Research Contribution

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EDUCATIONAL AFFORDANCES OF GOOGLE GLASS AS A NEW INSTRUCTIONAL PLATFORM FOR FOODSERVICE TRAINING

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ABSTRACT
Foodservice training delivered through wearable computers is a new type of instructional delivery method, yet little is known about how it impacts training outcomes. Three educational properties of a wearable computer-based foodservice training platform were compared to traditional, strictly video-based, classroom training. Results showed the efficiency of using the wearable computer as an on-the-job training method, as participants required less than 50% of the time to view and execute the training and food handling tasks compared to the strictly video-based group. Food industry stakeholders should weigh the costs and benefits of using wearable computers when considering upgrading existing training methods.

Keywords: wearable computers; foodservice training; food safety training; smart glasses

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INTRODUCTION

Many companies struggle to ensure their employees are properly trained and perform their prescribed job duties. It is estimated that in 2012 corporations spent more than $164 billion in training, much of which failed to lead to changes in individual job performance (Miller, 2013). Effective training of front-line personnel is foundational to foodservice and has been shown to boost both employee efficiency and their confidence in the workplace (Aguinis & Kraiger, 2009).

Foodservice owners and managers train their workers on tasks and procedures through different methods and forms of instruction. When designing training programs, attention must be given to the selection of the most effective instructional media, as it can impact learning outcomes and training transfer (Tonhäuser, Büker, Tonh, & Laura, 2016). A review of food safety training methodologies found that videos were the most commonly used audiovisual resource, followed by posters, slides, illustrations, flip charts, music, and interactive media (Medeiros, Cavalli, Salay, & Proença, 2011). However, improvements in the affordability and design of advanced training technologies have made computer-based training among the most popular instructional media in the foodservice industry (Mandabach, 2007).

Computer-based training provides a flexible learning platform where the employee can self-navigate through the content at their own pace (Pintauro, Krahl, Buzzell, & Chamberlain, 2005), saving on costs for dedicated trainers during normal shifts (Singh, Kim, & Feinstein, 2011). Self-navigation through training may increase motivation to learn through providing foodservice workers greater individual autonomy for their own learning (Hall, 2015). Computer-based training can minimize variation in peer-to-peer training as well as inaccuracies and/or employee deviations from established job procedures (Hall, 2015).

Costly, high turnover rates drive the need for effective and efficient training to ensure consistent product quality and safety. Employee turnover rates in the fast food industry average 150% (Spencer, 2018). Replacing low paying, high turnover jobs, such as that commonly associated with the food industry, costs employers an average of 16% of an employee's annual wages (Boushey & Glynn, 2012). Because many computer-based training mediums are novel, they have been shown to arouse increased employee interest in routine training content (Fredricks, Blumenfeld, & Paris, 2004). A study of 96 healthcare workers enrolled in safety training found computer-based training motivated employees to a greater extent than videos or routine lectures (Rodgers & Withrow-Thorton, 2005).

While advantageous in some regards, there are several drawbacks to computer-based training, including cost concerns (Hall, 2015) and its overall impact on learning compared to other types of instructional media. Some foodservice companies may be hesitant to invest in novel technologies that may become obsolete in a few years (Tanyeri, 2018). Concerning learning outcomes, a study comparing lecture-based to computer-assisted, interactive food safety training found both methods were equally effective at increasing food safety knowledge (Costello, Gaddis, Tamplin, & Morris, 1997). Behnke and Ghiselli (2004) found no significant differences in knowledge retention scores across two groups that received menu training through either a face-to-face lecture or computer. These studies are in line with Reiser's (2001) finding that the type of instructional media has historically had minimal impact on improving the effectiveness of instructional practices. From a theoretical perspective, the instructional media serves as simply a carrier of information and thus is unlikely to have a dramatic effect on the efficiency of the learning process (Clark, 1983, 1994).

Most of the aforementioned studies, however, are concerned with what might now be called traditional, computer-assisted methods. A new type of instructional media involves the use of wearable devices which deliver step-by-step instruction while the trainee performs the action. Wearable computers are increasingly being used in the manufacturing and foodservice industry (della Cavo, 2014). A wearable computer can be defined as a "fully functional, self-powered, self-contained computer that is worn on the body… [that] provides access to information" (Caudell & Barfield, 2001, p. 6). Wearable computers may take the form of smart glasses or virtual reality headsets. This technology carries a unique set of educational properties or features (Table 1). Wearable computers such as smart glasses can provide hands free training that could affect how efficiently training is viewed and executed, potentially affecting training expenses for companies. A new paradigm is emerging that suggests greater organizational outcomes can be achieved by educating workers through computer-based training and augmenting worker performance with the assistance of smart glasses (Abraham & Annunziata, 2017; Noone & Coulter, 2012). These plausible benefits

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Table 1: Educational Properties of Wearable Computers as a Training Delivery Method

Positives	Negatives
In situ contextual information	Overreliance on wearable technology
Recording	Familiarization with the technology
Simulation	Small interface
Communication	Privacy
Engagement	Cost
First-person view	Technical Problems
Hands free access to information	Legal Issues
In situ guidance	Development of software
Feedback	Processing power
Efficiency	Distraction
Presence	
Distribution	
Freed up spaces	
Gamification	

Adapted from Bower and Sturman (2015)

must be weighed against some of the potential drawbacks associated with wearable computers as an educational tool (Table 1).

To date, little is known of the impact of wearable computers on the food industry or its functionality in a training situation. Understanding the functionality and limitations of using wearable computers for training purposes can help food industry stakeholders make better informed decisions about whether to supplant existing instructional delivery methods with new technology. The objective of this study was to understand properties of wearable computer-based foodservice training in comparison with a more traditional, strictly video-based training platform. This study looked at the properties of efficiency, hands-free access to information, and freed-up space in the work environment. Efficiency was evaluated, while hands-free access to information and freed-up space in the work environment were addressed.

METHODS

Participants

Prior to data collection, approval was obtained by the University of Arkansas' Institutional Review Board for human subjects. To recruit participants, the study was posted in campus news emails sent out to students, faculty, and staff of the university. No affiliation with the university was necessary for study participation. Recruiting was conducted on a rolling "as-needed" basis, and participants were told the purpose of the study was to understand how food handler training affects food handling outcomes. Individuals were pre-screened for any food allergies, food intolerances, or predisposition to Obsessive-Compulsive Disorder related to excessive handwashing behavior (Pellegrino, Crandall, & Seo, 2015). Participants were balanced across the two treatment groups by age, gender, foodservice experience, and their familiarity with technology usage. To determine technology usage, participants were given a list of common, interactive technologies, which included smart watches, tablets, mobile phones, computers, and digital games among others (Agbatogun, 2013). Participants were asked how often they used each type of technology on a three-point scale, "1 = Never", "2 = Sometimes", "3 = Frequently." Adding up the total score yielded technology usage for each participant.

Research Instruments

The wearable computer used in this study was Glass, Enterprise Edition (Google, 2018a) (Figure 1). Glass is worn by the user like a pair of eye glasses, and an optical display located in the user's field of vision shows training content. Users navigate through the training content through voice commands or a scroll pad embedded in the side frame. Using voice commands poses a potential decreased risk of cross contamination in comparison to using the scroll pad.

A team of professional videographers filmed the training content for both treatment groups, and a university theater student with prior acting experience served as the food handler. All training content was filmed in a commercial kitchen. The training included when and how to wash hands and a procedural learning task of making a sandwich. These tasks were selected because: (a) poor personal hygiene such as lack of handwashing is associated with an increased risk of foodborne illness transmission and foodborne illness outbreaks (Food and Drug Administration, 2010; Todd et al., 2010), b.) low handwashing compliance is often observed among food handlers (Food and Drug Administration [FDA], 2018), and c.) procedural learning is integral in the foodservice industry in which food handlers must remember to prepare food products with ingredients in a specific order and/or arrangement.

Handwashing training for both treatment groups utilized the same footage taken from the third-person, or observer perspective. This would be equivalent to watching a peer wash hands. Handwashing steps were based on Centers for Disease Control and Prevention (CDC) recommendations and included wetting the hands, adding soap, 20 seconds of lathering, rinsing the hands, drying the hands, and turning off the water with a paper towel (CDC, 2015). Participants were shown four events of when to wash hands: (a) handwashing before touching food; (b) after cleaning; (c) after handling pre-cooked, processed meat, but before handling vegetables, and (d) after touching money. These events were chosen, in part, due to mandates in the 2017 FDA Food Code regarding washing hands before engaging in food preparation and after events that could contaminate the hands (FDA, 2017). The researchers recognized that handling ready-to -eat pre-cooked meat may not constitute a hand contamination event. This event was used in the preliminary pilot study and could not be edited out by the researchers given the nature of the Glass software configuration. However, the event may be analogous to training procedures on avoiding cross contamination of allergens or for religious food handling procedures such as halal, kosher, etc.

For the procedural learning task, photo stills for the Glass training were extracted from video footage obtained simultaneously as that used for the strictly video-based training. Photo stills were obtained using a GoPro HERO4 which captures the first-person, or actor perspective (Figure 2). This would be like watching oneself perform a

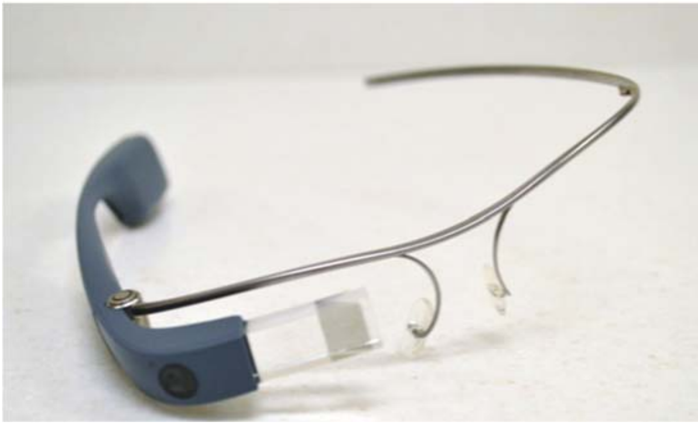

Figure 1: The Wearable Computer Used in the Study.

task from a bird's eye view. The video footage used for the sandwich making with the strictly video-based training was captured from the third-person perspective. The sandwich training for both training groups included placing ten food items in a specific arrangement on a piece of bread marked as a 2x2 grid.

Procedures

Participants in both training groups were told they were being trained to make a sandwich and that handwashing was important. While both groups executed the training content, overall time to wash hands and make the sandwich was recorded. Time was calculated as total time required to both view and execute the handwashing training. For the Glass group, viewing and execution occurred simultaneously, while for the video group viewing and executing the training were two separate events, i.e. in the classroom (viewing) and in the testing area (execution). For the video group, time to traverse between the classroom and testing area was not included in the calculations. Adherence to the CDC six handwashing steps and lathering time were recorded. Lathering times less than 20 seconds were recorded as a missed step in the handwashing process. Participants were surveyed on whether they had received food safety training prior to the study and duration and type of foodservice experience, if applicable. Then participants were debriefed and compensated with a $20 gift card.

Video training group

Participants in the strictly video-based training group viewed the four-minute training video from eight feet away with a 25-inch screen. To control for differences in instructional media display, the video size was calibrated to correspond with the Glass display which is analogous to watching a 25 inch television from eight feet away (Google, 2018b). Immediately afterwards, participants were ushered into the testing area with sandwich materials arranged in a similar manner as seen in the training video and available handwashing facilities. To minimize experimenter error, the same researcher was used to give and assess the training. Approximate time between training viewing and execution was two minutes. Then participants were told to make a sandwich based on the training they had just received.

Glass training group

In the testing area with handwashing facilities and sandwich materials arranged in a similar manner as the training, participants were provided an instruction sheet created by the training software developer. This gave information on how to go through the training step-by-step using voice activation and/or manually swiping and tapping a scroll pad embedded in the temple of the glasses to advance to the next step in the training sequence. Participants were allowed to familiarize themselves with device functionality by going through a deli slicer cleaning module until they felt comfortable. No deli slicer was present and participants were shown this training for the sole purpose of learning how to progress stepwise through the training. To control for navigation type and assess hands free access to information, participants were encouraged to advance to the next training step by voice activation by saying, "next step" out loud. However, some participants were not comfortable relying solely on voice commands, necessitating usage of the scroll pad. After becoming familiar with Glass, participants were reminded by the researcher to complete the training by simultaneously making the sandwich as instructed by the device.

Analytical Procedure

Thirty participants were recruited and an equal ratio of men to women were placed in each training group (5 men and 10 women) (Table 2). Average age of the Glass group and strictly video-based training group was 32.1 years (SD = 12.4, range: 19-60) and 30.0 years (SD = 11.5, range: 20-60), respectively. This closely mirrors the median age of food preparation workers in the U.S. (31.5 years) (Data USA, 2016). There was no significant difference between training groups in age [$t(28) = .49$, $p = 0.62$], technology use [$t(28) = .14$, $p = 0.89$], or foodservice experience [$\chi^2(1) = .13$, $p = 0.72$]. Data was analyzed using SPSS version 24.

Figure 2: Comparison of Sandwich Training between Training Methods. First-person Perspective Photo Stills were Used for the Wearable Computer Training (Left) and a Third-person Perspective Video was Used in the Video Training (Right).

Table 2: Demographic Characteristics of the Wearable Computer and Video Training Groups

		Wearable Computer	Video
Age (average, years)		32.1 ± 12.4	30.0 ± 11.5
Gender	Male	5	5
	Female	10	10
Food service experience (years)	None	8	7
	<1	2	3
	1-3	2	1
	4-7	2	4
	8+	1	-
Type of food service experience	Restaurant	4	3
	Cafeteria	1	2
	Catering	-	1
	Other	-	-
	Multiple	2	2
Prior food safety training	Yes	7	6
	No	8	9

RESULTS

Average time to view and execute the sandwich and handwashing training for the Glass and strictly video-based training group was 4 minutes 15 seconds (SD = 33 seconds) and 6 minutes 43 seconds (SD = 36 seconds), respectively. All participants in the Glass group made the sandwich in the exact way informed by the training, receiving an average score of 10 out of a possible 10. Average sandwich score in the strictly video-based group was 5.1 (SD = 2.3, range = 2-10). All participants washed hands both times as designated in the training. Average lathering time before making the sandwich for the Glass and strictly video-based training groups was 24.5 seconds (SD = 7.2, range = 12-43) and 19.7 seconds (SD = 8.7, range = 3-37), respectively. Average lathering time before handling vegetables after touching pre-cooked, processed meat for the Glass and strictly video-based training groups was 19.8 seconds (SD = 8.8, range = 0-30) and 21.3 seconds (SD = 8.7, range = 3-45), respectively. There was no significant difference between the training groups in lathering times for before making the sandwich [$t(28) = 1.63$, $p = 0.11$] and before handling vegetables after touching pre-cooked, processed meat [$t(28) = -.48$, $p = 0.64$].

DISCUSSION

The purpose of the study was to explore the educational properties of wearable computers that included efficiency, hands free access to information, and freed up spaces in the work environment. Efficiency was evaluated, while hands- free access to information and freed-up space in the work environment were addressed. The strictly video-based training group required over 50% more time to receive and execute the training compared to the Glass group [6 minutes 43 seconds (SD =36 seconds) compared to 4 minutes 15 seconds (SD = 33 seconds)]. Wearable computers such as smart glasses show potential to expedite and to impact food handler training positively. However, more research is needed that determines whether this potential is realized across a diverse workforce with different comfort levels in learning and using new technology (Ravichandran, Cichy, Powers, & Kirby, 2015). Recent labor trends indicate more older workers are being employed in the foodservice industry (Patton, 2018). Older foodservice workers have expressed frustration with computer-based training and may require one-on-one assistance that increases the overall cost of training (Ravichandran et al., 2015).

Having access to the training material through hands-free voice activation or manual scrolling allowed some participants in the Glass group to receive on-the-job training. A study that assessed hygiene of food contact surfaces in a catering establishment found 19.4% of surfaces that included cutting boards, meat slicers, and countertops were considered dirty (>100 CFU/25 cm^2) (Garayoa, Díez-Leturia, Bes-Rastrollo, García-Jalón, & Vitas, 2014). This highlights the advantages of hands-free access to training content through voice activation, which could decrease the risk of cross contamination between food, food contact surfaces, and the instructional media. Concerning freed-up space in the work environment, foodservice kitchens may face space limitations, as smaller work areas allow food handlers quick access to ingredients. Additionally, some tasks such as properly cleaning food equipment may require more than a poster on a wall to explain the procedure properly, rendering paper-based training manuals impractical.

CONCLUSIONS AND APPLICATIONS

Foodservice owners and managers have a need to train employees quickly and effectively, given high turnover and the resulting training costs. While the type of instructional media may not have significant effects on learning outcomes, it does offer different properties, uses, and conveniences. The present study examined three properties offered by wearable computers in juxtaposing Glass and strictly video-based training. This information could benefit foodservice stakeholders conducting cost-benefit analysis on whether to modernize training programs by utilizing wearable computers.

The cost of wearable computers compared to more traditional forms of instructional media should be considered in light of the possibility of time savings. While computer-based training allows employers to save money through decreasing the need for paper manuals (Hall II, 2015) this must be weighed against the cost of using the technology. The smart glasses used in the study cost between $1200-$1400 per pair, though renting the devices remains a potential costing option for foodservice entities. As with any piece of equipment, foodservice entities would need to consider the device's durability and maintenance needs balanced against the possibility of it being damaged or stolen. One device has the capacity to train an unlimited number of workers one at a time (limited by battery life). As implied, training multiple workers simultaneously would necessitate multiple devices, which would also drive up training costs.

More research is needed that compares the time required to design and execute training with wearable computers compared to strictly video-based methods or paper-based training manuals. Creating a workflow and embedding video instructions in the smart glasses ranged from 2-3 hours. While the researchers did not time participants on how long it took them to learn how to operate the smart glasses, this time cost of computer-based training should also be examined.

The experiment had several limitations. The study was a laboratory experiment, and future research should assess wearable computer use in the context of an operational foodservice environment. Qualitative research with industry stakeholders on the advantages and disadvantages of using wearable technology to train workers would provide needed perspectives to supplement the present study's findings. The study was limited to 15 participants per group, and future studies should compare trainings with a larger sample size. Additionally, the exact number of participants in the Glass group that used voice activation or manually scrolling was not determined, but rather only that a portion of participants fell into either category. Future research should seek to better understand the factors that influence the preferred choice for completing training. Future studies could also compare and quantify cross contamination events between using solely voice activation or manually scrolling.

The researchers were mindful of the impact an observer may have on an employee performing a behavior, commonly known as the Hawthorne effect (Latham, 2012). The researchers endeavored to minimize the impact of the Hawthorne effect by utilizing the same experimenter for both the wearable computer and strictly video-based training groups. In addition, the efficiency of both trainings was measured, rather than focusing solely on the compliance with handwashing behavior which has been shown to be inflated by the presence of an observer (Srigley, Furness, Baker, & Gardam, 2014). Time to become familiar with and learn how to operate the smart glasses was not recorded by the researchers and future studies should measure this input.

REFERENCES

Abraham, M., & Annunziata, M. (2017). Augmented reality is already improving worker performance. Retrieved from https://hbr.org/2017/03/augmented-reality-is-already-improving-worker-performance

Agbatogun, A. O. (2013). Interactive digital technologies' use in Southwest Nigerian universities. *Educational Technology Research and Development*, *61*(2), 333–357. Retrieved from http://doi.org/10.1007/s11423-012-9282-1

Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. *Annual Review of Psychology*, *60*, 451–474. Retrieved from http://doi.org/10.1146/annurev.psych.60.110707.163505

Behnke, C., & Ghiselli, R. (2004). A comparison of educational delivery techniques in a foodservice training environment. *Journal of Teaching in Travel & Tourism*, *4*(1), 41–56.

Boushey, H., & Glynn, S. (2012). There Are significant business costs to replacing employees. *Center for American Progress*. Retrieved from https://www.sciencedirect.com/science/article/pii/S036013151530018X

Bower, M., & Sturman, D. (2015). What are the educational affordances of wearable technologies? *Computers and Education*, *88*, 343–353. Retrieved from http://doi.org/10.1016/j.compedu.2015.07.013

Caudell, T., & Barfield, W. (2001). Basic concepts in wearable computers and augmented reality. In *Fundamentals of wearable computers and augmented reality* (pp. 19–42). CRC Press. Atlanta, GA

Centers for Disease Control. (2015). When & how to wash your hands. Retrieved from http://www.cdc.gov/handwashing/when-how-handwashing.html

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, *53*(4), 445–49.

Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, *42*(2), 21–29.

Costello, C., Gaddis, T., Tamplin, M., & Morris, W. (1997). Evaluating the effectiveness of two instructional techniques for teaching food safety principles to quick service employees. *Journal of Foodservice*, *10*(1), 41–50.

Data USA. (2016). Food preparation workers. Retrieved from https://datausa.io/profile/soc/352021/

della Cavo, M. (2014). Google's Glass gets new workplace partners. Retrieved from https://www.usatoday.com/story/tech/2014/10/21/google-glass-five-new-certified-partners/17686637/

Food and Drug Administration. (2017). *Food Code*. College Park, MD. Retrieved from https://www.fda.gov/downloads/Food/Guidance Regulation/RetailFoodProtection/FoodCode/UCM595140.pdf

Food and Drug Administration. (2018). *FDA Report on the occurrence of foodborne illness risk factors in fast food and full service restaurants 2013-2014*. Retrieved from http://www.fda.gov/Retailfoodprotection.

Food and Drug Administration. (2010). FDA trend analysis report on the occurrence of foodborne illness risk factors in selected institutional foodservice, restaurant, and retail rood store facility types (1998-2008). Retrieved from https://wayback.archive-it.org/7993/20170113095247/http://www.fda.gov/downloads/Food/GuidanceRegulation/RetailFood Protection/FoodborneIllnessRiskFactorReduction/UCM369245.pdf

Fredricks, J., Blumenfeld, P., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74* (1), 59–109.

Garayoa, R., Díez-Leturia, M., Bes-Rastrollo, M., García-Jalón, I., & Vitas, A. I. (2014). Catering services and HACCP: Temperature assessment and surface hygiene control. *Food Control*, *43*, 1–23.

Google. (2018a). Glass. Retrieved from https://x.company/glass/

Google. (2018b). Tech Specs. Retrieved from https://support.google.com/glass/answer/3064128?hl=en

Hall, II, R. E. (2015). *Impediments of implementing computer-based training for employees: Perceptions of restaurant owners in a quick service restaurant (QSR) chain using a mixed methods approach*. Iowa State University.

Latham, G. P. (2012). *Work motivation: History, theory, research, and practice*. SAGE.

Mandabach, K. (2007). Differences in the use, training, and effect on careers of technology between independent and chain foodservice managers. *Journal of Culinary Science & Technology*, *5*(1), 5–18. http://doi.org/10.1300/J385v05n01_02

Medeiros, C. O., Cavalli, S. B., Salay, E., & Proença, R. P. C. (2011). Assessment of the methodological strategies adopted by food safety training programmes for food service workers: A systematic review. *Food Control*, *22*(8), 1136–1144. http://doi.org/10.1016/j.foodcont.2011.02.008

Miller, L. (2013). ASTD's 2013 state of the industry report: Workplace learning. *Training & Development Magazine*, *67*(11), 40.

Noone, B. M., & Coulter, R. C. (2012). Applying modern robotics technologies to demand prediction and production management in the quick-service restaurant sector. *Cornell Hospitality Quarterly*, *53*(2), 122–133. http://doi.org/10.1177/1938965511434112

Patton, L. (2018). Senior citizens are replacing teenagers as fast-food workers. Retrieved from https://www.bloomberg.com/news/articles/2018-11-05/senior-citizens-are-replacing-teenagers-at-fast-food-joints

Pellegrino, R., Crandall, P. G., & Seo, H.-S. (2015). Using olfaction and unpleasant reminders to reduce the intention- behavior gap in hand washing. *Nature Publishing Group*, (November 2015), 1–9. http://doi.org/10.1038/srep18890

Pintauro, S. J., Krahl, A. G., Buzzell, P. R., & Chamberlain, V. M. (2005). Food safety and regulation: Evaluation of an online multimedia course. *Journal of Food Science Education, 4*(4), 66-69.

Ravichandran, S., Cichy, K. E., Powers, M., & Kirby, K. (2015). Exploring the training needs of older workers in the foodservice industry. *International Journal of Hospitality Management*, *44*, 157–164. http://doi.org/10.1016/j.ijhm.2014.10.003

Reiser, R. A. (2001). A history of instructional design and technology: Part I: A history of instructional media. *Educational Technology Research and Development, 49*(1), 53.

Rodgers, D. L., & Withrow-Thorton, B. J. (2005). The effect of instructional media on learner motivation. *International Journal of Instructional Media*, *32*(4), 333–343.

Singh, D., Kim, Y.-S., & Feinstein, A. H. (2011). Internet utilization as a medium for training employees in multi-unit restaurants. *Journal of Foodservice Business Research*, *14*(2), 122–145. http://doi.org/10.1080/15378020.2011.574535

Spencer, T. (2018). Fast-food industry has 150% employee turnover rate. Retrieved from http://disruptcre.com/retail/fast-food-industry-150-employee-turnover-rate/

Srigley, J. A., Furness, C. D., Baker, G. R., & Gardam, M. (2014). Quantification of the Hawthorne effect in hand hygiene compliance monitoring using an electronic monitoring system: a retrospective cohort study. *BMJ Quality & Safety*, *23*(12), 974–80. http://doi.org/10.1136/bmjqs-2014-003080

Tanyeri, D. (2018, May). The Future of Automation in Foodservice. Retrieved from http://www.fesmag.com/features/foodservice-issues/15850-the-future-of-automation-in-foodservice

Todd, E. C. D., Michaels, B. S., Greig, J. D., Smith, D., Holah, J., & Bartleson, C. A. (2010). Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 2. Description of outbreaks by size, severity, and settings. *Journal of Food Protection*, *73*(8), 1552–1565.

Tonhäuser, C., Büker, L., Tonh, C., & Laura, B. (2016). Determinants of transfer of training : A comprehensive literature review. *International Journal for Research in Vocational Education and Training (IJRVET)*, *03*(02), 127–165. http://doi.org/10.13152/IJRVET.3.2.4