JOURNAL OF EVENT, TOURISM AND HOSPITALITY STUDIES
http://e-journal.uum.edu.my/index.php/jeth

How to cite this article:
Amin, U. U., Nordin, N., & Hasbullah, S. A. (2021). Assessment of culinary class demonstration methods on students' performance: Video versus live streaming. *Journal of Event, Tourism and Hospitality Studies, 1*(1), 71-94. https://doi.org/10.32890/jeth2021.1.4

ASSESSMENT OF CULINARY CLASS DEMONSTRATION METHODS ON STUDENTS' PERFORMANCE: VIDEO VERSUS LIVE STREAMING

[1]Umme Umaimah Amin, Norhafizi Nordin & Siti Aminah Hasbullah

School of Tourism, Hospitality and Event Management
Universiti Utara Malaysia, Malaysia

Corresponding author: umme@uum.edu.my[1]

Received: 30/4/2021 Revised: 16/5/2021 Accepted: 28/5/2021 Published: 15/7/2021

ABSTRACT

The temporarily close of educational institutions due to the Covid-19 lockout situation affected educators at every level of education to conduct classes online. This study explored whether the use of video demonstration significantly improves students' performance of learning culinary compared with control group counterparts who were exposed to the live streaming demonstration. In addition, students' perceptions of the instructions are assessed. A quasi-experimental study design was used for this study. The study sample consisted of 36 undergraduate Hospitality students enrolled in a culinary course. Sixteen students in the experimental group and 20 students in the control group were exposed to video and live streaming demonstrations, respectively. Both groups were tested about the same target content, 'Understanding Vegetables and Basic Cuttings'. Students' performance grades were computed and analyzed to compare students' learning outcomes between the two groups. Students' perceptions were assessed based on their opinions of instruction, their self-reported level of understanding of vegetables and basic cuttings, and their level of satisfaction. Results of independent samples t-tests showed; students in the experimental group had a significantly higher performance score and express positive perceptions of the instruction than the students in the control group. The findings from this study would shed light on the instructional strategy suitable for culinary students.

Keywords: Culinary Education, Culinary Skills Training, Teaching Demonstration, Distance Learning

INTRODUCTION

The ongoing global pandemic Coronavirus disease (COVID-19) caused by a newly found coronavirus and public lockdown had severely impacted every nation's economic sector and social disruption. Social distancing, self-isolation, border controls, and educational institution closures are some of the highlighted consequences (QS, 2020). This pandemic had a profound effect on higher education, resulting in significant changes that impacted students. The closure of institutions, schools, and other learning spaces has impacted more than 94% of the world's student population (Pokhrel & Chhetri, 2021). In addition, social distancing and restrictive movement policies have significantly disturbed traditional educational practices. The decision to temporarily close educational institutions made by policy-makers was made based on the principle that large gatherings had a higher risk during this pandemic. Universities around the world were required to lockout and close all of their campuses, obliging instructors of all subjects to move instantly to a virtual environment. Consequently, students turn to online learning and interactive platforms, known as e-learning, as a substitute, including Malaysia, which has begun to implement online classes. E-learning resources were critical in assisting colleges and universities in facilitating student learning during the closing of universities and schools (Subedi et al., 2020). Subsequently, transitioning into online learning platforms presented a challenge for educators and students, as they had to adjust to a completely new environment. Recent studies reported students and educators were not ready for the new form of learning through the online environment (Josep & Adamu, 2020; Zhong, 2020; Ismail et al., 2020). In fact, due to internet connectivity issues, Chung et al. (2020) discovered that most students preferred physical classes over online learning. Meanwhile, culinary educators faced a unique challenge in that they had to coordinate not only theoretical but also practical aspects of teaching, necessitating the transition of demonstration and mock kitchen activities to an online world.

In Universiti Utara Malaysia, the situation described above has affected The Principles of Food Preparation course, offered by the university's Bachelor in Hospitality Management (BHM) program. The course aims to introduce students to the fundamental culinary concepts and cooking principles in food production, covering both theory and practical, as both are equally important

for students' learning and understanding. Culinary education primarily teaches students skill-based knowledge founded on the principles of learning by doing and experiential learning (Cankul, 2019). The traditional model of culinary instruction entails a face-to-face instructor's demonstration of various skills and food preparation techniques for the students to practice (Noe, 2005). Later, the students are instructed to recall and thus replicate the skills and techniques they have observed. During practice, the students receive immediate feedback on their command of the practiced skills. Sugathapala and Chandrika (2021) highlighted demonstration method enables the student to develop effective learning skills such as good reasoning, keen observation, and active open-mindedness. Early research confirmed that demonstration is an effective teaching tool for teaching skills-based knowledge (Packer et al., 1999). The demonstration method builds students' confidence, enhances social skills, and provides a deeper understanding of procedures than the traditional teacher-centered approach.

However, before the advent of COVID-19 in Malaysia, the hands-on demonstration could no longer be held physically. The BHM's culinary students faced severe impacts as a result of the COVID-19 pandemic. Since universities have been closed, all physical classes have been halted, and they have missed out on training opportunities and practices in the kitchen laboratory. To continue providing students with a thorough understanding of the subject, the physical demonstration had to be transferred into a virtual environment. In fact, due to the new restrictions imposed by the COVID -19 pandemic, culinary education is expected to undergo significant changes. The norm in culinary education can no longer be implemented during this critical period. A physical demonstration is impossible to hold in light of the current pandemic that is transforming education into a virtual environment. Currently, the physical demonstration is being replaced by a live streaming demonstration. However, the main drawbacks of this type of demonstration are the instructors' reliance on students, limited field of view, and the inability to repeat sessions. As a result, utilizing video-based education to teach culinary skills is advantageous.

'Understanding Vegetables and Basic Cuttings' is the introductory topic taught and learned by the BHM's culinary students, where the fundamental is to the learning process of understanding vegetables and cooking vegetables. In the training kitchen, students are required to perform various cuts of vegetables. The objective is for them to gain a fundamental knowledge of not only how to cut, but also what cooking techniques are applicable for each type of vegetables cut according to its standard size (e.g., moist heat cooking, and dry heat). This study investigated the educational effectiveness of video and live streaming demonstrations for teaching culinary courses. Specifically, this research aims to investigate the effectiveness of video demonstrations on culinary students' performance and perceptions of learning culinary skills virtually during this critical period in Malaysia. It is worthwhile to investigate whether there are significant achievement differences between students in video demonstration classes and students in live streaming demonstration classes. This research is an attempt to identify an appropriate method of delivering practical courses online in universities, specifically culinary training, and thus provides insight to the Malaysian government in supporting online learning in Malaysian universities.

Research Objectives

This study assessed two demonstration methods for teaching culinary skills, namely live streaming and video demonstration. This study expected that video demonstration would effectively enhance student learning and perception to learn culinary. Therefore, the objectives of the study are:

i. To determine students' performance in the application of taught culinary courses using video and live streaming demonstration methods.
ii. To examine students' perception of taught culinary courses using video and live streaming demonstration methods.

Research Question

The focus of this paper is to search into how teaching and learning culinary skills through video demonstration affects students' performance. More specifically, the research question of interest is as follows:

To what extend is the performance and perception of students on the taught culinary skills using video and live streaming demonstration method?

Literature Review

Online Instructional Delivery

The covid-19 pandemic had a significant impact on higher education institutions worldwide, forcing them to close temporarily. Consequently, education has changed dramatically, with learning methods delivered through distance learning halfway through the second semester of the 2019/2020 academic year. Distance learning is an area of education in which the emphasis is on teaching methods and technology (Bušelić, 2012). In distance learning, both learners and teachers are not physically present in a typical educational environment such as a classroom due to geographical distance. Since learners and teachers are geographically and/or temporally separated, instruction is delivered using video, audio, or computer technologies (Wheeler, 2012). Numerous empirical studies in hospitality education have acknowledged the effectiveness of incorporating technology into teaching (Rakes & Casey, 2002; Feinstein et al., 2005; Yamauchi, 2008), however, the literature is reported scarce in the field of culinary. Few studies reported technological adaptation in teaching culinary skills, implying that culinary education lags behind other academic subjects in technological development (Jeffrey et al., 2013, Hsu & Chien, 2015).

Online distance learning, like the traditional classrooms, included components such as curriculum, communication, assessment, and teaching methods. According to Park (2011), the most significant difference between online distance learning and traditional classroom instruction is the method of delivery. Jeffrey et al., (2013) stated that one of the important aspects of distance learning is online teaching. Numerous studies have identified the advantages of online instructional delivery. An earlier study discovered that online instructional delivery eliminates classroom boundaries and surges educational accessibility for students who have been underserved by conventional learning formats (Mangan, 2001). Furthermore, Adam et al. (2015) discovered that online classes offer the opportunity to overcome many logistical barriers to access for traditional teaching and learning in nutrition education and culinary skills classes, and thus

supported online instructional delivery offers the benefit of reaching the needs of a global audience. Moreover, these materials are available at all times and are accessible from many locations (McDowall & Lin, 2007). As a result, online instructional delivery provides tremendous flexibility and accessibility since learners can receive instruction in their spare time and at their own pace.

The rapid rise of online education has led to an increasing interest in research on teaching and learning via instructional videos (Poquet et al., 2018). In online courses, video is often the primary method for delivering instruction (Hansch et al., 2015; Hollands & Tirthali, 2014). Therefore, instructional video plays a significant role in online learners' learning experiences as it offers an abundance of benefits to the users. Through video learning, students able to listen to the audio while at the same time viewing the diagrams and figures. Procedural videos can be a valuable teaching tool because they allow for better visualization of procedural steps and provide media-rich audiovisual stimulation that caters to a broader range of learning styles or preferences (Ramlogan et al., 2014). Furthermore, it improves laboratory step visualization and allows students to review technical procedures before, throughout, or even after laboratory sessions, thereby overcoming the shortage of time for onsite learning. Several empirical studies have been conducted to investigate the effectiveness of video and live demonstrations for teaching clinical and laboratory skills. Alqahtani et al. (2015) discovered that both videotaped and live demonstrations were equally effective since both groups gained a comparable level of understanding. Their findings, however, revealed that students prefer live streaming to videotaped demonstrations. A recent study supported the findings, hence proposed that a combination of methods of teaching can be adopted to improve students' skill development (Sugathapala & Chandrika, 2021).

Devi et al., (2019) on the other hand, published different results. Their findings showed that the control group (traditional demonstration) had higher post-test intervention scores than the experimental group (video-assisted teaching), implying that lecture demonstration has a greater effect on improving skills. They affirmed that the former method was more effective than video demonstration in teaching clinical skills. Meanwhile, in culinary education, the idea of online

delivery instruction is supported by Jeffrey et al. (2013). Their findings concluded online video as effective as a live demonstration in teaching culinary skills. They further suggested that the online delivery method should be utilized in culinary arts education. Hsu and Chien (2015) conducted a similar study using a quasi-experimental design in which students were tested on their knowledge and cooking skills of preparing two dishes, namely basic and advanced. They found that students in the experimental group who used multimedia web-based instructional videos performed better in culinary skills training than students in the control group who used live demonstration educational methods. This supported the assertion that online delivery instruction in culinary skills training affects culinary students' performance. Hence, these preceding studies supported the notion that video instruction can be used to complement the traditional teaching method of demonstration in the culinary education setting.

Learning Theories Supporting Culinary Education

Behaviorism, cognitivism, and constructivism are the three fundamental learning theories most often utilized in the construction of instructional designs (Barker, 2008). From the perspective of behaviorism, learning begins when there is a response to a given stimulus (Kim & Hatton, 2010). The learning process furthers if there are appropriate extrinsic motivations, be it positive or negative reinforcement, while the said learning ends when a behavior change is established and maintained. In short, behaviorists believed learning is responding to environmental stimuli, hence affects changes in the behavior of the learners. Cognitivism, on the other hand, stresses the internal mental structures and the acquisition of knowledge (Bower & Hilgard, 1981). Cognitivism views learning as a process of formation of cognitive structures and representatives of an active mind. Cognitive learning emphasizes critical thinking, problem-solving, discovery learning, and receptions. The knowledge is gained not through drill and practice but rather from the process of how information is received, organized, stored, and retrieved to enable observation of the correlation between the stored experience and problem encountered (Ertmer & Newby, 1993).

As for constructivism, the theory suggests learners construct their sense of what is being learned through experience (Bednar et al., 1992). In a constructivist learning environment, students build

their knowledge by participating actively, by comparing new information with existing knowledge to solve problems and to gain an understanding of the new information. In teaching culinary skills, the formulation of instructional designs typically based upon behaviorism and constructivism. Behaviorists prescribed the use of instructional cues, practice, and reinforcement as some of the strategies often used for building and strengthening stimulus-response relationships (Winn, 1990). These prescriptions were generally consistent with culinary skills training where the learning activities involved recalling facts, applying explanations, and performing a specified procedure. To ensure the replication of the taught skills or techniques, the instructor relies on motivators such as grades, recognitions, and praises (Morrison et al, 2004). Cues or hints are also provided to lead students to the desired outcomes. Instead of involving students in solving problems, the instructor dispensed information through direct instructional method (teaching skills in isolation) and assessed students learning, their ability to demonstrate mastery of skills, techniques, and procedures through performance rubric and individual test.

Meanwhile, in constructivism, learning is viewed as a search for meaning. Constructivists believed learners construct their knowledge and their understanding was developed based on experience (Bush, 2006). It is pointed out that learning by experience is more powerful compared to any lecture. If the students directed their learning, they will understand the concept better than just being handed the right way to do things. For instance, in culinary skills training, students who first attended theoretical classrooms did not truly comprehend the foundation of culinary when the instructor tried to explain it verbally. However, once the students were in the laboratory kitchen or experienced the cooking themselves, they were able to understand the lesson better. The traditional learning environment in culinary skills training can be characterized as active learning, where there are active engagement, inquiry, and collaboration among students and instructor. As suggested by Kim and Hattan (2010), a learning environment in a constructivist setting is when students share ideas while teachers facilitate and encourage the sharing of information. Here, the instructor adapts to the role of facilitator and not the teacher (Ertmer & Newby, 1993). Rather than being a sole dispenser of knowledge, the instructor facilitates students to work, encourages them to express their ideas, thoughts, and conclusions. As the result of

education moving online, culinary educators were curious how culinary laboratory training is delivered during this critical period. While little documentation can be found on this matter, this study compared two methods of demonstration, namely video and live streaming, in teaching culinary.

METHODOLOGY

Research Design

This study used quasi-experimental, a design comparing students' performance from identical cooking classes delivered using two different delivery methods, namely online video or live streaming demonstration. A quasi-experiment was selected since the study used an intact group in the experiment (Creswell, 2014). The research hypothesized a relationship between independent variables, the instructional session; video, and live streaming demonstration, while the dependent variable is the student s' performance. Specifically, the study tested the following objectives.

H1: Students who were exposed to video demonstration demonstrated better performance than those taught using the live streaming demonstration method.

H2: Students who were exposed to video demonstration expressed positive perceptions of the instruction than those taught using the live streaming demonstration method.

Sampling

The participants were undergraduate students who have enrolled in an introductory culinary course at a public university in northern Malaysia. Based on the school's current records, there are 51 BHM students registered for the course. These students are clustered into three classes or groups: A, B, and C. For the study, two groups were used: the experimental group (students who were exposed to the video demonstration method) and the control group (students who were exposed to the live streaming demonstration method). Two groups of participants were derived from two classes of students studying the same course. Class B consisted of 20 students for the control group, while Class C comprised 16 students for the experimental group. Therefore, the

study sample consisted of 36 students.

Research Procedures

Students were assigned to two groups, experimental and control, and were instructed using video and live streaming demonstrations, respectively. They had no prior knowledge as to which course section offered the video or live streaming demonstrations, which eliminated self-selection bias. Both experimental and control groups received the same syllabus, course materials, evaluation process, and they were trained by the same instructor to acquire culinary skills on the topic of 'Understanding Vegetables and Basic Cuttings' through virtual classroom using the WebEx platform; the only difference between these two groups is the instructional delivery model. The experimental group had the access to the video demonstrations posted on the 'Online Learning' course management site. This method required students in the control group to rely solely on the information presented during the live streaming demonstration. The students in the experimental group could view the cooking videos as much as they wanted, giving them more opportunities to review the specific techniques or skills. Meanwhile, students in the control group relied solely on the information derived from the live streaming demonstration.

Following the instructor demonstrations (via video or live streaming), both groups were instructed to work independently to replicate the techniques and skills at their current location. All participants were given a week to complete a post-test in which their culinary skills were tested by producing a video of the same product that they had previously observed. Their final product was graded using a rubric specifically designed to assess skills and techniques in cooking. Each student received an individual grade based on their performance and ability to meet the expectation outlined in the rubric. To avoid bias, students were evaluated based on their video submissions by different instructors teaching the same subject. After the post-test, all participants were asked to answer the questionnaire to assess their perceptions and experience on the taught methods.

Research Instruments

Performance Rubric

The performance rubric was specifically developed to examine the students' understanding of the foundation culinary. The rubric used a grading scale of 1 to 10, and it consisted of five components, as shown in Table 1. The content was validated by two experts with culinary education backgrounds.

Table 1

Performance Rubric

Components	Description
Skills and techniques	Demonstrate excellent culinary skills and techniques in accomplishing the task
Mise en place (pre-preparation)	Demonstrate planning, thorough knowledge of the food preparation and production procedure in completing the task
Food quality/presentation	Produce high-quality food products that fulfill the elements of temperature, color, and consistency of the food. Very clean presentation and attractive color combination
Sanitation/food safety	Perform proper hand washing and good food handler practices at the start until the end of the operation, have proper attire in the kitchen, and show initiative proactive approach towards sanitation
Equipment knowledge	Demonstrate thorough knowledge of the kitchen equipment usage in terms of handling the right utensils and equipment

Perception Questionnaire

The study assessed students' perceptions of the method of instruction they were exposed to. The questionnaire was used for the experimental and control group consisted of three sections. Section A included 18 questions that addressed participants' opinions whereby the first 11 questions addressed students' opinions about the instruction using a 5-point Likert range from 1=strongly disagree to 5=strongly agree. The next five questions addressed students' self-reported of understanding and information provided during the instructional session, using a 5-point range

from 1=not at all to 5=a great deal. The following two questions assessed the overall satisfaction of students with instructions, measured with a 5-point range from 1=very unsuccessful/very dissatisfied to 5=very successful/very satisfied. Section B dealt with the demographic information of the participants such as gender, age, race, CGPA, and entry qualification. Section C consisted of eight additional questions related to video characteristics (video instruction) that were specifically posed for students in the experimental only. The first five questions assessed the students' opinions on whether they watch the video, the frequency of viewing both the vegetables cutting and cooking vegetables each, the time they watch the videos, and which section of the video they find more beneficial. The next 3 questions measure the student's opinion on the characteristic of online video (informative, useful, and interesting). The instrument is adapted from Yamauchi (2008) who studied the effects of multimedia instruction on student's learning and perception in the Quantity Food Production and Service Management Experience Course at Iowa State University. Due to the similarity in nature of the study; hands-on learning, therefore, the instrument is used with minor modification. Table 2 below demonstrated the dimensions of the instrument.

Table 2

Instrument' Dimension and Sources

Dimensions	**No of Items**	**Sources**
Section A: Students' Perception of Instruction	18	Yamauchi (2008)
Section B: Demographic Profile	5	Researcher
Section C: Additional Question (Experimental Group Only)	8	Yamauchi (2008)

Reliability of the Instrument

Sekaran and Bougie (2010) stated reliability of a measure is an indication of the stability and consistency with which the instruments measure the concept and helps to assess the 'goodness' of a measure. In general, reliabilities less than 0.60 are considered to be poor, those in the 0.70 range are acceptable and those over 0.80 are good. As shown in Table 3, the values of Cronbach alpha

coefficient for the survey items were above 0.7 indicated good reliability values.

Table 3

Reliability Test for Students' Perception Survey Questionnaires by Section

Variables	**Cronbach's Alpha**	**No of item**
Instructional Session	.734	11
Level of Understanding	.855	5
Overall Perception	.734	2
Additional Questions	.743	8

RESULTS

The study used quantitative data analysis. Descriptive analysis such as mean, standard deviation, and demographic information which include gender, age, race, CGPA, and entry qualification was used to gain an understanding of the data and perceptions of the participants. Meanwhile, to test the hypotheses for this study, the t-test, a type of inferential statistic, was used to determine the significant interaction effects of the delivery method on student performance. Overall, there were 16 students in the video demonstration class and 20 students in the live streaming demonstration class.

Performance Score

A performance rubric was used to assess culinary students' knowledge. The rubric is scored from 1 to 10 and evaluated students' performance based on an established criterion rubric. The frequency and percent of the gained score for both the control and experimental group were shown in Table 4. More than three participants from both groups scored higher than 40. The frequency for the experimental group was reported constant with only thrice occurrence in marks while in the control group occurrence happens five times. To compare, occurrence in the experimental group appeared above the score of 34, while control was below the said score. There were only two participants (12.6%) from the experimental group that scores lower than 30 marks compared to the control group with 10 participants (50%). The lowest score for the control

group was 24 marks (5.0%) and 29 marks (6.3%) for the experimental group. According to the descriptive results, the experimental group outperformed the control group.

Table 4

Frequency Distribution Analysis for Performance Score

Performance Score (Total marks=50)	**Posttest**			
	Control (n = 20)		**Experimental (n = 16)**	
	Frequency	**%**	**Frequency**	**%**
24	1	5.0	0	0
26	2	10.0	0	0
27	1	5.0	0	0
28	2	10.0	0	0
29	2	10.0	1	6.3
30	2	10.0	1	6.3
31	3	15.0	1	6.3
32	1	5.0	1	6.3
34	1	5.0	2	12.5
36	1	5.0	1	6.3
37	1	5.0	1	6.3
38	0	0	2	12.5
39	0	0	2	12.5
40	0	0	1	6.3
41	1	5.0	1	6.3
42	1	5.0	1	6.3
43	1	5.0	1	6.3

Hypothesis 1 proposed that students who were exposed to video demonstration demonstrated better performance than those taught using the live streaming demonstration method. An independent *t*-test is used when the researcher wants to compare the mean score, on some continuous variable, for two different groups of subjects (Pallant, 2013). The t-test result is shown in Table 5. According to Pallant (2013), if the value in the Sig. (2-tailed) column is equal to or less than the value of 0.05, there is a significant difference in the mean scores on the dependent variables for each of the two groups. There was a significant difference in performance scores

between the experimental and control group. The experimental group obtained significantly high performance score (M = 36.44, SD = 4.35; t (34) = 2.79, p = .009, two-tailed) than the control group (M = 31.75, SD = 5.47). This result indicated that the students who received video demonstration improved their knowledge about Vegetable Cuttings and Cooking Vegetables, compared to students who received the live streaming demonstration method.

Table 5

Independent t-test by Group Types – Performance Score

	Performance score				
Group	**Mean**	**SD**	***t***	***df***	***p***
Control (n=20)	31.75	5.466	2.792	34	.009
Experimental (n=16)	36.44	4.351			

Perceptions of the Instruction

Students' perceptions of the instruction were assessed by their level of agreement on 11 statements (Table 6). The second hypothesis stated that students who were exposed to video demonstration expressed more positive perceptions of the instruction than those taught using the live streaming demonstration method. For each perception statement asked in the post-test questionnaire, a *t*-value was computed to compare control and experimental groups. The independent t-test result revealed a statically significant difference for most statements except for three statements (p = >0.05) which statistically appeared to be no difference between the two groups. First, both groups agreed that the ideas presented through both instructional sessions were concise (p = 0.66). Second, students' responses for item five indicated that both video and live streaming instructional sessions equally provided the students the opportunity to ask questions (p = 0.308). Finally, no significant difference was found regarding the information covered in instructional sessions for both groups (p = 0.399). In most cases, significant differences were found in students' perceptions of instruction between the experimental and control ($p < 0.05$). This finding indicated that the experimental students who were taught using video demonstration had more positive perceptions of the instructional delivery compared to students in the control

group.

Table 6

Student Perception of Video and Live Streaming Demonstration Method – Instructional Session

Questions	Group type	N	Mean	SD	p-value
1. Instructional session was systematic	Experimental	16	4.63	.619	.006
	Control	20	4.10	.447	
2. Idea presented instructional session was clear	Experimental	16	4.63	.500	.000
	Control	20	3.95	.510	
3. Idea presented instructional session was concise	Experimental	16	4.38	.619	.066
	Control	20	4.00	.562	
4. Idea presented instructional session was easy to understand	Experimental	16	4.56	.512	.007
	Control	20	4.10	.447	
5. Opportunity to ask question	Experimental	16	4.38	.619	.308
	Control	20	4.15	.671	
6. Instructor covered too much information in the instructional session	Experimental	16	4.19	.750	.399
	Control	20	3.95	.887	
a. IS: Basic understanding of the topic	Experimental	16	4.56	.512	.003
	Control	20	3.85	.745	
b. IS: Demonstrate different vegetable cutting	Experimental	16	4.63	.500	.000
	Control	20	3.75	.639	
7. Apply the proper method of cooking vegetables	Experimental	16	4.56	.629	.000
	Control	20	3.35	.671	
8. Changes could be made in the instructional session to facilitate the learning process	Experimental	16	3.56	1.315	.034
	Control	20	4.35	.813	
9. Overall instructional session assist in performing skill effectively	Experimental	16	4.50	.516	.002
	Control	20	3.90	.553	

Responses about the Video Treatment

Additional questions included in the students' perception survey were distributed to participants in the experimental group only. The questions assessed the students' opinions on whether they watched the video, how frequently they watched both the vegetables cutting and cooking videos, when they watched the videos, which section of the video they found more beneficial, and their overall opinion on the characteristics of online video. Responses to additional questions about the video treatment posed to the experimental group of students revealed that the majority of the students enthusiastic about the video treatment and found it to be informative, useful, and interesting.

DISCUSSION

Transitioning to online learning in culinary education is more challenging than for theoretical courses due to the hands-on nature of the subject. Culinary students are expected to gain skills and be able to perform tasks related to food preparation based on their observations on the instructor demonstration. This study empirically investigated the efficiency of two methods of teaching culinary skills: online video and live streaming demonstration, on the culinary students' performance. The analysis of the data suggests that post-test intervention scores were higher in the experimental group (video demonstration) as compared to the control group (live streaming demonstration) indicating that experimental students gain more cooking skills and knowledge than the control group. The findings validated the findings of many, that the use of video demonstrations promotes students' understandings and demonstrates better performance in learning skills (Yamauchi, 2008, Jeffrey et al., 2013, Hsu & Chien, 2015). The research question was addressed by an independent samples *t*-test indicated significant difference in performance score between group existed; control (M = 31.75, SD = 5.47) and experimental (M = 36.44, SD = 4.35; t (34) = 2.79, p = .009, two-tailed). The result supported hypothesis one: students who were exposed to video demonstration will demonstrate better performance than those taught using the live streaming demonstration method.

The findings echo those of Hsu and Chien (2015), who discovered that the experimental group

exposed to multimedia web-based instructional videos performed better than the control group exposed to live demonstration when their culinary skills were tested. Their result indicated that experimental group had a higher mean score (M = 73.15 to 63.84 for the control group) and lower standard deviation (SD = 16.71 to 18.43 for the control group) with t = 2.57, p = .01. On contrary, Devi et al. (2019) found that the video-based demonstration method scored lower than the traditional demonstration method when post-test skills were compared. Alqahtani et al., (2015) reported no significant difference was detected between the two groups, with the mean students' scores being 6.69 and 6.78 for the live demonstration and video groups, respectively.

Analysis of responses on students' perceptions concluded that, in general, students in the experimental group had more positive perceptions of the instruction than those who were in the control group after receiving the intervening treatment of the video demonstration. Results showed that of the 18 statements about students' perceptions of the instruction, 15 were found significantly different (p = <.05). This finding suggested that the introduction video demonstration as a method of instructional delivery positively influences students' perceptions to learn culinary. The findings were consistent with those of Everette (2016), who studied learning and perception in a traditional face-to-face culinary arts class by incorporating videos as part of a blended learning model. In general, she discovered that students were delighted to have the videos available as instructional material for learning culinary skills. Yamauchi (2008), on the other hand, found no significant differences when the two groups were compared. Only three of the seventeen statements were found to be significant, implying that video introduction in the class had only a slight impact on students' perceptions. Meanwhile, Alqahtani et al. (2015) discovered significant differences in the mean response between the two groups for one statement, while the remaining statements were not significant.

In general, this study supports the effectiveness of online videos in culinary education. It also confirms previous studies' findings, lending further support to the hypothesis that online video demonstrations were more effective than live demonstrations for teaching culinary skills. The use of online videos was repetitive, as students could watch them at any time and did not have to rely solely on the instructor's demonstration for the practiced skill, which further improved their

understanding and ability to recall the procedure that had been demonstrated by the instructor. Furthermore, the use of video demonstrations was deemed beneficial and useful by the students (Everette, 2016). This is consistent with the findings of the study analysis on experimental students' responses to online video instruction, which revealed that students were pleased with the videos in terms of quality and execution, as well as facilitation of the topic's learning objectives. The result also supported the learning of the theory of constructivism. As Bush (2006) points out, learning through experience is more powerful than lectures because learners construct their knowledge and understanding, rather than simply being instructed how to do things. Teachers' roles include not only lecturing but also assisting students in developing their understanding based on a specific concept with the help of interactive learning materials or supplements to enhance the student's cognitive capability. Therefore, in the online learning environment, learning through videos can provide greater enrichment, and learning tools such as graphics, videos, and other media and education materials are required to assist learners in discovering things on their own.

This research aimed at finding out the effectiveness of video and live streaming demonstration methods on the performance of students taking the culinary course as a way of indicating a more effective method for teaching the subject and enhancing meaningful learning sessions. The findings from this study would shed light on the instructional strategy suitable for culinary students. The findings provided insight into potential improvements and may influence future curriculum innovation programs such as Mass Open Online Course (MOOC) in the field of culinary. Furthermore, the findings from this research work may help to suggest a teaching and learning strategy that culinary instructors could adopt so that students will have maximum benefit and thus meeting individual students' needs. From the academic perspective, a lack of research in Malaysia focusing on the field of culinary education, the outcomes of this study contributed to the extending body of knowledge and literature. These findings provided empirical evidence to support the assertion that integrating video instruction in teaching culinary skills fosters better performance for the students. Thus, support for the hypothesis of many previous studies that online video teaching is as effective as a live class for the teaching of the clinical and skills.

Furthermore, the effectiveness of teaching with video has been established, therefore more classes of this type should be developed. Online instructional delivery through video in culinary arts education has the potential to reach a broader audience base and to reduce costs for educational institutions and students, a scenario that provides benefits for all of the entities involved in culinary and hospitality educational initiatives.

Limitations and Recommendation for Future Studies

This study had few limitations. Creswell (2014) defined a quasi-experiment as an experimental situation in which the researchers assigns, but not randomly, participants to groups because the experimenter cannot artificially create groups for the experiment. The sample was not randomly selected since it was confined to students in a single university. Hence, the findings of this study can only be generalized to a group of student in the same university. Second, the study's sample size is small. However, since only 51 BHM students registered for the culinary course, this sample size is deemed adequate. Third, the study focused on the introductory topic only, 'Understanding Vegetables and Vegetables Cuttings'. Hence, the result of the study cannot be generalized to the other advanced topics. Future studies could adopt a representative sampling strategy with relevant demographics such as educational level and/or university classification that consider the performance of culinary students from additional universities. Furthermore, this study only utilized student's rubric scores to measure performance; thus, future investigations could include other metrics, such as students' test scores, as assessments of students' learning outcomes.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENT

The authors would like to acknowledge the School of Tourism, Hospitality and Event Management, UUM for providing the teaching facility that enabled the experiment. Also, the authors would like to thanks culinary students who participated in this study.

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