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Virtual Food Safety Education Programs Reveal Significant Opportunities for Accessible and Effective Distance Learning

ABSTRACT

The demand for food safety extension programing continued throughout the COVID-19 pandemic, even as in-person training was restricted for over a year in the U.S. Consequently, innovation in virtual education occurred rapidly. Here we share the outcomes from our experience offering 23 courses to >2,000 very small food processors in 11 states between 2020 and 2021. Courses were taught in English and Spanish, offered in both synchronous and asynchronous modalities, and varied in structure, in collaboration with our in-state partners. Our goal is to provide successful strategies rooted in the pedagogy of adult education to help direct future work in virtual food safety education. For example, a clear positive outcome involved improved accessibility among audiences due to reduced travel costs and increased audio-visual options. The use of Universal Design for Learning and Resilient Pedagogy frameworks supported participant engagement, which could also be enhanced through the use of chat functions, breakout rooms, office hours, and applying Bloom's taxonomy to learning outcomes in food safety education. Positive participant feedback suggested that, now that restrictions relaxed, the opportunities available in virtual food safety education will remain an important, complementary option to in-person trainings to improve accessibility, engagement, and learning outcomes in the future.

INTRODUCTION

The Preventive Controls for Human Food (PCHF) Rule of the Food Safety Modernization Act (FSMA) represents an updated framework for food processors regulated by the U.S. Food and Drug Administration (FDA). The PCHF Rule helps ensure the safe manufacturing, packing, and holding of food products intended for human consumption. Very small food processors are eligible for qualified exemptions from the PCHF Rule *(13)*. However, these very small processors are, nonetheless, still subject to the current Good Manufacturing Practices (GMPs) and other specific documentation requirements. Of note, the requirement for documentation of employee training and completion of the FDA attestation form for qualified exemptions are new requirements for very

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small food businesses. Consequently, the training needs for very small food businesses are different from the larger members of the industry whose training in the 20-hour (2.5 day) Food Safety Preventive Control Alliance (FSPCA) Preventive Controls for Qualified Individuals (PCQI) course focuses on Subpart C (Requirements for Hazard Analysis and Risk-Based Preventive Controls) and G (Requirements for a Supply-Chain Program).

Very small food businesses who may otherwise lack the resources to obtain and implement food safety education often depend on university-based extension programs for food safety training *(8)*. Food safety training courses frequently involve direct costs (e.g., course registration and travel expenses) and indirect costs (e.g., staff absence and production downtime). Therefore, food processors want to see a return on their investment from training *(3)*. Documentation and record keeping are often some of the greatest perceived barriers to regulatory compliance among very small food businesses *(7)*. Concise hands-on instruction with guided exercises can increase preparedness within these facilities. In 2019, we led a pilot training program which focused on food safety document development for very small food businesses which was implemented in Ohio. In total, >240 very small food processors were trained in six classes. Based on the post-course evaluations from that course *(Table 1)*, that training was adapted for nationwide distribution in 2020 *(3)*.

However, early in the nationwide rollout, the program was rapidly transitioned to emergency remote teaching (ERT) early in the COVID-19 pandemic *(18)*. Trainings were adapted rather than postponed due to 1) the high demand for remote course opportunities; 2) the ongoing pressure for regulatory compliance despite the pandemic; and 3) the unknown duration of the pandemic. The pandemic also elevated demand for this course content because early disruptions to the supply chain led many food service operations, which had been temporarily closed, to transition to manufacturing wholesale goods (e.g., restaurants shifting to selling bottled sauces, dressings, or deconstructed meal kits containing ingredients and preparation instructions). To meet the industry demand, a range of challenges and opportunities associated with distance education were encountered. The objective of this discussion is to communicate the strategies, methods, and efforts that were used to address those challenges and opportunities.

DISCUSSION

Participant satisfaction and learning outcomes were similar between in-person and online classes

The virtual training included a range of topics dealing with food safety document development and management. For the purposes of this manuscript, we will refer to these trainings simply as "food safety training." More specifically, our food safety training detailed exemption requirements

TABLE 1. Internal analysis from stakeholder assessments for both in-person pilot trainings offered in 2019 (left) and virtual trainings offered in 2020-2021 (right)

Feedback from in-person pilot trainings (~7 hours active instruction)	Feedback from the national virtual trainings (~3 hours active instruction)
Small facilities identified a preference for virtual trainings whereas larger facilities stated preference for in-person trainings.[1]	Because of the COVID-19 pandemic in early 2020, 87% of the food safety courses were transitioned online; only 13% were in person (offered at the end of 2019).[2]
Small stakeholders identified a greater need for training related to verification, record keeping, and food safety plan development.	Many stakeholder responses expressed an appreciation for training on FSMA, GMPs, SSOPs, and how they could apply these programs during the pandemic. One participant wrote: "The COVID-19 has made this a new world that we live in and I'm glad that this type of program is available to us".
On a post-training evaluation, the participants mentioned that they found the course "very useful" (85%) and "somewhat useful" (15%).	Participants (96%) stated that they gained knowledge from the training and agreed that their expectations for the course were met (92%).
Several participants expressed their preference for a half-day program rather than an 8-hour program.	Participants (94%) mentioned that they thought the length of the seminar was just about right.

[1]Data collected in 2019
[2]Data from the in-person trainings is not included in this comparison

from the PCHF Rule based on size, GMP requirements, employee training, and the development of different written plans and implementation records. Examples of food safety records and plan templates were shared with participants. PowerPoint modules were developed in English and Spanish for synchronous delivery and pre-recorded short clips were also provided for asynchronous learners. These materials are available, free of charge, on the Food Safety Resource Clearing House webpage, and https://blogs.cornell.edu/snyder/training-material/ *(33)*. The structure of the virtual trainings was highly flexible because of the modular format of the training materials. Input from in-state collaborators was used to adapt each training based on individual preferences and stakeholders' needs. For example, courses have been offered as a series of three 1-h sessions, as a two-part series of 90-minute sessions, and as a 1-part 90-minute presentation supplemented with either a roundtable among university food safety specialists and state food safety regulators, a follow-up virtual office hours opportunity, or with a pre-distributed workshop booklet with access to asynchronous materials.

After the trainings, surveys and evaluations were distributed as recommended by the in-state collaborator. Consequently, we did not aggregate survey data or make comparisons among trainings as evaluation instrument and training format varied. Tailoring trainings to audience-specific needs and preferences was an intentional choice. A survey protocol for these food safety training assessments was submitted to the Institutional Review Board at Cornell University and was deemed exempt. This enabled us to compare outcomes from our in-person trainings in our pilot program (2019) with our virtual trainings offered during the pandemic. For example, one of the most common comments on post-training surveys offered during in-person workshops in 2019 was that a shorter training was preferable. The in-person training was 8h in length (including lunch and breaks). In a post-training survey from a 3h virtual workshop, 94% of respondents indicated that they thought the length was "just about right." Additionally, 96% of the virtual participants indicated that they had gained knowledge from the training and 92% felt that their expectation had been met. This is a similar level of satisfaction that was reported across the in-person trainings in 2019 in which 85% of respondents indicated that the course was "very useful" and the remaining 15% said that the course was "somewhat useful" *(4)*. Therefore, the shorter length was adopted for virtual trainings in response to participant feedback which is also aligned with the findings of other recent work *(26, 35)*.

The quantitative assessments summarized in *Table 1* primarily pertain training outcomes that fit within Level 1 Kirkpatrick Model *(20)*, defined as "Reaction" which focuses on the degree to which participants find the training favorable and job relevant. Conversely, Level 2 is defined as "Learning" and concerns participant knowledge acquisition and confidence based on their participation in the training. Regarding Level 2 outcomes, we observed an increase in participation in our virtual trainings through 1) more frequent and conceptual questions, 2) increased engagement in roundtable discussions with instructors and regulators, and 3) equivalent participation in structured activities compared to in-person trainings. These positive outcomes were detected during each synchronous session using the Zoom platform. One of the food safety educators would take note of feedback and questions and save that information on a Word document. Kirkpatrick argues that when trainees react positively to training, they would be more likely to learn, and better apply their new knowledge and skills *(25)*. We discuss these observations in greater detail in sections specific to relevant pedagogy below, but they suggest an opportunity to adopt practices that improve learning outcomes via virtual education.

Qualitative and quantitative outcomes from virtual food safety trainings

A total of 2,079 people were trained via asynchronous and synchronous virtual trainings from October 2019 to January 2021. There were 859 synchronous participants in 19 trainings and 1,220 attendees in 4 asynchronous trainings. Food safety experts from 11 different states primarily in the northeastern and midwestern U.S. were involved in the preparation and execution of these food safety trainings *(Fig. 1)*. In most courses, the team of Cornell-based and in-state university trainers were joined by regulators from the state's department of agriculture, sanitarians from the state's department of health, or managers of shared-use kitchens or manufacturing partnership programs (MPP).

Quantitative data (n=68) was collected, and it is shown in *Figure 2* and *2.1*. Participants were asked about the usefulness of different topics taught. Positive results stating that the topic was "extremely helpful" were found, respectively enhanced GMPs - FSMA section (57%), cleaning and sanitizing section (54%), personnel management (47%), questions and answers session (29%). Furthermore, 93% of participants stated that they gained knowledge through the training, and 84% mentioned that their expectations were met. Qualitative comments were collected from participants and a summary from one training is shown in *Figure 3*. Respondents were asked to identify the most interesting or helpful topic of the training (open response). By far, the most frequent comments indicated that the training as a whole was helpful. Indeed, many different topics were variably identified among different participants, indicating that the integration of different topics was useful. Respondents were also asked what they would change about the training, and the responses that were received were split between stating that the training covered too much new information and stating that the training had too much refresher information. This is indicative of the challenge faced by large, virtual trainings where the previous knowledge and experience of participants is highly variable *(8, 9)*.

FIGURE 1. Distribution of food safety trainings offered across the Midwest and Northeast U.S. between October 2019 and January 2021 (image adapted from d-maps). Dots represent the number of trainings performed in each state.

[1]Kansas and Missouri were trained together because they share an extension specialist. State-specific content was offered at each training.

When respondents were asked to identify what presentation or methods did or did not work well, several key issues important to successful virtual trainings were identified. Respondents were highly appreciative when webinar recordings and slides were posted promptly. Participants respond very negatively to poorly functioning audio or delays in slide transitions. This suggests the need for high-quality, well-rehearsed audio-visual support is required in distance education *(15)*, and that this expectation for strong audio-visual support from virtual participants appeared to be even greater than during in-person trainings.

Opportunities to promote accessibility among diverse audiences are supported by virtual food safety training.

The virtual food safety training experience was analyzed in a SWOT matrix *(Fig. 4)*. A SWOT analysis is a strategic planning technique used to help a person or organization identify strengths (S), weaknesses (W), opportunities (O), and threats (T) related to project planning *(14)*. A significant opportunity identified in virtual trainings is improved accessibility among diverse audiences *(2)*. While this may seem obvious because virtual trainings do not require travel, upon further analysis, we found many other elements of accessibility were supported through distance education that we had not previously considered. These advantages suggest the utility of this training modality even after the pandemic travel restrictions have ceased.

One advantage of virtual trainings is that they are easily adapted to different learning styles and different languages. For example, closed captioning can be applied in real-time or added to recorded talks, or transcripts can be made available to participants. This supports participants with different audio-visual needs and preferences *(11)*. This also improves accessibility for English as a second language (ESL) viewers. Closed captions enable digital indexing, which supports text searches *(11)*. Captioning also allows

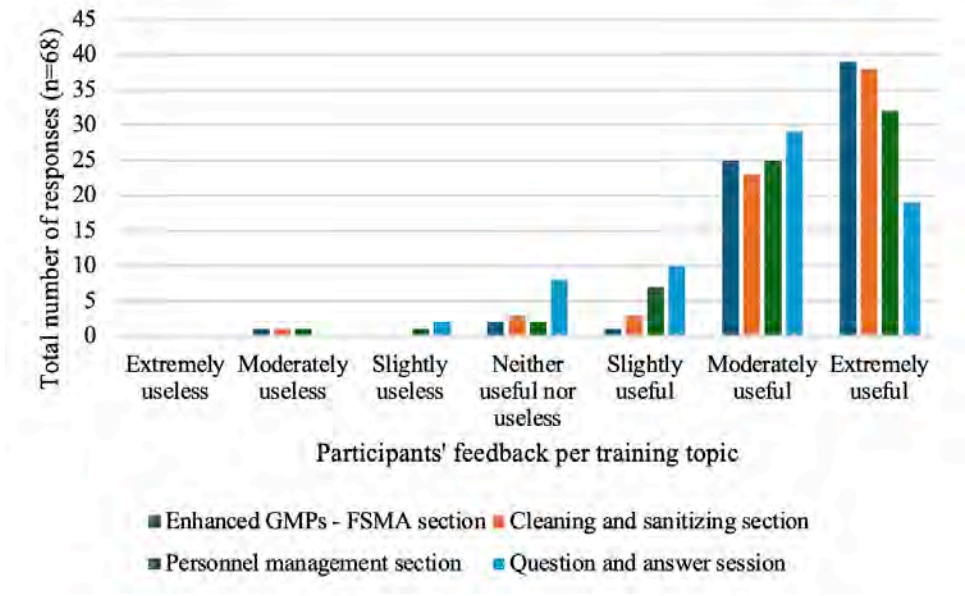

FIGURE 2. Survey results containing participants feedback per training topic (n=68).

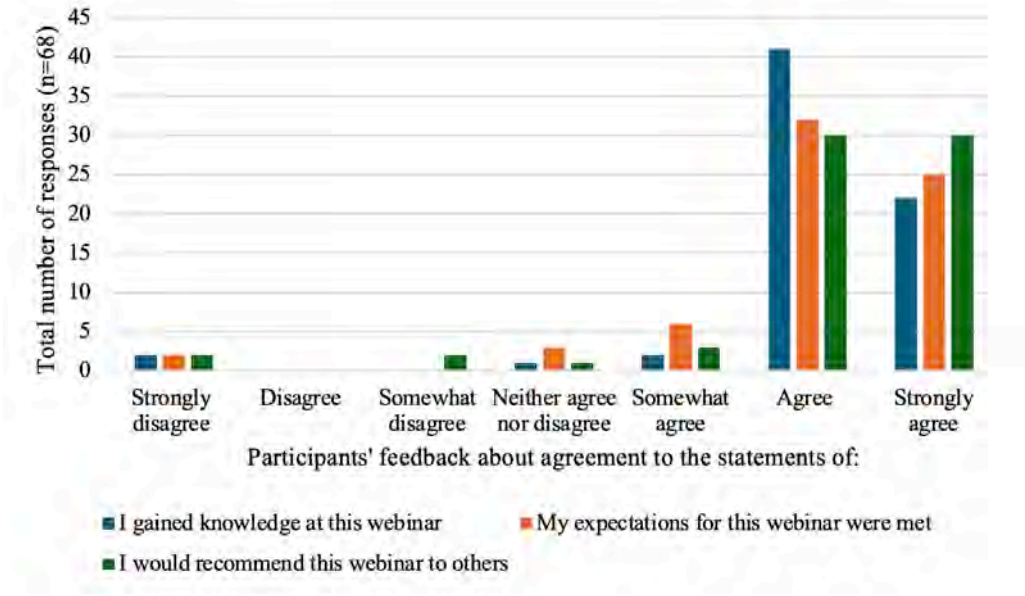

FIGURE 2.1 Survey results (n=68) containing participants feedback about gained knowledge, expectations, and future recommendations of the food safety training.

viewers to watch videos on mobile devices in public spaces, such as in waiting rooms or on public transportation *(6)*. Conversely, audio allows people to listen to content while walking or driving. Together, these options increase the opportunities for industry professionals to engage with food safety education. Finally, closed captioning has been shown to improve comprehension and retention of media content for all viewers, regardless of needs and preferences. A survey of 2,000 students across 15 institutions of higher education indicated that among all respondents, 35% said they always or often use closed captioning when available, and an additional 19% said they sometimes used closed captioning *(22)*. Additionally, offering recorded talks to participants after the completion of the course can also support

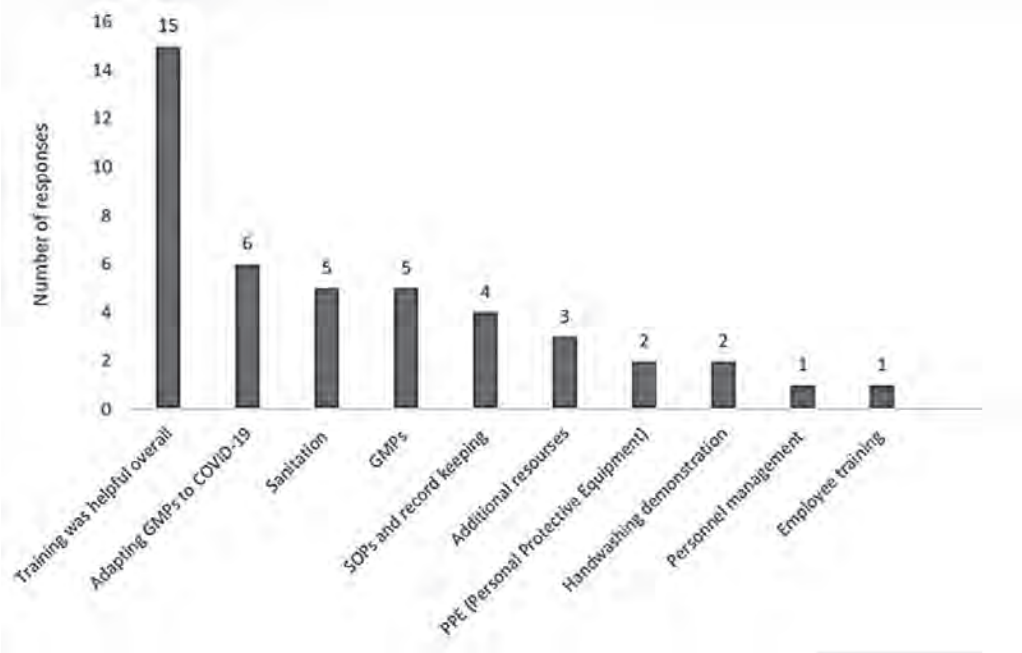

FIGURE 3. Survey results from 32 participants following a single virtual training. Respondents were asked "What was the most interesting or helpful topic in the training?" Some respondents provided multiple answers.

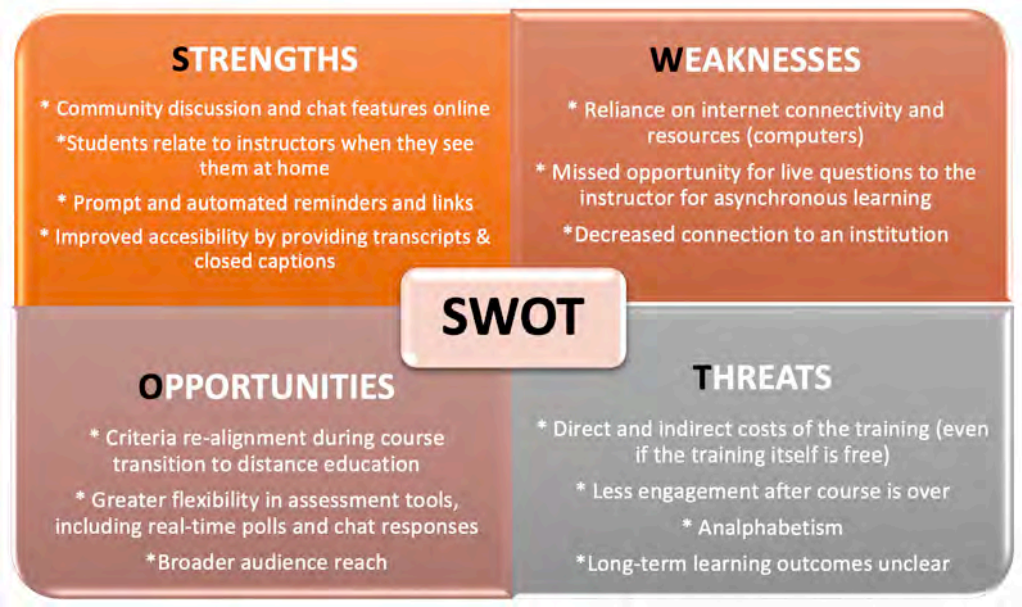

FIGURE 4. SWOT matrix for virtual food safety trainings targeting small food processors as the intended audience. Represented in each box here are the Strengths, Weaknesses, Opportunities, and Threats.

participants who wish to re-watch the training, which could enhance knowledge retention. This statement is consistent with previous research *(25)* that found the trainees who had participated in more food safety trainings (e.g., more exposure to concepts) performed better in tests before a training on a new food safety concept.

Secondly, virtual learning removes the barrier of participant and trainer geographic location and eliminates travel costs. At one of our trainings, the course was advertised nationally through trade organizations which yielded participation from 16 states and Mexico. At a second training, the course was promoted to international food producers who import product into the U.S. Global participation among small food processors would not have been feasible for an in-person training. Furthermore, asynchronous training removes time constraints which supports participants with inflexible work schedules or personal responsibilities. Asynchronous opportunities may be particularly useful for small food businesses who do not have enough staff redundancy to cover the absence of employees attending in-person food safety trainings.

We also found that offering trainings in languages other than English was easier in virtual settings. First, the availability of bilingual trainers with specific food safety expertise increased when the need for travel was removed. Second, more participants who needed these trainings could be reached through distance education. By contrast, educators providing in-person trainings offered in languages other than English may struggle to reach a sufficient number of participants within the target audience in some regions, even as the size of this audience is growing. Even among ESL participants who typically utilize English language training, it has been shown that using the participant's native language is a small step toward supporting multicultural engagement and demonstrates cultural competence, respect, and interest which can lead to empowerment of participants *(25, 28)*. While our trainings were limited to English and Spanish, growing demand for trainings in Mandarin, Korean, Arabic, Portuguese and other languages relevant to region-specific immigrant communities are needed in future food safety education, which coincides with findings from Yeung et al (2019) stating that increasing the number of non-native English speakers (for food safety training) would allow each education method (i.e. online and in person) to be evaluated for effectiveness at meeting the unique educational requirements for each group *(35)*.

Similarly, the overall diversity of the trainers can more easily be enhanced in virtual settings because experts in any location can be involved. Diversity can be defined by several factors including race, ethnicity, gender, age, food sector, and job role. Educator representation that mirrors the range of participant's identities increases trust and engagement. Research has shown that students assigned to an educator who had similar demographic characteristics to the students, experience positive benefits in academic perceptions and attitudes as well as sustainable long run educational attainment *(10, 12, 17)*. Several of our participants noted their appreciation for women speakers because, previously, they had been exposed to expert panels comprised exclusively of men. Historically, fewer women have been in positions of leadership within fields of agriculture and science *(14)*. However, the proportion of women in agriculture has increased over time *(30)*. In fact, nearly half (49%) of the Institute of Food Technologists (IFT) membership are women *(21)*. Similarly, to support equity and inclusion in virtual classrooms, strategies built around Universal Design for Learning (UDL) can be employed within extension education. UDL guidelines are tools used to improve learning across all people. Curriculum developed with UDL in mind promotes universal understanding by explicitly clarifying syntax, abbreviations, and understanding by using multiple media, supplying rather than assuming background knowledge, and highlighting patterns and big ideas *(6)*.

Conversely, virtual trainings can create accessibility limitations, namely in audiences without ready access to computers or high-speed internet or for participants who are not comfortable using these technologies *(Fig. 4)*. Potential solutions could be built on joint efforts among educators, participants, and the community (libraries, internet service providers, university information technology units) to keep education accessible *(32)*. Extension educators can facilitate accessibility by 1) providing instructions to participants ahead of time, 2) having someone available to answer questions and test their system prior to the training, and 3) having someone dedicated to technical support (e.g., not the person giving the training). Educators should have guidance available for potential participants summarizing alternative technical accessibility accommodations, such as suggestions for public spaces (e.g., libraries, extension offices) where participants can utilize high-speed internet or devices. Alternatively, printed materials can be sent in advance to specific individuals. This strategy may also be effective for training plain-sect audiences who do not use digital technologies.

Different approaches are required to engage participants in virtual education, but strategic teaching techniques can promote higher-order cognition

Previous studies showed that virtual trainings offered some advantages for audience engagement (e.g., relatedness or relatability to the trainer) *(26, 27, 35)* although participants can face increased distractions at home, asynchronous learners cannot ask real-time questions, student-student interaction is very limited, and participants may not feel as connected to the training institution as when they are trained on-site. A recent systematic review on virtual food safety education programs confirmed some of those limitations *(5)*. Therefore, leveraging the tools available in virtual trainings to better support engagement is essential to combating

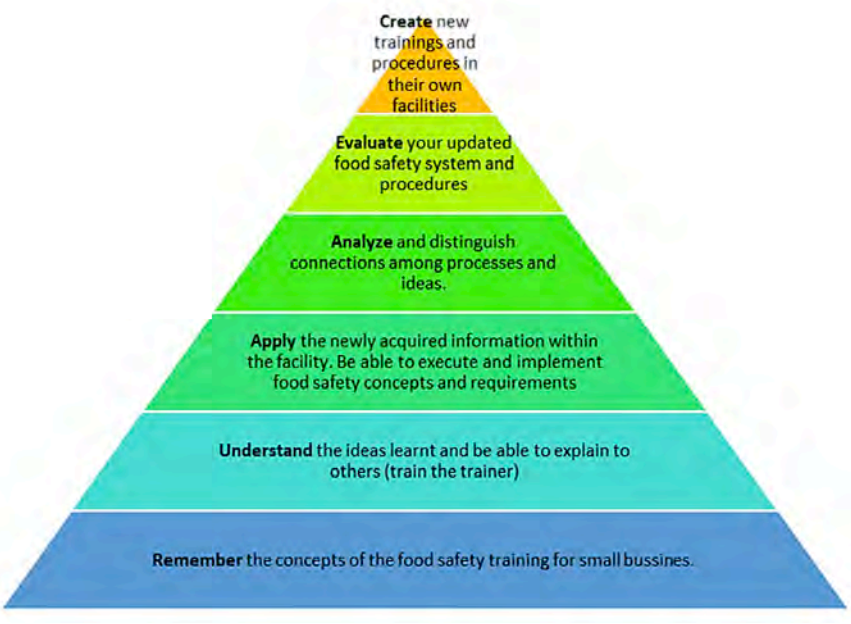

FIGURE 5. Application of Bloom's taxonomy hierarchy of knowledge to the learning objectives from our virtual food safety trainings.

these drawbacks. A critical tool we leveraged in successful engagement of virtual audiences was the use of the chat function during video conferencing. Anecdotally, the number and quality of questions we received via chat during our virtual trainings far exceeded those from our conventional in-person trainings. The chat tool promotes engagement as a less-stressful alternative to asking questions verbally and chat enables immediate and continuous responses from instructors which improves the dynamics of the conversion and makes the training more engaging. However, presenting and moderating chat simultaneously is a skill that may be challenging for some trainers. Trainers can build this skill with practice or, alternatively, multiple trainers can be simultaneously engaged to share these responsibilities.

Engagement of participants affects learning outcomes, and the UDL guidelines suggest that there is not one style of engagement that will be optimal for all learners. Rather, providing multiple means for engagement is necessary. Crucially, active engagement and teaching techniques can influence the level of understanding and ability of the participants to apply course concepts within their food businesses *(34)*. Here, we have adapted Bloom's taxonomy *(1)* to describe how the learning objectives for virtual food safety trainings can be applied across higher-order thinking. Bloom's taxonomy is a hierarchical framework for cognition which provides a classification for the levels of intellectual behavior *(Fig. 5)*. It consists of six major categories: remembering (knowledge), understanding (comprehension), applying, analyzing, evaluating, and creating. The categories in this method are ordered from concrete to abstract and help educators frame and deliver instruction and design valid assessment tools *(1)*.

Adapting the concepts in Bloom's Taxonomy to food safety education can facilitate participant empowerment. For example, the open discussion format empowered participants to freely answer questions, fostering communication among them and clarifying concepts. Furthermore, case-scenario applications during trainings and continued engagement with extension personnel through consultation afterwards, were other strategies provided to empower trainees. Though post-course evaluations focus primarily on the "remembering" step of the pyramid, the applied examples and exercises utilized in our trainings could have benefited higher-order learning outcomes as well. Nevertheless, due to the sudden transition of in-person to virtual modality training one of the limitations of this study was that we could not collect additional data to assess the higher level of cognition according to Bloom's taxonomy. Future studies can focus on incorporating Bloom's taxonomy hierarchy pyramid, in conjunction with our proposed version on how higher levels of cognition can potentially be achieved in a food processing facility *(Fig. 5)*. Once incorporated, food processors can analyze if their food safety programs are compliant with regulations and effectively manage risk.

Explaining newly acquired concepts to other employees in their facilities after the course further cements the process of applying knowledge. This is particularly relevant as employee GMP training is required within the PCHF Rule, even among very small food businesses. Furthermore,

using the hands-on materials and templates, participants can create new processes for their plants. Fostering collaboration and community among participants and trainers also benefits learning. Mentoring through peers can increase the opportunity for one-on-one support and the connections fostered during trainings could leave the participants with a network that can provide support during the implementation phase *(3)*. The application of chat functions, breakout rooms, or Q&A panels can help facilitate that process in virtual settings. Post-training opportunities were provided to attendees, such as making the materials available on extension websites, where people can re-watch them anytime, and the number of views can be monitored by educators, as well as personal communications with state regulators following inspections of sites who participated in the course.

Using concepts from resilient pedagogy can improve learning and engagement in future virtual education.

Conventionally, food safety trainings have been executed mostly using traditional educational methodology in which the instructor segments the seminars into units, with each unit covering a certain number of regulation chapters, typically delivered via lecture, punctuated by group discussions or activities, and assessed by a test at the end. However, there is increasing demand to introduce innovative and creative teaching methods and materials as conventional teachings were abruptly disrupted because of the pandemic *(19, 27)*. The pandemic affected all aspects of methodology, delivery, and execution of instruction. However, many of the necessary changes were aligned with contemporary education methods described by resilient pedagogy theory. Resilient pedagogy is a "course design strategy that helps make classes, assignments, and assessments as resistant to disruption as possible" *(16)*. This approach already existed prior to the pandemic, although its use has since become more widespread *(27)*. This approach emphasizes more engagement, deeper knowledge, and a resilient style. For example, there is greater emphasis on participation in the learning environment in ways that promote persistence, effort, and other behaviors that lead to learning success. Some forms of engagement are easily observable (e.g., submitting quality work, selecting challenging options, responding in generative ways), whereas others might not be (e.g., making private connections between ideas, engaging in metacognitive reflection, choosing to allocate mental effort in beneficial ways). Another form of engagement, called emotional, involves an affective connection that could lead to interest, value, or curiosity in doing the training *(31)*. Using this framework, we analyzed three concepts that could be applied to virtual food safety extension education for small food processors. These concepts relate to course organization, syllabus structure, and content menus.

Traditional food safety courses with a long-established organization or "course rhythm" can face substantial challenges when it comes to disruption, particularly if their goal is to replicate the previously existing course format or organization. Although this repeatable pattern might meet the needs of some students, a single method for distributing content (i.e., lecture) followed by a single assessment (i.e., tests) may hinder the needs of other students. Therefore, instructors should consider selecting the rhythm of the course with intention *(31)*. For example, in virtual food safety trainings this approach could include a concept check, a verification of understanding (after each class and prior to the next one), concluding with a discussion section where groups report out on their final assignment. An effective course rhythm will intentionally repeat key interactions that increase the sense of student competence *(23)*. Course designs with a mix of modes can be considered a resilient decision.

Another important component of a resilient course is a structured syllabus that specifies the goals for participants regarding comprehension, regardless of the modality. Developing a syllabus focused on participants' needs can increase their perception of autonomy (i.e., achieving success is possible) and competence (i.e., they possess the ability and format to succeed) *(23)*. For example, in virtual food safety trainings, this approach could include using a pre-course survey to facilitate a needs-focused teaching approach. This approach facilitates feelings of engagement and can provide useful feedback for instructors. Examples of questions could include: *What is the reason you are taking this food safety course? What do you hope to get out of this course? Is there anything you are worried about regarding this course?* In our case, we used feedback from participant surveys from the in-person pilot trainings to shape our instructional format *(Table 1)* These questions can also help instructors evaluate the learning environment and reveal technology barriers.

A final concept involves content menus which are a list of ways that students can access content. In many food safety trainings, the content and curriculum are standardized because they are based on a regulatory framework (i.e., HACCP training, PCQI training, Better Process Control School). However, in other trainings, instructors have greater flexibility. Resilient pedagogy suggests utilizing content menus to provide autonomy, independence, and flexibility to participants to select their preferred choice in how to learn. Instead of relying on a single mode like the traditional lecture, instructors can build redundancy into their courses by pulling together a list of ways that students can access content, including relevant readings, video lists from YouTube, and recorded lectures. Because each student will interact with the content in a unique way, content menus will maximize student autonomy. For example, in virtual food safety trainings, this approach could include offering several modalities and additional opportunities to learn more. This instructional strategy is a resilient, needs-focused choice and addresses cost and time tradeoffs for participants *(29)*. Overall, resilient pedagogy fulfills the need for autonomy

which leads to enhanced academic success, including increased self-regulation, interest, enjoyment, and perceived competence, as well as decreased anxiety. The opportunities in virtual settings enhance course structure flexibility, such that these approaches are well suited to distance food safety education *(36)*.

CONCLUSIONS

Based on our experiences offering virtual food safety trainings and our engagement with pedagogy theory, we recommend the following conceptual framework for future virtual food safety education:

- Capitalize on the opportunity provided by the lack of geographical restrictions to include diverse instructors. This enhances engagement and trust among diverse audiences. This is particularly important in the development of targeted trainings that serve the needs of historically marginalized groups.
- Acknowledge the technical barriers facing some participants and provide accommodations in the form of guidance, technical support, and information on additional resources (i.e., libraries and extension offices).
- Increase engagement and improve higher-order cognition through the regular use of chat boxes, break-out discussion rooms, or follow-up virtual office hours. Although dynamic interactions with instructors and with other participants is important for all food safety trainings, it is essential in virtual settings where there is greater opportunity for participant distraction and less physical connection with instructors.
- Provide participants flexibility and multiple options in instructional formats, activities, and assessments of competence. Optional readings, recordings, quizzes, and discussion activities increase participant satisfaction and confidence because they can choose what aspects they participate in. Virtual modalities increase the opportunity to present options since coursework is already being conducted online and, often, at the participant's own pace.

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