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Dietetic Educators' Perceived Barriers to Technology Integration in Foodservice Management Courses

Yee Ming Lee[1], Yee Ling Lee[2]

[1]*Associate Professor, Auburn University, Department of Nutrition, Dietetics, and Hospitality Management,* 362 *Spidle Hall, Auburn University, Auburn AL 36849-5605.*

[2] *Research Centre for Future Learning, School of Education, Taylor's University, 46500 Subang Jaya, Selangor, Malaysia.*

ABSTRACT: *A wealth of literature has discussed technology integration in education. However, few studies have examined technology integration and barriers in foodservice management courses. This study aimed to investigate types of technology, perceived barriers to technology integration, and level of confidence in integrating technology among foodservice management educators in the dietetics program prior to COVID-19 pandemic. A total of 41 faculty members teaching foodservice management courses completed an online survey. Data was analyzed using descriptive and simple regression analysis. The results showed that the technology integration in foodservice management courses was infrequent. Technology was mostly limited to using PowerPoint to prepare lectures. The biggest barriers to technology integration were lack of time to redesign courses, budgetary constraints and lack of skills/ knowledge. The participants have moderate level of confidence in technology integration. They would attempt to solve problems related to technology integration independently. Recommendations to remove barriers and increase foodservice educators' confidence in integrating technology were discussed.*

KEYWORDS –*barriers, confidence level, dietetics, food service management, technology integration*

I. INTRODUCTION

Technology has rapidly transformed many aspects of education [1].Technology provides a means to reenergize and engage students. Technology is widely used for enhancing student learning experience, knowledge and skills at higher education institutions [2][3][4].Rogers [4] identified seven benefits of technology integration for students in higher education, including promoting in-depth exploration and problem-solving skills; improving collaborative and interpersonal skills; as well as providing personalized learning so that students can learn at their own pace.

In line with the technology advancement, educators have started to integrate technology into their teaching pedagogy. For example, computer-based simulations are helpful for reinforcing financial management, marketing, and human resource management skills [3]. In dietetics courses, simulations expose students to supervised practice using standardized patients [5]. Classroom response systems such as Clikers are potential tools to clarify concepts and misconceptions in nutrition and dietetics courses as well as to engage students in discussions [2]. Game-based learning platforms (e.g., Kahoot!) and virtual reality simulations support student learning by adding vitality to the classroom [6].

In foodservice management courses within dietetics programs, technology-assisted learning that incorporates different software (e.g., Computrition, Nutricomp) for inventory management, production planning, and employee scheduling is a common practice [7]. However, research related to the use of technology in

foodservice management was published nearly two decades ago [7]. Thus, the extent to which foodservice instructors have followed this paradigm and incorporated technology into their classrooms remains unknown. This led to the objectives of this study, which were to explore the practice of technology integration and perceived barriers to technology integration among foodservice management educators. This study also investigated foodservice management educators' confidence level in technology integration andthe factors that associated with their level of confidence. The strategies they used to get assistance in incorporating technology were also investigated.

II. LITERATURE REVIEW

The literature review covers empirical works related to barriers to technology integration and foodservice management educators' confidence level in integrating technology into their classroom practice.

2.1 Barriers to Technology Integration

Previous studies have investigated the barriers to technology integration across academic school years, from pre-schools to higher education. For example, an earlier study by Ertmer [8] classified the barriers of integrating technology into first- and second- order barriers. The first-order barriers refer to external obstacles to teachers such as lack of resources, environment, time and training [8]. The second-order barriers are internal factors such as teachers' beliefs, attitudes and knowledge [8]. Both barriers are inextricably linked, and thus, teachers need to use different strategies for overcoming both types of barriers [8]. Hew and Brush [9] identified six major categories of barriers faced by middle school teachers when they integrated technology into the curriculum for instructional purposes. These barriers included resources, knowledge and skills, institution, attitudes and beliefs, assessment, and subject culture[9]. In the higher education setting, a review article published by Goh and Sigala [10] identified the main barriers to technology integration in hospitality management programs as additional time involved in learning new technology, self-perceived difficulty in incorporating technology into classrooms as well as institutional, personal and technological barriers. In general, there is no universal agreement on how barriers to technology integration should be categorized [11]. In this study, barriers to technology integration were categorized into four categories, namely facility-related; support system; faculty-related and student-related factors.

In terms of facility, previous studies [9][11][12][13][14][15] found that lack of technical support and accessibility to equipment limited the use of technology among early childhood teachers. Dinc [16] added that security issue, lack of maintenance and reliability of equipment hampered technology in classes. In addition, lack of computer and appropriate software [12][14][15] as well as low bandwidth [17] are obstacles in technology integration. ICT equipment which was located in an inconvenient location also limits access to technology [10].

Support system could be an important decisive factor for technology integration. Some educators reported that that lack of administrative support, poor training [11][12][13][16][17][18]]19] and technical support [12][15] discouraged them to integrate technology in their teaching. Lack of funding is also a barrier for implementing technology-assisted lessons as there were cost-related to hardware and software acquisition and build of infrastructure [14][16][20].

In terms of faculty-related factors, previous studies indicated that educators' beliefs, attitudes, inadequate knowledge and skills, as well as resistance to change impacted their practice in knowledge integration [9][11][12]]13]]15][16][17][21]. Lack of time also hindered technology integration as educators needed time to learn how to use hardware and software, to collaborate with other teachers and to incorporate technology into their curriculum [12][14][16][18][19].Challenging classroom management and teachers' low readiness were also barriers to technology integration [18]. Watty et al. [19] reported that lack of updated information about technology caused some of the faculty members not fully understood the potential of technology in enhancing student learning.

In addition, student factors, including large size class [11] and lack of ICT skills [17] also pose challenges to technology integration. Hsu [17] explained that if students had low ICT literacy skills, teachers

had to allocate a substantial lesson time to teach them how to use ICT in learning. Though barriers to technology integration have been studied in other fields of study such as education [13][14][16] and accountancy [19], no previous research has looked at this aspect in the context of foodservice management. Foodservice management courses have their own program standards, assessment criteria and expected learning outcomes which are distinctive from the previous research context. Therefore, there is a need to investigate the barriers to technology integration in this field.

2.2 Confidence Level

Self-efficacy is an individual's beliefs on his or her capabilities to accomplish a task [22]. Hira[23] further defined self-efficacy as "having the confidence in one's ability to manage a situation without being overwhelmed. In the context related to teaching and learning" (p.5). Tschannen-Moran and Hoy [24] described self-efficacy as educators' beliefs on their abilities to take necessary action to complete a teaching-related tasks. Previous studies have indicated that there was a positive relationship between teachers' self-confidence and their beliefs in utilizing technology [11][13][21].Teachers who were confident with technology had a higher chance of integrating technology into their class [11][21]. Besides, they are more likely to perceive that technology integration could improve student learning [13]. Teachers with high confidence would find solutions to overcome the barriers they encountered in using technology [8][11] and to adapt to different class conditions such as large number of students, lack of space, demanding curriculum and class management issues [11].

Previous literature showed that teachers' self-efficacy could be affected by multiple factors such as years of experience, locality (urban versus rural), academic qualification and age [22][24][25]. Because self-efficacy has influential effect on educators' classroom strategies and behavior, it is important to investigate factors associated with foodservice educators' confidence level in integrating technology into teaching.

III. METHODOLOGY

The institutional Review Board (IRB) of a south eastern university classified this research as exempt and approved the research protocol of this study (Protocol # 20-011 EP 2001).

3.1 Participants

The target population of this study were faculty members teaching foodservice management courses in the dietetics program in the higher education institutions located in the U.S. To recruit the participants, the researchers created a database that contained a list of the foodservice educators identified two different methods. In the first method, the researchers visited the Accreditation Council for Education in Nutrition and Dietetics's (ACEND®) website to identify higher education institutions that offer Didactic Programs in Dietetics (DPD) and/or Coordinated Programs in Dietetics (CP). Next, the researchers located the specific departments that offered such programs, and reviewed the biography or curriculum vitae (if available) of each of the faculty members to identify the specific educators teaching the foodservice management courses. The researchers then retrieved their contact information, such as names, job titles, and email addresses and compiled such information into a database. The contact information of the directors was included in this list, if the researchers were unable to identify the foodservice instructors in a particular institution. In the second method, the researchers obtained the current member roster of the Foodservice Systems and Management Council (FSMEC) and carefully examined the roster to exclude those who were ineligible (i.e., hospitality management program faculty, retired faculty members, etc.). Any duplicated contacts were also excluded. The final database contained contact information for 285 potential participants, including 252 from DPD or CP and 33 from the FSMEC roster.

3.1.2 Demographic and Job Profiles of Participants

Of 285 invitation emails that were sent out to the potential participants, only 41 complete and usable surveys were collected, resulting in a response rate of 14.4%.

Most of the participants were female (n = 34, 82.9%) and Caucasian (n = 36, 87.8%). Slightly over one-third (n = 14, 34.1%) of the participants were aged 60 years or older. Twenty participants indicated that they

hold a Master's degree (n = 20, 48.8%), followed by doctoral degrees (n = 19, 46.3%). The most frequently reported current positions were Assistant Professor (n = 10, 24.4%), followed by instructor (n = 7, 17.1%) and Associate Professor (n = 6, 14.6%). About 40% (n = 16) of the participants reported less than 5 years of service in their current position. In term of credentials, approximately 80% (n = 34) of the participants were Registered Dietitian Nutritionist (RDN). The participants hold membership in various professional organizations, including the AND (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%). The detailed demographics and job profiles of the participants are shown in Table 1.

TABLE 1.Demographics of the Participants (N=41)

Items	Frequency (n)	Percentage (%)
Sex		
Female	24	82.9
Male	7	17.1
Ethnicity		
Caucasian/White	36	90.0
African/Black	1	2.5
Hispanic/Latino origin	1	2.5
Asian	1	2.5
Prefer not to respond	1	2.5
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	24.1
Prefer not to respond	1	2.5
Highest degree earned	20	48.7
Master's Degree	19	46.3
Doctoral Degree	2	5.0
Other		

Dietetic Internship (n = 23, 53.5%) was the most common program offered at the participants' institutions, with nearly half offered entirely on campus (n = 20, 48.8%) and the remainder as a combination of on-campus and online instruction (n = 21, 51.2%).

3.2 Instrument Development

An online survey instrument was developed based on the review of previous literature [12][15][26]. A screening questions was included at the beginning of the online questionnaire to exclude individuals who are not currently teaching a foodservice management course in an institution of higher education in the U.S. The rest of the survey instrument contained of four major parts. Part 1 asked the participants to self-report their frequency of using various kinds of instructional technology in foodservice management courses, which was measured using a 5-point Likert scale, ranging from Never (1) to Always (5). Part 2 asked the participants to select the strategies they used when needing assistance with instructional technology. Part 3 asked the participants to indicate the barriers of

instructional technology integration in the classroom. The barriers consisted of four categories (i.e., facility-related, faculty-related, student-related, and support system), with a total of 17 items. The participants indicated their response using a scale of 1 to 5, from 1 being "strongly disagree that it is a barrier" to 5 being "strong agree that it is a barrier". The self-efficacy for using instructional technology was developed to measure the confidence level of the educators in using technology (4 items). In addition, the educators were also asked to indicate their change in confidence level in technology-use after COVID-19 pandemic. In addition, the last part of the survey instrument solicited the demographic information of the participants, including gender, age, classes taught, years of teaching in an institution of higher education, current job position, credentials, and membership of professional organizations.

A panel of four experts, who are familiar with foodservice competencies were invited to review the initial questionnaire. The panel provided multiple comments and suggestions related to the wording of some survey items, organization and length of the questionnaire, and relevance of the questions. The online questionnaire was revised based on the experts' suggestions.

3.3 Pilot Study

A pilot study was conducted to evaluate feasibility of the study, as well as assessing the inter-item reliability of the scaled items. A total of 16 faculty members teaching food-related classes in the higher education institutions in the U.S. participated in this study, which met the recommended pilot study sample size of single group study[27][28][29][30]. The Cronbach alpha coefficient of the scaled items were higher than the minimum recommended Cronbach alpha values of .70, for example Cronbach alpha for "level of confidence of integrating technology" was .869 and .928 for "barriers of technology integration". Therefore, the scaled items were considered as having good internal consistency. Moreover, the participants of the pilot study also made several comments regarding the clarity and format of a few questions. The questionnaire was again revised based on the results of the pilot study.

3.4 Data collection

The final questionnaire was uploaded to an online survey platform (Qualtrics survey system). The invitation email that explained the purpose of the study with the survey link was emailed to each of the contacts in the database. The email recipients were also asked to forward or share the information about this research to other colleagues if they were not currently teaching foodservice management courses. 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 [31].

3.5 Data analysis

IBM® SPSS, version 25.0 was used for data analyses. Descriptive statistics were used to describe the demographics, frequency and perceived skills of integrating instructional technology, types of technological support used, as well as supportive factors and barriers to technology integration. Simple regression analysis was conducted to identify variables that associated with level of confidence of integrating instructional technology in the classroom. A p value of <.05 was considered as statistically significance.

IV. FINDINGS

The results of this study are presented in four parts, namely technology integration in foodservice management courses, barriers to technology integration, confidence level in technology integration and strategies used to get assistance in integrating technology.

4.1 Technology integration in foodservice management courses

Table 2 shows the instructional technology used by the food service management educators in their classrooms.

TABLE 2. Technology Adopted by Food Service Management Educators

Items Types of Technology	Frequency of use (n, %)					M±SD
	Neve	Rarely	Sometimes	Often	Always	
Presentation software (e.g., PowerPoint, videos)	0	0	3 (7.0)	13 (30.2)	26 (60.5)	4.55±.63
Student assessment tools (e.g., Kahoot!, online quiz)	9 (20.9)	6 (14.0)	9 (22.0)	12 (29.3)	5 (12.1)	2.98±1.34
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
Simulation	19 (46.3)	4 (9.8)	15 (36.6)	2 (4.9)	2 (4.9)	2.14±1.20
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
Clickers and smartphones apps (e.g. Poll Everywhere, GroupMe)	24 (58.6)	7 (17.1)	9 (19.5)	1 (2.4)	1 (2.4)	1.74±1.03
Digital field trips (e.g.,	30 (73.2)	8 (19.5)	3 (7.3)	0	0	1.33 ±.061
Social Media (e.g., Twitter hashtags, Facebook group)	35 (85.4)	2 (4.9)	3 (7.3)	1 (2.4)	0	1.26 ± .69

Based on Table 2, presentation software such as PowerPoint and videos were the most popular technology tools used. The participants indicated that they either always (n=26, 60.5%) or often (n=13, 30.2%) used the presentation software. Online collaboration tools (e.g., Google classroom), simulations, student assessment tools (e.g., Kahoot! online quiz), and lecture capturing tools (e.g., Panopto) fell into between "rarely" or "sometimes" used based on their average mean scores between 2.14±1.24 to 2.98±1.34 to. Meanwhile, gamification learning (e.g., Minecraft), digital field trips as well as clickers and smartphone apps (e.g., Poll Everywhere) were almost "never" or "rarely" been used (average mean ranging from 1.26 ± .69 to 1.74±1.03). More than 85% (n = 37) of the participants indicated that they "rarely" used social media such as Facebook and Twitter in their classrooms.

4.2 Barriers to technology integration

Table 3 shows perceived barriers to technology integration by categories: (a) facility; (b) support; (c) faculty; and (d) students.

TABLE 3. Perceived Barriers to Technology Integration

Statement	Strongly disagree that it is a barrier	Disagree that it is a barrier	Neutral	Agree that it is a barrier	Strongly agree that it is a barrier	Mean±SD
Faculty-related						
Too much time and effort to learn new technology	4 (9.8)	5 (12.2)	11 (26.8)	14 (34.1)	7 (17.1)	3.37±1.20
Lack of exposure to current instructional technology.	2 (4.9)	6 (14.6)	10 (24.4)	17 (41.5)	6 (14.6)	3.46±1.08

Lack of skills/ knowledge to integrate technology into courses.	2 (4.9)	7 (17.1)	9 (22.0)	15 (36.6)	8 (19.5)	3.49±1.14
Lack of time to redesign courses to integrate technology	1 (2.4)	6 (14.6)	5 (12.2)	17 (41.5)	12 (29.3)	3.80±1.10
Negative epistemological and pedagogical beliefs of instructors (e.g., unwilling to change, techno-phobia etc.)	3 (7.3)	11 (26.8)	8 (19.5)	14 (34.1)	5 (12.2)	3.17±1.18
Lack of ability to assess practical/laboratory/clinical/soft skills	4 (9.8)	9 (22.0)	11 (26.8)	10 (24.4)	7 (17.1)	3.17±1.24
						3.45±.83
Other Support Systems						
Lack of technical support	7 (17.1)	9 (22.0)	7 (17.1)	11 (26.8)	7 (17.1)	3.05±1.38
Lack of training and/or workshops on technology integration	3 (7.3)	12 (29.3)	6 (14.6)	14 (34.1)	6 (14.6)	3.20±1.23
Lack of onsite technology or media coordinator to assist instructors in technology use	8 (19.5)	10 (24.4)	6 (14.6)	9 (22.0)	8 (19.5)	2.98±1.44
Lack of information-sharing about technology integration among colleagues	8 (19.5)	6 (14.6)	9 (22.0)	12 (29.3)	6 (14.6)	3.05±1.36
Budget constraint	4 (9.8)	4 (9.8)	9 (22.0)	10 (24.4)	14 (34.1)	3.63±1.32
						3.18±1.19
Facility-related						
Lack of electronic devices (e.g., tablets and computers	8 (19.5)	11 (26.8)	3 (7.3)	15 (36.6)	4 (9.8)	2.86±1.37
Lack of software	4 (9.8)	9 (22.0)	8 (19.5)	11 (26.8)	9 (22.0)	3.29±1.31
Lack of lab space	5 (12.2)	7 (17.1)	10 (24.4)	11 (26.8)	8 (19.5)	3.24±1.30
						3.15±1.18
Number of students is inappropriate for technology integration (e.g., large class)	7 (17.1)	14 (34.1)	11 (26.6)	7 (17.1)	2 (4.9)	2.64±1.17
Lack of enthusiasm from students about instructional technology	5 (12.2)	16 (39.0)	4 (9.8)	14 (34.1)	2 (4.9)	2.80±1.19
						2.60±.97

Note. The perceived barriers of instructional technology integration were measured using a 5-point Likert scale, from 1 being "Strongly disagree that it is a barrier" to 5 being "Strongly agree that it is a barrier".

M±SD = Mean ± Standard Deviation

Compared to other categories of barriers, faculty-related factors (average mean: 3.45±.83) such as educators' knowledge, skills, beliefs and time management were major barriers to technology integration. Of all the items listed under the faculty-related barriers, lack of time to design courses to allow technology integration

was identified as the biggest barrier (3.80±1.10). Close to 70% of the participants either agreed or strongly agreed that it was a barrier. This was followed by lack of skill/ knowledge to integrate technology into the classroom (3.49±1.14) and lack of exposure to current instructional technology (3.46±1.08). More than 50% (n=21) of the participants also viewed the time and effort to learn technology asbarriers to integrate technology. Negative epistemological and pedagogical beliefs such as resistance for a change and techno-phobia (3.17±1.18), as well as unable to assess practical, laboratory, clinical or soft skills using technology (3.17±1.24) were perceived as less of a barrier by the participants.

In terms of the support systems, budget constraint (3.63±1.32) was perceived as the major barrier to technology integration, followed by lack of training (3.20±1.23), insufficient technical support (3.05±1.38) and lack of knowledge-sharing among colleagues (3.05±1.36). About 45% respondents either disagreed (n=10, 24.4%) or strongly disagreed (n=8, 19.5%) that lack of onsite technical support was a hindrance of technology integration.

Facility-related barriers also hindered technology integration. Among these, about 45% respondents (n = 19) recognized lack of electronic devices and lab space as a barrier (3.24±1.30), followed by lack of software (3.29±1.31).

Overall, the results of this study showed that student factor was not perceived as a major barrier to technology integration (2.60±.97). Majority of the participants did not perceive students as technology-illiterate (n=26, 62.9%) or disinterested in technology integration (n=21, 51.9%). The participants also did not view class size as much of a barrier to technology integration (2.64±1.17).

4.3 Confidence level in technology integration

Table 4 shows the respondents' confidence level in integrating technology into their classrooms.

TABLE 4. Foodservice Management Educators' Confidence Level in Technology Integration

Statement	Not at all confident	Only slightly confident	Somewhat confident	Moderately confident	Very confident	Mean±SD
I feel confident that I can teach relevant subject matter with appropriate use of technology.	0	2 (4.9)	3 (7.3)	17 (41.5)	19 (46.3)	4.29±.81
I feel confident that I can regularly incorporate appropriatetechnology into my lessons to enhance student learning.	0	3 (7.3)	8 (19.5)	16 (39.0)	14 (34.1)	4.00±.92
I feel confident that I can select appropriatetechnology for instruction based on curriculum standards-based pedagogy.	1 (2.4)	1 (2.4)	11 (26.8)	16 (39.0)	12 (29.3)	3.90±.94
I feel confident that I	3	6	11	15	6	3.37±1.14

can help students when they have difficulty with technology.	(7.3)	(14.6)	(26.8)	(36.6)	(14.6)

Note. The level of confidence of using instructional technology was indicated a 5-point Likert scale, from 1 being "Not at all confident" to 5 being "very confident".

M±SD = Mean ± Standard Deviation

Overall, the participants have moderate level of confidence in technology integration (3.89±.81). Overall, the participants were particularly confident that they could use appropriate instructional technology to teach a subject matter with (4.29±.81), followed by their ability to utilize technology regularly for academic enhancement (4.00±.92) and to select appropriate instructional technology based on curriculum standards-based pedagogy (3.90±.94). The respondents had the least confidence in assisting students who faced difficulties in using technology (3.37±1.14).

Results of simple regression showed that only age (β= -.543), years of service in higher education instructions (β= .560) and faculty-related barriers (β=-.525) were significant predictors of participants' level of confidence in technology integration. The younger participants($p < .01$), the participants with longer years of service ($p < .05$), as well as those who perceived less faculty-related barriers ($p < .05$) reported higher level of confidence in term of using technology in their classroom.

4.4 Strategies used when needing technology support or assistance for work-related activities

Table 5 shows the strategies adopted by the participants when they are in need of technology support.

TABLE 5. Strategies Used when Needing Technology Support

Strategies	M±SD
Figure it out my own (e.g., Search Google, Youtube, or other resources)	3.78± .64
Ask my peers or colleagues	3.47±.74
Use the college/university help desk or IT technologists	3.42±1.00
Ask staff at my institution's center for teaching and learning	3.30±1.16
Ask my students	2.42± 1.03
Contact software company or vendor	1.88±.98
Ask library staff	1.77± .81
Ask my teaching or research assistant	1.77± .97

Note. The strategies used when needing technical assistance was indicated a 5-point Likert scale, from 1 being "Never" to 5 being "Always".

M±SD = Mean ± Standard Deviation

The results showed that the participants would often figure out how to integrate technology into their teaching practice on their own (3.78±.64) and sought help from their colleagues (3.47±.74) when needing technology support. Approximately 65% respondents indicated either "often or "sometimes", they asked for assistance from IT help desk at their work place (3.42±1.00) and staff at the center for teaching and learning (3.30±1.16). Other strategies used included taking classes and asking family members or online course consultants for help.

V. DISCUSSION

This study aimed to investigate technology integration among foodservice management educators. The participants 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 food service courses were course management tool, online quizzes, online homework, online videos, and lectures or slides [32]. The participants rarely used technology for the purpose of game-based learning and to provide virtual learning experience to students. Social media was rarely used in the classroom. This finding is inconsistent with Moran, Seaman, and Tinti-Kane [33]'s study which showed that out of 1920 higher education faculty, close to two-third of them had used social media in their classrooms. These faculty had primarily asked students to read or review social media posts as parts of the class assignments [33]

The use of simulation among faculty teaching foodservice management courses was not prevalent. Similar results were reported by the study conducted by Schlein [5] among dietetic educators (n=141). The researcher reported that less than 3% of them used patient simulators in the classroom, though they were opened to this option. A plausible reason is instructional technology software and tools specific to the foodservice management in the dietetic program appear to be underdeveloped. For instance, simulation in dietetic education is mostly used in clinical settings to assess and enhance communication and counseling, documentation, and care planning skills [34]. Choices for simulation programs in foodservice management are very limited. Programs such as Student Hotel and Restaurant Enterprise Simulations [SHARES]) is more geared towards Hospitality Management courses. This finding suggests that foodservice educators in multiple higher education institutions may work together to plan and design a simulation software that fits the needs of food service management and work with vendors to develop this software.

This study categorized the barriers in technology integration into: (a) facility, (b) support system; (c) faculty; and (d) students. Among the four categories, faculty-related factors are the major barrier in technology integration. The findings were consistent with the previous studies which showed that educators' internal factors (e.g., lack of skills and the feeling of having extra workload) influenced their practice in utilizing instructional technology [8][15]. Educators need to have sufficient time to rethink and modify their lesson plans to accommodate technology in their lesson [35]. Technology integration is unlikely to happen if teachers do not have sufficient time to try out a technological tool and accommodate it based on the class situation [35].

Similar to the previous research [8][9][12][15], the participants in this study found that barriers related to facility such as lack of hardware and software, and limited computer lab also hindered technology integration. In addition to the facility-related barriers found from this study, low bandwidth and malfunction software are also major barriers [15].

The participants also perceived that a system of support from administrators and IT technicians are essential for successful technology integration [12][15][17]. Insufficient funding for technologies remains a challenge for educational institutions as cost associated with hardware and software acquisition, build of infrastructure (e.g., internet connection, electrical wiring) were high and significant [20]. Furthermore, lack of training and workshop that expose educators to useful information about technological devices [11][14][17][35] were hurdle for technology integration. School administrators need to release time for teachers to attend professional training workshop to upgrade their skills [36]. This study also found that lack of knowledge-sharing from colleagues was also a barrier in technology integration. Researchers [20][36] suggest that support from colleagues such as mentoring could encourage technology use.

The participants perceived student-related factors (e.g., IT literacy, student number and motivation) as minor barriers to technology integration. In contrary, about 65% of the respondents from Hsu (2016)'s showed concern about students' ICT competency in using technology. Educators need to spend more time in providing clear instruction to less competent students when they involve in technology-assisted lesson [17][20]. To ensure successful technology integration, students need to be able to access technology tools [9] and receive appropriate training if they are expected to use sophisticated technological devices to complete a task [20].

In contrary to Prestridge [21]'s study, majority of the participants had moderate level of confidence in technology integration. Teachers in the previous study showed high confidence in integrating technology and trying new software in their classroom [21]. Lack of confidence is a barrier for technology integration [8][11][13] as they view technology negatively [11]. Consistent with previous study a previous [11], this study indicated that years of experience and age were a predictor of the confidence level in technology integration. Educators with less years of service, who also tended to be younger, had more confidence in utilizing technology due to higher level of exposure and more positive attitudes towards technology [11][19][37]. Teachers with high confidence level would find ways to overcome barriers in integrating technology into their classrooms [8]. Training can increase teachers' confidence level [13]. Therefore, more support and appropriate professional development needs to be provided to teachers to improve their confidence level so that they will use technology more frequently in their classrooms [11][13][19]

Various strategies were adopted when the participants needing assistance with instructional technology. The research findings showed that the participants tended to be self-reliant to figure out a solution themselves (e.g., referring to online resources), prior to consulting others. The results also highlighted the important roles of colleagues, IT HelpDesk and institution's center for teaching and learning, in term of providing technology support. It is important for educators to know "who" could be their resource of reference and support, to ensure successfuluse of technology.

VI. CONCLUSION

In conclusion, technology integration is not prevalent compared to more traditional teaching methods in teaching food service management courses. If being used, the instructional technology is limited to PowerPoint presentation and videos. Foodservice educators need to consider technology as one of the options in teaching due to its well-established benefits [3][6]. Online teaching tools, such as Zoom and Panapto (lecture capturing tools), GoogleDocs and Piazza (online collaborative tool), Poll Everywhere (audience participant apps), Socrative and Nearpod (gamification learning) became increasing popular and essential during COVID-19 pandemic when teaching cannot be conducted face-to-face [38]. Therefore, foodservice educators are recommended to embrace technology integration and master their skills to use technology effectively.

Educators face a lot of barriers when integrating technology into their classrooms. Time constraint, lack of budget as well as insufficient knowledge and skills appeared to be the top perceived barriers. These findings suggest that besides improving professional development programs, more funding needs to be channelled to upgrade existing technological infrastructure and perform timely maintenance. Educators also need extra time to redesign their courses to incorporate new technologies. This may lead to extra work load, causing some educators to leave their jobs [9]. Proper time-tabling structure and reduction of irrelevant content may free up some time for educators to attempt new technology [9]. Majority of the participants in this study have moderate level of confidence in technology integration and they would explore solutions themselves when needing support for technology. These findings suggest that resources, such as online videos may encourage educators to explore new instructional technology.

6.1 Limitations and Recommendations

This study has several limitations. First, the response rate of this study was low (14.4%), despite the two follow-up emails sent to potential participants. Even though low response rate is a known concern for online survey [39] and response rate of 2% has been documented [40]. The results may have limited generalization and should be interpreted carefully. The low response rate may be result of the survey invitations not reaching the entire target population. Even though the database consisted of a mix of foodservice educators and directors of the DPD/CP, the invitation emails may not have been forwarded to the faculty members who taught foodservice management courses by those who were not in this position, despite being requested to do so. For future studies, the researchers could expand the recruitment methods, and recruit the participants via LinkedIn discussion groups, and other food or culinary-related professional organizations. Additionally, snowball sampling, which pertains to the referrals to other colleagues or friends in the same professional circle as the foodservice educators

who responded to this survey, may also be helpful for recruiting more participants [41]. Second, this is a cross-sectional study and the data was collected prior to the COVID-19 pandemic. Because COVID-19 has changed the teaching modalities for educational institutions across the country, a longitudinal study maybe meaningful to observe the changes in instructional technology use. Third, this study classified barriers into four different categories, but it should be noted that these four categories are inter-related rather than distinctive [13]. For example, support systems such as professional development programs and appropriate budget improves teachers' perceived beliefs on the benefits of technology integration. In addition, the survey instrument asked participants to indicate frequency of use of each type of instructional technology, but not their overall use of technology in the classroom. Including this question will allow other statistical analyses to be performed, such as to identify factors that associated with overall technology use and therefore, recommendations could be made to increase technology integration in classrooms.

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