Guest Speaker Sessions	<i>"I also have guest speakers visit the class and present their area of expertise such as National School Lunch Programs (NSPLs), Human Resource (HR) recruitment, HR management, HR scheduling and productivity, and Accessibility and American Disability Act (ADA)."</i>
Sustainability, waste reduction and environment protection	Assessment	<i>"Assessment of definitions of marketing terms used to promote biodegradable/compostable service."</i>
Safety principles related to food, personnel and consumers	Problem-based learning	<i>"Students complete a HACCP plan for a menu planning project."</i>
Combination of competencies	Problem-based learning	<p><i>"Foodservice Operations and Management courses have a project that builds upon all the competencies involved with food management. Students have to build a business from start to finish. Choices for establishments include hospital foodservice, school foodservice, private nutrition consulting and restaurant development. The components include business plan, mission, vision and values, menu development, purchasing, cost analysis, income statements, operating budget, facility design and marketing."</i></p> <p><i>"I use problem-based learning, which allows students to think more critically and enhance their abilities to analyze and solve real-world problems. By the end of the semester student should develop skills in gathering and evaluating information as well as acquiring versatile and effective communication skills. I use teams to problem solve and present case studies so student can gain experience working cooperatively working in teams/small groups."</i></p> <p><i>"The students were asked to design a cafeteria of their choice with a physical layout of the kitchen; create operating budget, write policies and procedures; develop work schedules, job descriptions, job specifications and organizational chart. The students were asked to create an innovative idea other than the traditional way of running the facility."</i></p>

Consistent with the previous literature, problem-based learning was frequently used in class, enabling students to learn and practice a few competencies for solving a task (Harman et al., 2014; Winter et al., 2002). Project-based learning could increase students' enthusiasm and interest in concepts taught in foodservice management courses (Fellers & Weese, 2001). As indicated by a few participants (n = 3), this typically included creating a foodservice operation that involved multiple components and steps, such as menu planning, menu modification to fit various therapeutic needs, nutrient analysis of menus, layout and facility design, food preparation and demonstration, and marketing. An interesting finding from this study was that a large number of participants used technology to teach competencies related to sustainability, waste reduction, and environmental protection. A plausible reason is that sustainability is a trendy topic and online resources are available for use, such as videos like Healthy Land, Healthy Food & Healthy Eater: Dietitians Cultivating Sustainable Food Systems (Tagtow & Harmon, 2009).

This study found that most participants perceived their skill levels for integrating various instructional technology to be "novice" or

"beginner", which might explain why the participants only integrated basic technological tools into their teaching. They adopted technology mostly for preparing their lecture presentations. Occasionally, technology was used to capture lectures, assess students' performance, and encourage collaborative learning among students. These findings were consistent with a previous study that showed some common instructional technology adopted in foodservice courses were course management tools, online quizzes, online homework, online videos, and lectures with slides (Goubeaud & Yan, 2004). The participants rarely used technology for the purpose of game-based learning or to provide virtual learning experiences to students. Social media was used infrequently in the classroom. This finding was contrary to a study conducted by Moran, Seaman, and Tinti-Kane (2011) that showed close to two-thirds of the 1,920 faculty members used social media in their classrooms and students were asked to read or review social media posts for class assignments (Moran et al., 2011). The differences in results maybe because social media is not a viable learning platform for every discipline (Tess, 2013). Additionally, whether social media is a tool that should be used to deliver formal education is still questionable and therefore, its use

Table 5. Participant's Perceived Skills and Use of Instructional Technology in the Classroom (N = 41)

Types of Instructional Technology	Frequency of use (n, %)					M ± SD	Skills in integrating (n, %)					M ± SD	Person Correlation
	Never	Rarely	Sometimes	Often	Always		Novice	Beginner	Competent	Proficient	Expert		r
Presentation software (e.g., PowerPoint,	0	0	3 (7.3)	12 (29.3)	26 (63.4)	4.55 ± 0.63	0	0	11 (26.8)	19 (46.4)	11 (26.8)	4.00 ± 0.73	0.319*
Student assessment tools (e.g., Kahoot!, online quiz)	9 (22.0)	6 (14.6)	9 (22.0)	12 (29.3)	5 (12.1)	2.98 ± 1.34	7 (17.1)	4 (9.8)	17 (41.4)	10 (24.4)	3 (7.3)	2.95 ± 1.25	0.774**
Online collaboration tools (e.g., Google classroom)	15 (36.5)	7 (17.1)	9 (22.0)	8 (19.5)	2 (4.9)	2.37 ± 1.29	7 (17.1)	8 (19.5)	23 (56.1)	2 (4.9)	1 (2.4)	2.55 ± .93	0.484**
Simulation (e.g., P.E.D.R.O)	19 (46.3)	4 (9.8)	15 (36.6)	2 (4.9)	2 (4.9)	2.14 ± 1.20	13 (31.7)	4 (9.8)	19 (46.3)	3 (7.3)	1 (2.4)	2.38 ± 1.02	0.754**
Lecture-capture tools (e.g., Panopto)	18 (43.9)	6 (14.6)	11 (26.8)	4 (9.8)	2 (4.9)	2.14 ± 1.24	16 (39.0)	6 (14.6)	13 (31.7)	4 (9.8)	2 (4.9)	2.23 ± 1.25	0.753**
Clickers and smartphones apps (e.g. GroupMe, Poll Everywhere)	24 (58.6)	7 (17.1)	8 (19.5)	1 (2.4)	1 (2.4)	1.74 ± 1.03	12 (29.3)	9 (22.0)	17 (41.5)	2 (4.8)	1 (2.4)	2.26 ± 1.04	0.764**
Digital field trips	30 (73.2)	8 (19.5)	3 (7.3)	0	0	1.33 ± 0.06	23 (56.0)	9 (22.0)	9 (22.0)	0	0	1.67 ± 0.08	0.641**
Social Media (e.g., Twitter hashtags, Facebook group)	35 (85.4)	2 (4.9)	3 (7.3)	1 (2.4)	0	1.26 ± 0.69	20 (48.8)	7 (17.1)	8 (19.5)	3 (7.3)	3 (7.3)	2.10 ± 1.31	0.301

**p < 0.01

*p < 0.05

is dependent on the instructors (Friesen & Lowe, 2011; Tess, 2013). The use of simulation among faculty teaching foodservice management courses was not prevalent. Similar results were reported in the study conducted by Schlein (2011) among dietetic educators (n = 141). Schlein (2011) reported that less than 3% used patient simulators in the classroom, although they were open to this option.

CONCLUSIONS AND APPLICATIONS

Due to the frequently changing working environment in foodservice management, teaching methods need to be constantly analysed and modified to prepare students for their future professions (Bierne et al., 2017). The results of this study revealed that a wide variety of teaching methods are currently being used to teach the foodservice management competencies, with lecture being the dominant approach. Lecture is an efficient method to deliver a substantial amount of information. This is especially important as 14% of the questions covered in the RD credential exam pertain to foodservice systems and another 21% of the questions relate to management. (Commission on Dietetic Registration, 2020). Foodservice faculty are encouraged to continue exploring teaching methods that will build upon or diversify their current methods of teaching. For example, discussions on the effects of meal production projects on the environment can be used to teach sustainable competencies (Harmon et al., 2011). In addition, students can gain management and human resources knowledge/competencies by working with practitioners (e.g., human resources directors, Child Nutrition Professionals, etc.).

Overall, the use of technology to teach foodservice competencies is not prevalent among foodservice instructors in the dietetics programs. When used, instructional technology is limited to PowerPoint presentations and videos. Although it is not always necessary to use technology to teach foodservice competencies, as mentioned by one participant, this option is worth considering due to its well-established benefits (e.g., improves engagement and knowledge retention, Miller & Petrillose; 1992; Plump & LaRosa, 2017; Shoikova et al., 2019). Furthermore, online teaching tools, such as Zoom and Panopto (lecture capturing tools), Google Docs and Piazza (online collaborative tool), Poll Everywhere (audience participant apps), Socrative and Nearpod (gamification) have become increasingly popular in the academia (Evans, 2020). Therefore, it is recommended that foodservice educators adopt various kinds of technology tools in teaching.

One drawback to this recommendation is that the availability of technology software and tools specific to the foodservice management in dietetic programs appear to be underdeveloped. For instance, simulation in dietetics education is mostly used in clinical settings to assess and enhance communication and counseling, documentation, and care planning skills (O'Shea et al., 2020). Simulation programs in foodservice management are still limited and, when available, are mainly designed for hospitality management fields (e.g., Student Hotel and Restaurant Enterprise Simulations). Faculty members and vendors can collaborate to explore the possibilities of developing competency-based foodservice management simulations for students to practice various skills and competencies.

The results of this study showed that participants mostly perceived their skill levels for integrating technology to be "novice" and "beginner". Perceived skill has a direct positive relationship with frequency of using technology (Gorder, 2008). Therefore, increasing foodservice educators' skills and abilities to use technology tools may be crucial for encouraging its incorporation into classrooms (Gorder, 2008). Given that the participants held membership in various

professional organizations, the results are useful for suggesting opportunities for professional organizations or organizers of national conferences to consider hosting pre-conference workshops to increase educators' information technology literacy. Conferences could also incorporate round table discussions, which allow educators to exchange information on various teaching approaches and resources.

This study has several limitations. First, even with two follow-up emails sent to potential participants, the response rate (14.4%) was not optimal. A study conducted by Webber and Sarjahani (2011) among 237 dietetic internship directors had a response rate of 34% with two follow-up emails. Similarly, the study by Vickery and Cotugna (2005) among 232 DPD directors reported a response rate of 35% (n = 82). Therefore, the results may not represent all foodservice educators and should not be used for generalization.

The low response rate may be result of the survey invitations not reaching the entire target population. Some participants might not have forwarded the invitation emails to their colleagues who taught foodservice management courses. Furthermore, the surveys were distributed at the beginning of the COVID-19 pandemic when universities nationwide were transitioning into online instruction. Many of the potential participants may have been preparing for the new teaching modality and did not have time to respond to this survey.

For future studies, the researchers could recruit participants through multiple channels, such as FSMEC's Facebook page, LinkedIn discussion groups, and other professional organizations. Snowball sampling, which pertains to the referrals to other colleagues/friends in the same professional circle as the foodservice educators who responded to this survey, may also be helpful for recruiting more participants (Johnson, 2014).

The second limitation was related to the survey instrument. Only one optional open-ended question was included in the questionnaire to allow participants to elaborate on and explain the various approaches and assignments used to teach foodservice management competencies. Because this study was among the few studies published in the area of foodservice management in dietetics, it will be beneficial to incorporate a few more follow-up questions to gain deeper insights to various topics. For instance, the participants who "never" or "rarely" integrate technology could be led to answer open-ended or multiple-choice questions to explain why this approach was not used in their classrooms. Regardless of these limitations, this study provided a glimpse into teaching methods and technology integration in the foodservice management courses in the dietetics programs and opens avenues for future studies that could advance foodservice education.

REFERENCES

- Accreditation Council for Education in Nutrition and Dietetics. (2016, October 5). *ACEND® standards update*. <https://www.eatrightpro.org/-media/eatrightpro-files/acend/monthlystandardsupdates/standardsupdateoctober2016.pdf?la=en&hash=1DE26107274D3548AA01F187141500FA65956AEB>
- Ash, S., Palermo, C., & Gallegos, D. (2018). The contested space: The impact of competency-based education and accreditation on dietetic practice in Australia. *Nutrition and Dietetics*, 76(1), 38-46. <https://doi.org/10.1111/1747-0080.12430>
- Bierne, J., Titko, J., Cerkovskis, E., & Lasmane, A. (2017). *Advanced teaching methods for students' competencies development*. Proceedings of the International Scientific Conference, 1, 63-72. <http://journals.ru.lv/index.php/SIE/article/view/2349/2284>

- Bringle, R. G., & Hatcher, J. A. (1995). A service-learning curriculum for faculty. *Michigan Journal of Community Service Learning, 2*(1), 112-122.
- Calhoun, J. G., Wrobel, C. A., & Finnegan, J. R. (2011). Current state in U.S. Public health competency-based graduate education. *Public Health Reviews, 33*(1), 148-167. <https://doi.org/10.1007/BF03391625>
- Carraccio, C., Wolfsthal, S. D., Englander, R., Ferentz, K., & Martin, C. (2002). Shifting paradigms: From flexner to competencies. *Academic Medicine, 77* (5), 361-367.
- Chabot, J. M., & Holben., D. H. (2003). Integrating service-learning into dietetics and nutrition education. *Topics in Clinical Nutrition, 18*(3), 177-184.
- Cluskey, M., Gerald, B., & Gregoire, M. (2012). Management in dietetics: Are we prepared for the future? *Journal of the Academy of Nutrition and Dietetics, 112*(5), Supplement, S34-S37. <https://doi.org/10.1016/j.jand.2012.03.015>
- Commission on Dietetic Registration. (2020). *Registered examination for dietitians: Handbook for candidates*. [https://admin.cdrnet.org/vault/2459/web//RD%20Handbook%20September\[1\].pdf](https://admin.cdrnet.org/vault/2459/web//RD%20Handbook%20September[1].pdf)
- Daugherty, J. (2015). Impact of service-learning experiences in culinary arts and nutrition science. *Journal of Public Scholarship in Higher Education, 5*, 61-78.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). Mail questionnaires and implementation. In D. A. Dillman, J. D. Smyth, & L. M. Christian (Eds.), *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed, pp. 351-397). John Wiley & Sons.
- Evans, D. (2020, April 4). *How Zoom became so popular during social distancing*. CNBC. <https://www.cnn.com/2020/04/03/how-zoom-rose-to-the-top-during-the-coronavirus-pandemic.html>
- Fellers, R. B., & Weese, J. O. (2001). Problem-based learning improves teaching evaluations in a foodservice management course. *Journal of the American Dietetic Association, 101*(9), A67. [https://doi.org/10.1016/S0002-8223\(01\)80214-5](https://doi.org/10.1016/S0002-8223(01)80214-5)
- Frank, J. R., Mungroo, R., Ahmad, Y., Wang, M., Rossi, S. D., & Horsley, T. (2010). Toward a definition of competency-based education in medicine: a systematic review of published definitions. *Medical Teacher, 32*(8), 631-637. <https://doi.org/10.3109/0142159X.2010.500898>
- Fraser, A. M., & Rock, C. L. (1996). An innovative approach to teaching foodservice management: Emphasis on community-based programs. *Journal of the American Dietetic Association, 96*(12), 1282-1283. [https://doi.org/10.1016/S0002-8223\(96\)00335-5](https://doi.org/10.1016/S0002-8223(96)00335-5)
- Friesen, N., & Lowe, S. (2011). The questionable promise of social media for education: Connective learning and the commercial imperative. *Journal of Computer Assisted Learning, 28*(3), 183-194. <https://doi.org/10.1111/j.1365-2729.2011.00426.x>
- Griswold, K., & Rigers, D. (2020). Compensation and benefits survey 2019. *Journal of the Academy of Nutrition and Dietetics, 120*(3), 448-464. <https://doi.org/10.1016/j.jand.2019.12.015>
- Gorder, L. M. (2008). A study of teacher perceptions of instructional technology integration in the classroom. *Delta Pi Epsilon Journal, 50*(2), 63-76.
- Goubeaud, K., & Yan, W. (2004). Teacher educators' teaching methods, assessments, and grading: A comparison of higher education faculty's instructional practices. *The Teacher Educator, 40*(1), 1-16. <https://doi.org/10.1080/0887873040955348>
- Gould, S. M. (2016). Potential use of classroom response systems (CRS, Clickers) in foods, nutrition, and dietetics higher education. *Journal of Nutrition Education and Behavior, 48*(9), 669-674. <https://doi.org/10.1016/j.jneb.2016.06.004>
- Gu, X., Zhu, Y., & Guo, X. (2013). Meeting the "digital natives": Understanding the acceptance of technology in classrooms. *Educational Technology & Society, 16*(1), 392-402.
- Harman, T., Bertrand, B., Greer, A., Pettus, A., Jennings, J., Wall-Bassett, E., & Babatunde, O. T. (2014). Case-based learning facilitates critical thinking in undergraduate nutrition education: Students describe the big picture. *Journal of the Academy of Nutrition and Dietetics, 115*(3), 378-388. <https://doi.org/10.1016/j.jand.2014.09.003>
- Harmon, A., Lapp, J. L., Blair, D., & Hauck-Lawson, A. (2011). Teaching food system sustainability in dietetic programs: Need, conceptualization, and practical approaches. *Journal of Hunger and Environmental Nutrition, 6*(1), 114-124. <https://doi.org/10.1080/19320248.2011.554272>
- Honeycutt, L. P., & Sullivan, S. S. (2003). Collaborating with campus dining services on a student project in foodservice management. *Proceedings of the Journal of the American Dietetic Association, 103*(Supp-S9). [https://doi.org/10.1016/S0002-8223\(08\)70236-0](https://doi.org/10.1016/S0002-8223(08)70236-0)
- Hussain, Z. (2017). Role of dietitian in a food service industry. *Nutrition Food Science International Journal, 3*(1), 555604. <https://doi.org/10.19080/NFSIJ.2017.03.555604>
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: a path model. *Educational Technology Research and Development, 58*, 137-154. <https://doi.org/10.1007/s11423-009-9132-y>
- Johnstone, S. M., & Soares, L. (2014). Principles for developing competency-based education programs. *Change: The magazine of higher learning, 46*(2), 12-19. <https://doi.org/10.1080/00091383.2014.896705>
- Kurasaki, K. S. (2000). Inter-coder reliability for validating conclusions drawn from open-ended interview data. *Field Methods, 12*(3), 179-194. <https://doi.org/10.1177/1525822X0001200301>
- Kuhn, L. (2014). *The perspectives of advanced practice dietitians in foodservice director roles: An exploratory investigation*. [Unpublished master's thesis]. Ohio State University.
- Lafferty, L., & Dowling, R. A. (1997). Position of the American Dietetic Association: Management of health care food and nutrition services. *Journal of the Academy of Nutrition and Dietetics, 97*(12), 1427-1430. [https://doi.org/10.1016/S0002-8223\(97\)00345-3](https://doi.org/10.1016/S0002-8223(97)00345-3)
- Lieux, E. M. (1996). *The effect of teaching method on student knowledge of quantity food production and service, course evaluations, and propensity for participative management* (Publication No. 9710956) [Doctoral dissertation, Virginia Polytechnic Institute and State University]. ProQuest Dissertations Publishing.
- Miller, J., & Petrillose, M. (1992). Computer simulations: an important supplement to the practical experience requirements of hotel operations courses. *Hospitality Education and Research Journal, 4*(2), 61-64. <https://doi.org/10.1177/109634802237486>
- Mocinic, S. (2011). Learning and teaching strategies for competence development. In N. Popov, C. Wolhuter, B. Leutwyler, M. Mihova & J. Ogunleye (Eds.), *Comparative Education, Teacher Training, Education Policy, School Leadership and Social Inclusion* (pp. 2243-250). Bureau for Educational Services.
- Moran, M., Seaman, J., & Tinti-Kane, H. (2011). *Teaching, learning, and sharing: How today's higher education faculty use social media*. Pearson Learning Solutions. <https://files.eric.ed.gov/fulltext/ED535130.pdf>
- O'Shea, M.-C., Palermo, C., Rogers, G. D., & Williams, L. T. (2020). Simulation-based learning experiences in dietetics programs: A systematic review. *Journal of Nutrition Education Behaviour, 52*(4), 429-438. <https://doi.org/10.1016/j.jneb.2019.06.015>
- Okeiyi, E., Finley, D., & Postel, R. T. (1994). Food and beverage management competencies: Educator, industry, and student perspectives. *Hospitality & Tourism Educator, 6*(4), 37-41. <https://doi.org/10.1080/23298758.1994.10685615>
- Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist, 50*(4), 258-283. <https://doi.org/10.1080/00461520.2015.1122533>
- Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for e-learning novices. *Management Teaching Review, 2*, 151-158. <https://doi.org/10.1177/2379298116689783>
- Reid, P. (2014). Categories for barriers to adoption of instructional technologies. *Education and Information Technologies, 9*(19), 383-407. <https://doi.org/10.1007/s10639-012-9222-z>
- Shah, Z., George, V. A., & Himburg, S. P. (1999). Computer-assisted education for dietetics students: A review of literature and selected software. *Journal of Nutrition Education, 31*(5), 255-261. [https://doi.org/10.1016/S0022-3182\(99\)70461-9](https://doi.org/10.1016/S0022-3182(99)70461-9)
- Shoikova, E., Nedeltcheva, G. N., & Nikolov, R. (2019). Competence-based education by advanced technologies. *Proceedings of the 12th annual International Conference of Education, Research and Innovation* (pp. 8004-8012). <https://library.iated.org/view/SHOIKOVA2019COM>

- Tagtow, A. M., & Harmon, A. H. (2009). *Healthy land, healthy food & healthy eaters: Dietitians cultivating sustainable food systems* [White paper]. The American Dietetic Association Food and Nutrition Conference and Exhibition. https://scholarworks.montana.edu/xmlui/bitstream/handle/1/3029/HillerHarmon_HLHFHE_2009.pdf?sequence=1&isAllowed=y
- Tess, P. A. The role of social media in higher education classes (real and virtual) – A literature review. *Computers in Human Behavior*, 29, A60-A68. <https://doi.org/10.1016/j.chb.2012.12.032>
- U.S. Bureau Labor of Statistics. (2018). *Occupational Employment and Wages, May 2018: 29-1031 Dietitians and Nutritionists*. <https://www.bls.gov/oes/2018/may/oes291031.htm#ind>
- Vickery, C. e., & Cotugna, N. (2005). Incorporating human genetics into dietetics curricula remains a challenge. *Journal of the American Dietetic Association*, 105(4), 583-588. <https://doi.org/10.1016/j.jada.2005.01.007>
- Webber, C. B., & Sarjahani, A. (2011). Fitting Sustainable Food Systems Into Dietetic Internships—A Growing Trend. *Journal of Hunger & Environmental Nutrition*, 6(4), 477-489. <https://doi.org/10.1080/19320248.2011.627304>
- Winter, J., Matters, H., & Nowson, C. (2002). A problem-based approach to clinical education in dietetics. *The Journal of the Dietitians Association of Australia*, 59(1), 23-28.
- Wright, O. (2017). Foodservice management returns: The need to rejuvenate the superhero contribution of dietetics. *Nutrition & Dietetics*, 31(5), 260-261. <https://doi.org/10.1111/1747-0080.12349>