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The Use of Distance Learning in Occupational Health and Safety Training: Assessing Effectiveness and Sustainability in the Context of the COVID-19 Pandemic

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Executive Summary

Introduction

The COVID-19 pandemic has caused great disruptions and uncertainty to organizations worldwide. The rapidly instituted changes to workplaces—for example, the immediate transition from in-person interaction to virtual and online communication—are now an everyday part of the workplace for many of us. Trainers, including those in the construction industry, were required to rapidly adapt health and safety and skill-based training which relies on in-person interaction and hands-on learning, to virtual format. The urgency and abruptness of the transition to distance learning formats and subsequent reliance on advanced technology has left users grappling with a series of issues: unfamiliar platforms and complicated training guides; lack of access to online resources; a lack of consistency of platforms used across organizations; need for clarity for compliance and ethical considerations; and a scarcity of readily available evaluation resources to assess the effectiveness of transitioning to the distance learning formats. These concerns highlight the need for systematic evaluations to monitor the effectiveness of distance learning training methods and assess the on-going quality improvements made when gaps are identified and addressed. Further, the dynamic nature of the pandemic highlights the need to share lessons learned and best practices as the training systems evolve. This is of particular importance in the occupational health and safety domain, in which training is being designed and delivered to meet emerging worker safety needs during the pandemic.

Purpose

The current evaluation project involves **a comprehensive system designed to assess effectiveness of the rapid transition to synchronous online training in the occupational health and safety domain**. It addresses not only the effectiveness of the safety training content and distance learning format, but also the feasibility of integrating the distance learning format into future training efforts. The evaluation system was designed to investigate: (1) comparisons of safety training delivered in a face-to-face versus synchronous online format; (2) effectiveness of newly developed online COVID-19 trainings in addressing emerging worker safety needs; and (3) best practices and lessons learned for occupational health and safety training delivered in distance learning format.

Methods

The methodology employed is based on an established evaluation system designed by Sarpy and Associates. This evaluation process is strategically designed to include: (1) use of a **mixed-method approach** that incorporates **qualitative and quantitative data**; (2) a **multiple stakeholder system** that will provide 360 degree feedback of effectiveness from major stakeholders; (3) **identification of best practices/lessons learned** from project findings; and (4) **general recommendations to enhance programmatic success and sustainability**. It should be noted that this evaluation process has previously been used to evaluate the effectiveness and impact of online and face-to-face occupational health and safety training programs, emergency management and disaster response, and resiliency training programs nationwide. Sarpy and Associates worked closely with CPWR – The Center for Construction Research and Training (CPWR) to apply this methodology to the following studies.

Study 1: Comparative Study of Face-to-face versus Distance Learning Format on Training Outcomes. Using the process described above, an evaluation was developed to provide direct comparisons of the effectiveness of a worker health and safety training course delivered in a traditional face-to-face format with the same course delivered in a synchronous online format. CPWR's Infection Control Risk Assessment (ICRA) Awareness training program was selected for evaluation because it has been presented in face-to-face format for a number of years and was modified by CPWR to a distance learning format for presentation during the COVID-19 pandemic. CPWR course evaluations, administered to all course participants directly following training, were analyzed to compare the effectiveness of instructor and teaching/learning methods, safety-related knowledge and skill gains, and the course's overall effectiveness in improving the knowledge, skills, and confidence to work safely. Results of analyses revealed that participants in the face-to-face courses reported, on average, statistically significantly higher ratings of: (1) Instructor Effectiveness; (2) Teaching/Learning Methods; and (3)

Overall Effectiveness in developing the knowledge, skills, and confidence to work safely. However, it should be noted that while face-to-face delivery was rated more highly, respondents indicated that, on average, both delivery formats were highly effective. Importantly, no significant differences in specific safety-related knowledge and skills were reported by participants in the face-to-face versus distance learning formats, suggesting that high levels of learning occurred regardless of format.

Study 2: Online Training Developed During the Pandemic. A complementary study was conducted to assess the effectiveness of two newly developed CPWR COVID-19 courses (COVID-19 and the Construction Industry Awareness; ICRA/COVID-19 Awareness) delivered in a synchronous online format to address emerging safety needs. The evaluation was conducted three to six months after the initial training session and provides additional information to determine whether the online training effectively transferred to improved job site safety during the COVID-19 pandemic. Study 2 examined the effectiveness of the synchronous online format in addressing worker health and safety training needs in real-time during the pandemic.

Online evaluation questionnaires were designed and administered to all participants who received the training (workers, trainers, union representatives) as well as the CPWR instructors who delivered the training. Results of the evaluation demonstrated high levels of effectiveness for the synchronous online training, both for those receiving the training as well as those CPWR trainers who provided the training. The respondents reported, on average, that the training had resulted in not only high levels of safety-related knowledge and skill, but also improved their preparedness to work safely and many had used the training on the job. Similarly, they cited that their training-related knowledge and skills were supported on the job, both by their supervisors and the organizations in which they worked. The vast majority of trainers receiving the training reported that they felt prepared to train others using the distance learning format.

While work-related characteristics of the trainees (occupation, trade association membership) and training (type/length of training, month training presented) did not affect outcomes, technology-related characteristics of the trainee did have an impact. Those reporting higher levels of "Comfort in Taking the Training via Distance Learning" gave higher ratings of Instructor, Content, and Format effectiveness as well as higher ratings of Learning, On-the-job Performance, and Support of the training at the worksite than those reporting less Comfort. Similarly, those reporting greater "Skill in Using Distance Learning" gave higher ratings of Instructor and Overall Effectiveness as well as greater Learning than those reporting less Skill. These results suggest that, to engender optimal training outcomes, the technological comfort and skill of the learner should be taken into consideration when designing and delivering training using distance learning.

Best Practices/Lessons Learned and General Recommendations

To gain a greater understanding of the quantitative results, qualitative information was gathered to determine best practices and lessons learned for use of distance learning in occupational health and safety. In addition, meetings with project stakeholders and occupational health and safety training representatives were conducted to gather additional feedback and information. In general, across stakeholders, several aspects of the distance learning format were cited as most important for success: (1) instructor expertise; (2) use of synchronous online platform (Zoom); (3) up-to-date and relevant content, including its application to the workplace; (4) interaction and discussions of content with participants (breakout groups, polls); and (5) shift to distance learning methods to ensure safety of worker as well as flexibility during the pandemic.

On the other hand, respondents indicated that with remote learning: (1) face-to-face is the gold standard and is recognized as more effective; (2) has limitations regarding the extent to which interactions can be fostered; (3) presents challenges in using hands-on exercises and demonstrations; (4) creates technical issues including accessibility of computer equipment and Internet; and (5) limits the instructor's ability to see non-verbal cues and "read the room" to assess learner understanding.

The qualitative comments and suggestions were synthesized to create general recommendations for enhancing effectiveness of synchronous online training courses, including Tools and Tips for trainers and

trainees. The recommendations focus on designing and delivering training sessions in ways that address learner needs and emulate the general principles of adult learning and excellence in instructional design for traditional face-to-face training.

The Trainer Tools and Tips encourage advance planning and organization of training, interactive delivery methods that foster active participation of trainees, and practices for information sharing following the training. These strategies include: (1) gaining information about learner (technological proficiency; accessibility) and workplace needs (occupational; trade) in advance of the session; (2) providing orientation training for participants and trainers that clarifies technology, course expectations, and resources; (3) providing participants access to all course-related information in advance of the training session; (4) convening instructor planning and coordinating meetings to review roles and responsibilities; (5) rehearsing presentations using the technology (including camera), preferably with performance feedback; (6) encouraging trainee engagement and interactions using specific regular interaction/discussions and diverse methods; (7) using co-instructor(s) to assist with technology; (8) creating an open and flexible learning environment; (9) evaluating training to ensure continuous quality improvement; and (10) providing up-to-date, relevant, online resources for participants and trainers. In addition, specific best practices for recommended distance learning methods (e.g., virtual breakout rooms) and Etiquette for Online Success are also provided.

Future Research

The present study provides evidence of the viability of using the distance learning format to successfully deliver occupational health and safety training. It also demonstrates the use of a real-time, comprehensive evaluation process to identify best practices, lessons learned, and general recommendations that can be adopted for continued use of the new technology. Further research is needed to advance our understanding of the trainee characteristics most critical to success in using technology-based training for workers' health and safety. Likewise, additional evaluations of the pedagogical features influencing effectiveness of distance learning formats are needed including the conditions under which it is most effective for occupational health and safety. This information can facilitate strategic decision-making regarding use of distance technology to improve occupational health and safety training systems.

Conclusion

The present evaluation provides preliminary evidence supporting the effectiveness of the distance learning format in delivering occupational health and safety training. Trainee characteristics and training factors affecting effectiveness and impact are identified, as well as recommendations for continuous quality improvement. Finally, suggestions for future research on use of the distance learning technology in occupational health and safety training systems are provided. Taken together, these findings and general recommendations can be used to ensure successful and sustained integration of synchronous online occupational health and safety trainings.

> *"I feel ICRA related training will become a norm as training in the way we looked at it is changing. I believe 100% in face-to-face training but if we cannot it is a responsibility for us to train them on how to be safe.* ***We sometimes forget about the art of safety. We are forced in this time not to do face to face training, but we have members working today. We had to look at the art side and find the next best avenue. Safety can never stop - no matter what obstacles are put in front of us. Great job for CPWR staff and instructors to adapt and overcome to reach the members."***
>
> Quote from Participant in the ICRA/COVID-19 Awareness Training (April 13, 2020)

The Use of Distance Learning in Occupational Health and Safety Training: Assessing Effectiveness and Sustainability in the Context of the COVID-19 Pandemic

Introduction

The COVID-19 pandemic has caused great disruptions and uncertainty to organizations worldwide. The rapidly instituted changes to workplaces—for example, the immediate transition from in-person interaction to virtual and online communication—are now an everyday part of the workplace for many of us. Trainers, including those in the construction industry, were required to rapidly adapt health and safety and skill-based training which relies on in-person interaction and hands-on learning, to virtual format. The urgency and abruptness of the transition to distance learning formats and subsequent reliance on advanced technology has left users grappling with a series of issues: unfamiliar platforms and complicated training guides; lack of access to online resources; a lack of consistency of platforms used across organizations; need for clarity for compliance and ethical considerations; and a scarcity of readily available evaluation resources to assess the effectiveness of transitioning to the distance learning formats. These concerns highlight the need for systematic evaluations to monitor the effectiveness of distance learning training methods and assess the on-going quality improvements made when gaps are identified and addressed. Further, the dynamic nature of the pandemic highlights the need to share lessons learned and best practices as the training systems evolve. This is of particular importance in the occupational health and safety domain, in which training is being designed and delivered to meet emerging worker safety needs during the pandemic.

CPWR: The Center for Construction Research and Training (CPWR) is a nonprofit dedicated to reducing occupational injuries, illnesses and fatalities in the construction industry. CPWR conducts specific types of construction health and safety training for members of its consortium partners and the North American Build Trades Unions (NABTU). The overarching goal of CPWR training is to enable and empower construction workers to recognize potentially unsafe working conditions, and to identify proper ways to eliminate or control those hazards that make conditions unsafe.

In 2016, CPWR developed an eight hour Infection Control Risk Assessment (ICRA) Awareness program to assist NABTU affiliates in the preparation of their workforces to perform construction, renovation, maintenance and demolition activities on healthcare facilities. Performing work in a healthcare facility requires coordination among all of the construction trades to minimize the risk of spreading infections to hospital patients, staff, and visitors. The ICRA Awareness program was part of the overarching goal of CPWR to ensure that members of NABTU understand what it is to work safely and professionally in a healthcare facility. The CPWR ICRA Awareness course was designed in a traditional face-to-face format that includes case studies, lectures with group discussions, demonstrations, and activities that involve active learner participation in the training process.

As a result of the pandemic and its impact on businesses and communities nationwide, the transition to distance and online learning was rapid and unexpected. It should be noted that for the purposes of this report, distance learning is an umbrella term used to describe training in which trainer and learner are remote during the instruction, that is, not in the same location (i.e., geographically distant). Online training is a specific distance learning format in which the training is provided using the Internet (Moore, Dickson-Deane, & Galyen, 2010). For further discussion, the reader is referred to the Glossary of this report.

The trainings delivered during the COVID-19 pandemic were designed and presented in real time to meet the immediate and on-going health and safety needs of the workers. In rapid response to the COVID-19 pandemic, CPWR revised the original 8-hour ICRA Awareness training to include occupational safety and health issues resulting from the pandemic. That is, the revised goal of the ICRA/COVID-19 Awareness training was to provide the necessary training to increase the health and safety awareness for construction workers who are impacted by the pandemic and understand the Infection Control Risk Assessment procedures for properly performing healthcare or other occupied facility construction,

maintenance, and renovation tasks. In addition, the training was revised from its original face-to-face format to be delivered as synchronous online training using the Zoom Video Communications (Zoom) platform. In this way, the trainers were able to actively engage their learners but maintain the safety and health of workers attending the training during the pandemic.

In addition, a one-hour COVID-19 and the Construction Industry (COVID-19) Awareness course was also designed and delivered in a completely online synchronous format using Zoom. The goal of the COVID-19 Awareness training was more broadly focused to increase the health and safety awareness for construction workers who are impacted by the pandemic. Training content included knowledge and skills related to basic facts about COVID-19, assessing risk of workplace exposure to COVID-19, key steps in worker protection and infection control, and protective measures employers should implement.

It should be noted that links to relevant online resource websites were provided at the conclusion of both training courses (COVID-19 Awareness and ICRA/COVID-19 Awareness). These links included: (1) CPWR's COVID-19 Construction Clearinghouse; (2) National Institute for Environmental Health Sciences Worker Training Program COVID-19; (3) National Institute for Occupational Safety and Health; (4) Centers for Disease Control and Prevention; and (5) Occupational Safety and Health Administration. Participants were encouraged to access these links to obtain the most up-to-date and accurate information regarding workplace safety during the pandemic.

Purpose

The current evaluation project involves **a comprehensive evaluation system designed to assess effectiveness of the rapid transition to synchronous online training in the occupational health and safety domain**. These evaluations address not only the effectiveness of the safety training content and online format, but also the feasibility of integrating the distance learning format into future occupational health and safety training efforts. The evaluation system was designed to address the following: (1) comparisons of safety training delivered in a face-to-face versus synchronous online format; (2) effectiveness of newly developed online COVID-19 courses in addressing emerging worker safety needs; and (3) best practices and lessons learned to enhance occupational health and safety training delivered in distance learning format.

Evaluation Process

The evaluation process used for the current project involved a two pronged approach. To examine differences in effectiveness of face-to-face versus distance learning courses (Study 1), the evaluation focused on training outcomes immediately following the completion of training. To examine the extent to which distance learning courses were effectively meeting workers' health and safety-related needs during the pandemic (Study 2), the evaluation focused on longer-term training outcomes (3 to 6 months) following the completion of training. The methodology employed in the evaluation process is based on an established evaluation system designed by Sarpy and Associates. This evaluation process is strategically designed with the following objectives: (1) use a **mixed-method approach** that incorporates **qualitative and quantitative data**; (2) incorporate a **multiple stakeholder system** that will provide 360 degree feedback of effectiveness from major stakeholders; (3) **identify best practices/lessons learned** from project findings; and (4) provide **general recommendations** for consideration to enhance **programmatic success and sustainability**. The evaluation process also follows Kirkpatrick's framework for training evaluation criteria and includes evaluation of reactions (Level 1), learning (Level 2), transfer to improvements in on-the-job safety performance (Level 3), and organizational results (Level 4). It should be noted that this evaluation process has been used to evaluate the effectiveness and impact of online and face-to-face occupational health and safety and leadership training programs (Sarpy, Burke, Rabito, & Hughes, 2017; Sarpy & Kaplan, 2012), emergency management and disaster response (Sarpy et al., 2006; Sarpy, Chauvin, & Anderson, 2003), and resiliency training programs nationwide (Sarpy, Rabito, & Goldstein, 2012) and is consistent with recommended best practices in worker training evaluation (NIEHS, 2015).

Study 1: Comparative Study of Face-to-Face versus Distance Learning Format

An evaluation was conducted to provide direct comparisons of the effectiveness of worker health and safety training courses delivered in a traditional face-to-face format before the pandemic with courses delivered in a synchronous online format during the pandemic on training outcomes.

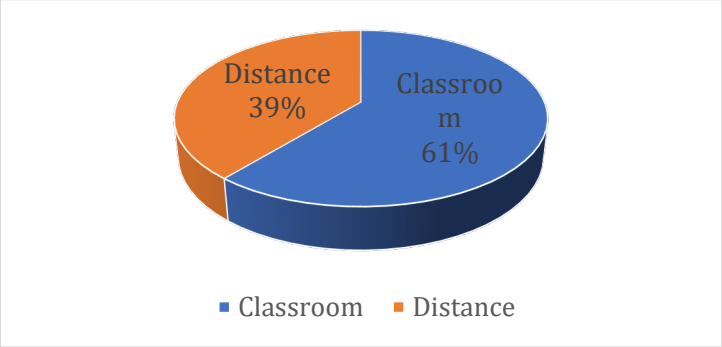
Targeted Course. After a review of the CPWR worker health and safety course offerings, the Infection Control Risk Assessment (ICRA) Awareness training was selected for the comparative study. The ICRA Awareness course provides the necessary training to understand the procedures for properly performing healthcare or other occupied facility construction and renovation tasks. In addition, participants examine the practical use of ICRA tools including containment, negative air, HEPA filtration, and work practice techniques. The course uses a variety of adult education classroom activities to build upon participants' experience working in construction, renovation, demolition, or healthcare facility environments.

This course was chosen largely because it was presented in face-to-face format prior to the pandemic (April 2016 to February 2020) and modified in March 2020 to a synchronous online format and presented during the COVID-19 pandemic. Similarly, the COVID-19 Awareness course, developed during the pandemic to directly address workers' immediate health and safety needs and delivered in online format, was also included in the comparative study. It should be noted that the same team of CPWR health and safety instructors presented both the face-to-face and online trainings, controlling for instructor's expertise and allowing for more direct comparisons of course formats.

Evaluation Method. CPWR Trainee Course Evaluation Forms are used to assess effectiveness of all trainings presented (see Appendix A). The evaluations are administered to all participants *directly following* training. The questionnaires contain 26 items and require respondents to rate: (1) Instructor's effectiveness (e.g., "The instructor(s) explained how the course content applies to my job or trade."); (2) Teaching/learning method use (e.g., "The classroom discussions/small group activities are helpful for learning the material covered."); (3) Safety-related knowledge and skill gains (e.g., "The course helped me to improve my ability to Recognize health hazards on the job."); and (4) Overall effectiveness in improving the knowledge, skills, and confidence to work safely. Respondents rate each item on a scale ranging from 1 (not at all) to 5 (always). The questionnaire also contains an open-ended item encouraging respondents to suggest how the course can be improved. The CPWR Trainee Course Evaluation Forms are gathered and compiled in a worker training database. The evaluation data for all ICRA and COVID-19 courses (face-to-face and online) presented from April 2015 to July 2020 were included in this study.

Participants. A total of 840 training participants completed the CPWR Trainee Course Evaluations. More specifically, 516 respondents evaluated the face-to-face trainings, whereas 324 respondents evaluated the online trainings. Figure 1 below depicts the percentage of evaluations included in the study according to training format.

Figure 1. Percentage of Evaluation Responses by Training Format



Note. Total respondents: N=840; Classroom: N=Item 516; Distance Learning N=324.

It should be noted that number of respondents also varied according to length of course and delivery method. As depicted in Table 1, for the face-to-face trainings, the largest number of respondents attended the ICRA Awareness 8-hour course whereas a fairly equal number of respondents completed the ICRA/COVID-19 Awareness 6-hour and COVID-19 Awareness 1-hour courses in the distance learning format.

Table 1. Number of Post-Course Evaluations by Course and Delivery Method

Course by Delivery Method	Number of Respondents
Face-to-Face Courses	**516**
ICRA Awareness (8-hour)	321
ICRA Awareness - Train-the-Trainer (16-hour)	141
ICRA Worker - Train-the-Trainer (24-hour)	36
ICRA Worker - Train-the-Trainer (32-hour)	18
Distance Learning Courses	**324**
ICRA/COVID-19 Awareness (6-hour)	151
COVID-19 Awareness (1-hour)	173

Descriptive Analysis. Descriptive statistics were conducted on the CPWR Training Course Evaluation for item of the CPWR and category of effectiveness according to format of training attended (face-to-face, distance). Table 2 presents the means, standard deviations, and number of survey respondents. Item statistics for CPWR Trainee Course Evaluations are presented in Appendix B.

Reactions: Effectiveness of Training

In general, trainees report *high levels of effectiveness* with respondents providing the *highest ratings to Instructor Effectiveness* in both face-to-face and distance formats. However, results also demonstrate that respondents in the *face-to-face format report higher levels of training effectiveness, on average, than those attending the training in distance learning format.* Importantly, those attending the *distance learning courses report, on average, the lowest ratings for training method effectiveness*.

Learning: Safety-related Knowledge and Skills

With respect to learning outcomes, respondents attending *both the face-to-face and distance learning indicate high levels of attainment of the safety-related knowledge and skills associated with the trainings.* However, results generally show that trainees in *the face-to-face format reported slightly higher levels of knowledge and skill, on average, than those who attended the distance learning courses*. Two exceptions occurred. The trainees reported equally high levels of attainment of knowledge and skills associated with the use of appropriate personal protective equipment regardless of training format. The trainees attending the distance learning courses reported slightly greater knowledge and skill in recognizing the signs and symptoms that may be related to hazardous environments and exposures than those in the face-to-face trainings.

To further explore the similarities and differences between trainees' ratings of effectiveness and learning for trainees attending courses presented face-to-face versus distance learning format, comparative analyses were conducted and will be discussed in the following section.

Table 2. Descriptive Statistics for Face-to-Face and Distance Learning Effectiveness Ratings.

	Face-to-Face			*Distance*		
Evaluation Items	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Instructor Effectiveness	**516**	**4.79**	**0.36**	**324**	**4.66**	**0.52**
1. Described the course and lesson objectives clearly.	515	4.80	0.45	324	4.77	0.57
2. Explained how the course content applies to my job or trade.	513	4.60	0.79	324	4.50	0.84
3. Presented the material clearly, so that I could understand it.	516	4.82	0.43	324	4.78	0.55
4. Kept the class focused on the learning objectives.	515	4.78	0.51	324	4.70	0.64
5. Encouraged class participation.	125	4.80	0.49	324	4.63	0.75
6. Reviewed key points.	515	4.87	0.38	324	4.77	0.59
7. Gave helpful feedback to the class on the exercises and activities.	516	4.84	0.42	324	4.68	0.70
8. Made good use of the student materials / manuals.	514	4.81	0.47	324	4.49	0.92
Training Method Effectiveness	**491**	**4.68**	**0.43**	**324**	**4.41**	**0.69**
9. Lectures (Instructor only talked and responded to questions)	483	4.58	0.63	316	4.47	0.83
10. Classroom discussions / small group activities	488	4.72	0.51	299	4.49	0.82
11. Demonstrations	483	4.78	0.50	203	4.32	0.96
12. Classroom-based activities / exercises	479	4.70	0.60	227	4.19	1.05
13. Hands-on activities / exercises / simulations	481	4.75	0.55	NA	NA	NA
14. Course manual/handouts	487	4.62	0.64	175	4.20	0.98
15. PowerPoints	369	4.67	0.58	321	4.59	0.73
16. Video / YouTube / DVD	301	4.61	0.65	208	4.21	0.97
Safety-related Knowledge and Skills	**516**	**4.66**	**0.51**	**324**	**4.60**	**0.63**
17. Understand the hazards/dangers of working with/around the topic(s) taught in this class.	516	4.73	0.58	324	4.61	0.75
18. Recognize health hazards on the job.	516	4.78	0.51	323	4.61	0.74
19. Recognize unsafe work conditions and practices.	515	4.72	0.59	323	4.62	0.72
20. Recognize the signs and symptoms that may be related to hazardous environments and exposures.	512	4.53	0.85	323	4.59	0.78
21. Understand when a job hazard needs me to take immediate action.	514	4.68	0.64	322	4.58	0.77
22. Use appropriate personal protective equipment.	514	4.74	0.59	317	4.74	0.62
23. Understand my legal rights.	509	4.37	0.97	302	4.32	1.08
24. Understand the importance of jobsite safety plans and emergency response planning.	510	4.74	0.61	321	4.71	0.65
Overall Effectiveness						
25. How well did this class meet the objective of helping you to develop the knowledge, skills, and confidence you need to work safely?	**477**	**4.74**	**0.48**	**321**	**4.62**	**0.60**

Note. Instructor effectiveness items rated on a scale ranging from 1 (Rarely) to 5 (Always). Training/learning method effectiveness items rated on a scale ranging from 1 (Didn't help at all) to 5 (Really helped). Overall Effectiveness and Training-related Knowledge/Skills items rated on a scale ranging from 1 (Very little) to 5 (A lot).

Comparative analyses. Comparative analyses were conducted to further explore the similarities and differences between trainees' ratings of effectiveness and learning for trainees attending courses presented face-to-face versus distance learning format. The first set of comparisons focused on effects of training format more generally (i.e., all courses) whereas the second set of comparisons were more narrowly focused on a single course. In this way, a broader comparison was conducted to assess the effects of the training format overall, while a more refined comparison (course with more similar content and training length) allows for a more refined comparison of the effects of the training format on a specific occupational health and safety course.

For both sets of comparisons, One-way Analysis of Variance (ANOVA) were conducted on the mean ratings of: (1) Instructor Effectiveness, (2) Learning/Teaching Method Effectiveness, (3) Overall

Effectiveness, and (4) Safety-related Knowledge and Skills for all trainees receiving training in the face-to-face compared to the distance learning formats. Each will be discussed separately below.

General Comparisons of Face-to-face versus Distance Learning Courses

The first set of analyses included combined evaluations from *all ICRA courses* presented face-to-face (ICRA Awareness, ICRA Train-the-Trainer) with those presented in distance format (ICRA/COVID-19 Awareness, COVID-19 Awareness) on training outcomes.

Instructor Effectiveness

A one-way ANOVA was performed on the ratings of Instructor Effectiveness for both training formats. As depicted in Table 3, results reveal, on average, respondents in the *face-to-face trainings report significantly higher ratings of instructor effectiveness* than those in the distance learning format [$F(1, 838) = 16.37$, $p < .001$, $\eta^2 = .02$].

Table 3. Analysis of Variance of Instructor Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
Face-to-face	516	4.79	0.36	<.001**
Distance learning	324	4.66	0.52	

Note. Instructor effectiveness items rated on a scale ranging from 1 (Rarely) to 5 (Always).

Training/Learning Methods Effectiveness

A one-way ANOVA was run to explore differences in ratings of effectiveness of the Training Methods by class format. Table 4 shows that, on average, ratings of training methods effectiveness for those in the *face-to-face trainings were statistically significantly higher* than those offered in a distance learning format [$F(1, 813) = 47.80$, $p < .001$, $\eta^2 = .01$].

Table 4. Analysis of Variance of Training Methods Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
Face-to-face	491	4.68	0.43	<.001**
Distance learning	324	4.41	0.69	

Note. Training methods effectiveness items rated on a scale ranging from 1 (Didn't help at all) to 5 (Really helped).

Overall Effectiveness

A one-way ANOVA was run to explore differences in ratings of Overall effectiveness of both formats in helping the trainees to develop the knowledge, skills, and confidence to work safely. Table 5 shows that, on average, ratings of Overall effectiveness for those in the *face-to-face trainings were statistically significantly higher* than those offered in a distance learning format [$F(1, 796) = 9.73$, $p = .002$, $\eta^2 = .01$.].

Table 5. Analysis of Variance of Overall Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
Face-to-face	477	4.74	0.48	.002*
Distance Learning	321	4.62	0.60	

Note. Overall effectiveness items rated on a scale ranging from 1 (Very little) to 5 (A lot).

Safety-related Knowledge and Skills

A one-way ANOVA was performed to explore if differences existed between trainees' safety-related knowledge and skill gains varied as a result of the format in which they received the training. Table 6 shows that, on average, there were *not statistically significant differences in learning* between those attending face-to-face courses and those attending training using the distance learning format [$F(1, 838) = 2.49$ $p = .115$, $\eta^2 = .00$].

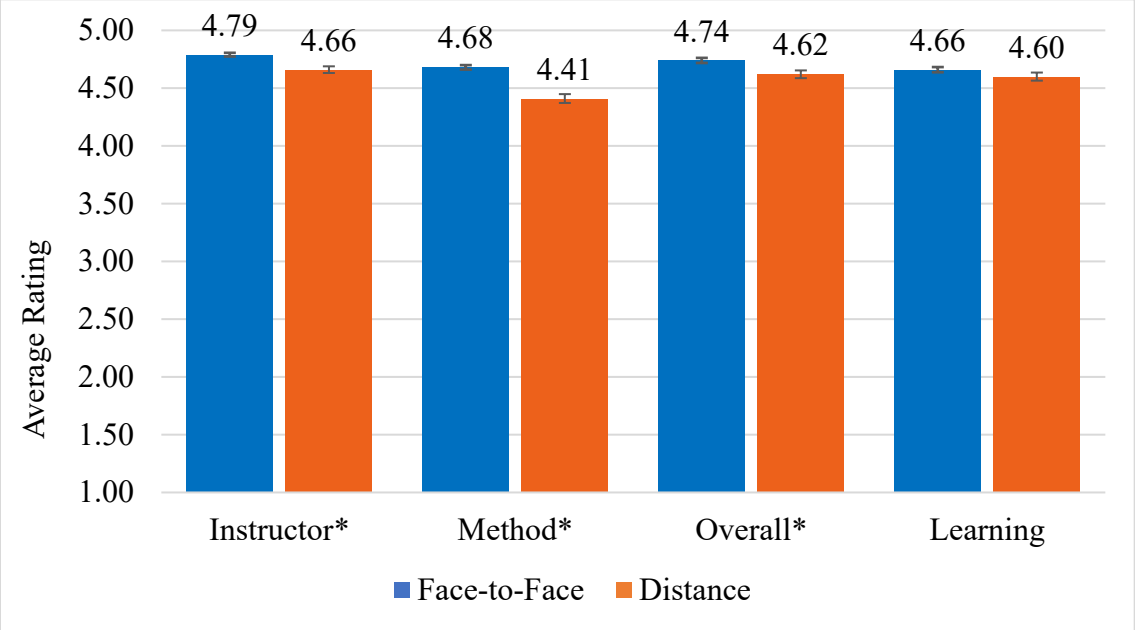
Table 6. Analysis of Variance of Safety-related Knowledge and Skill Gain by Training Format

Course Format	N	Mean	SD	p-value
Face-to-face	516	4.66	0.51	.115
Distance Learning	324	4.60	0.63	

Note. Safety-related knowledge and skill items rated on a scale ranging from 1 (Very little) to 5 (A lot).

Figure 2 provides a graphical depiction of these results. It should be noted that while the results show that the effectiveness ratings are significantly higher for those in the traditional face-to-face format, *the effectiveness ratings are, on average, very positive in both formats.*

Figure 2. Mean Effectiveness Ratings Across Categories by Training Format for All Courses



*Note. Effectiveness ratings significant at $p<.01$. Items ratings range from 1 (Least Effective) to 5 (Most Effective). Error bars represent the standard error of the mean.

Comparisons of Face-to-face versus Distance Learning: ICRA Awareness Course

Because the combined comparisons above did not account for differences among specific training content and length, a second related set of comparisons were conducted. These comparisons targeted the ICRA Awareness course, which was presented in face-to-face (8-hour pre-pandemic) and distance format (6-hour during pandemic). To maximize the similarity in comparisons and control for history effects, only the most recent face-to-face respondents were included (from June 2018 to February 2020). These inclusion criteria also generated a relatively equal number of respondents across both formats.

Instructor Effectiveness

A one-way ANOVA was performed on the ratings of Instructor Effectiveness for trainees attending the ICRA Awareness in either face-to-face or distance formats. As depicted in Table 7, results reveal, on average, respondents in the *face-to-face trainings report statistically significantly higher ratings of instructor effectiveness* than those in the distance learning format [$F(1, 300) = 4.45$, $p = .036$, $\eta^2 = .02$].

Table 7. Analysis of Variance of Instructor Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
ICRA Face-to-face	151	4.80	0.37	.036*
ICRA Distance Learning	151	4.71	0.40	

Note. Instructor effectiveness items rated on a scale ranging from 1 (Rarely) to 5 (Always).

Training/Learning Methods Effectiveness

A one-way ANOVA was employed to explore differences in ratings of effectiveness of the Training Methods by class format for the ICRA Awareness courses. Table 8 shows that, on average, ratings of training methods effectiveness for those in the *face-to-face trainings were statistically significantly higher* than those attending in a distance learning format [$F(1, 292) = 12.48$, $p < .001$, $\eta^2 = .04$].

Table 8. Analysis of Variance of Training Methods Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
ICRA Face-to-face	143	4.65	0.46	<.001**
ICRA Distance learning	151	4.43	0.59	

Note. Training methods effectiveness items rated on a scale ranging from 1 (Didn't help at all) to 5 (Really helped).

Overall Effectiveness

A one-way ANOVA was run to explore differences in ratings of Overall effectiveness of training format in helping the trainees to develop the knowledge, skills, and confidence to work safely. Table 9 shows that, on average, ratings of Overall Effectiveness for those in the *face-to-face trainings were statistically significantly higher* than those offered in a distance learning format [$F(1, 287) = 4.37$, $p = .037$, $\eta^2 = .02$].

Table 9. Analysis of Variance of Overall Effectiveness by Training Format

Course Format	N	Mean	SD	p-value
ICRA Face-to-face	138	4.76	0.46	.037*
ICRA Distance Learning	151	4.64	0.55	

Note. Overall effectiveness items rated on a scale ranging from 1 (1 (Very little) to 5 (A lot).

Safety-related Knowledge and Skills

A one-way ANOVA was performed to explore if differences existed between trainees' safety-related knowledge and skill gains varied as a result of the format in which they received the training. Table 10

shows that, on average, there were *not significant differences in learning* between those attending face-to-face courses and those attending training using the distance learning format [$F(1, 300) = 3.36$, $p = .068$, $\eta^2 = .01$].

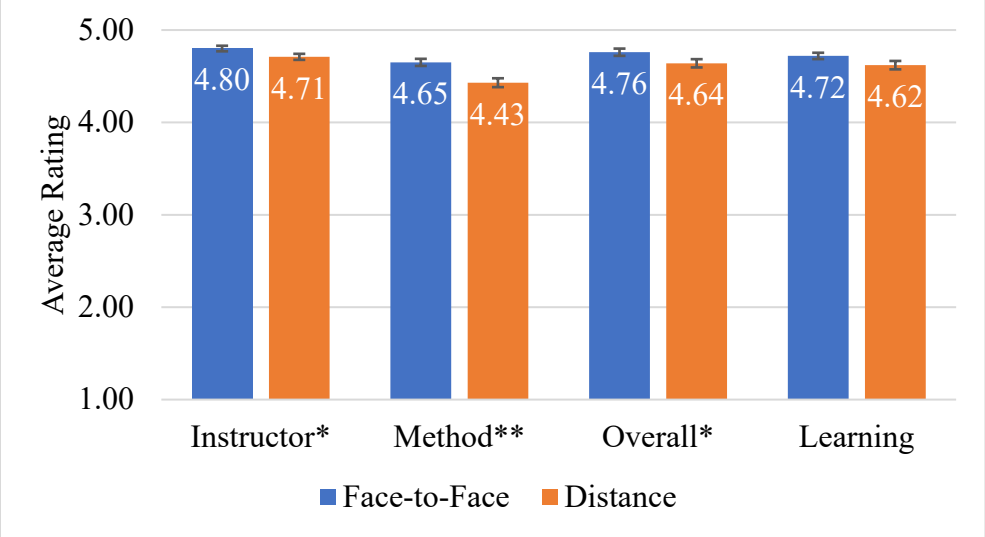
Table 10. Analysis of Variance of Safety-related Knowledge and Skill Gain by Training Format

Course Format	N	Mean	SD	p-value
ICRA Face-to-face	151	4.72	0.42	.068
ICRA Distance Learning	151	4.62	0.56	

Note. Safety-related knowledge and skill items rated on a scale ranging from 1 (1 (Very little) to 5 (A lot).

Figure 3 below provides a graphical depiction of these results. It should be noted that, similar to the previous comparisons of the combined courses, the mean effectiveness ratings are significantly higher for those in the traditional face-to-face format. However, both formats were rated quite positively. Further, consistent with previous findings, there were not significant differences in learning gains, suggesting that the trainees' safety-related knowledge and skills are enhanced regardless of format.

Figure 3. Mean Effectiveness Ratings Across Categories by Training Format for ICRA Awareness Courses



Note. Effectiveness ratings significant at *$p<.05$; **$p<.001$. Items ratings range from 1 (Least Effective) to 5 (Most Effective). Error bars represent the standard error of the mean.

Additional Analyses of ICRA Trainings Using Distance Learning Format

The transition to distance/online learning was rapid and unexpected. The trainings delivered during the COVID-19 pandemic were designed and presented in real time to meet the immediate and on-going health and safety needs of the workers. As a result, the instructors raised additional areas of inquiry specific to the distance learning format: (1) length of training; and (2) date attended training.

Length of Training. Within the occupational health and safety domain, highly engaging, hands-on face-to-face training is considered the gold standard. The use of distance learning in delivering worker health and safety training is emergent and regarded as less engaging. It was asserted that the length of distance

learning courses would be inversely related to positive training outcomes (i.e., longer courses would result in lower ratings). Comparative analyses of the COVID-19 Awareness (1-hour) and ICRA/COVID-19 Awareness (6-hour) were conducted. It should be noted that the ICRA/COVID-19 Awareness course was designed to be delivered in two 3-hour sessions. One-way ANOVAs were performed on training outcomes (see Appendix C). Results of the analyses revealed *no significant differences among training outcomes according to length of training attended.* Interestingly, although not significantly different, ratings of effectiveness and learning were slightly higher for the longer course than those for the shorter 1-hour course.

Date Attended Training. A second area of inquiry was the date that the participant attended the training event. More specifically, on April 27, 2020, the *NABTU and CPWR COVID-19 Standards for U.S. Construction Sites* were established. It was asserted that establishment of these Standards may have a significantly positive affect on learning outcomes of those attending the COVID-19 training. Comparative analyses of the learning outcomes of those attending the COVID-19 courses before and after April 27 were conducted (see Appendix C). The results demonstrated *no significant differences among reported safety-related knowledge and skills* between those who attended the training either before or after the establishment of the NABTU COVID-19 Standards.

Study 2: Online Training Developed During the Pandemic

A complementary study was conducted to assess effectiveness of the newly developed COVID-19 Awareness courses (COVID-19; ICRA/COVID-19) delivered in a synchronous online format to address emerging safety needs. This evaluation was conducted 3 to 6 months after the initial training sessions and provides information that complements the Study 1 findings. The focus of Study 2 involved retention and transfer of the knowledge and skills gained during training to improved safety performance on the job. Simply put, Study 2 examined the **effectiveness of the synchronous online format in addressing worker safety training needs in real-time during the pandemic.**

Targeted Course. All CPWR distance learning developed and delivered during the COVID-19 pandemic was targeted for the study. The training included the ICRA/COVID-19 Awareness courses and the COVID-19 Awareness courses detailed in Study 1.

Evaluation Method. Two questionnaires were developed and administered online to assess effectiveness and impact of the trainings delivered in distance learning format. Separate questionnaires were designed to capture specific feedback from CPWR instructors presenting the training as well as the participants receiving the training.

The *CPWR Distance Learning Evaluation: CPWR Instructor version* contained 23 items and requires instructors to rate items concerning: (1) Instructor's effectiveness (e.g., "The instructors were well-prepared."); (2) Content effectiveness (e.g., "The content was accurate and up-to-date."); (3) Format effectiveness (e.g., "The group discussions were helpful in trainees exchanging ideas with others."); (4) Transfer of Learning (e.g., "The training prepared the trainee to work safely on the job."). Items are rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The questionnaire also required instructors to rate general effectiveness concerning: (1) Instructor(s); (2) Content; (3) Format; (4) Overall on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). The questionnaire also contained two items that gather information specific to the training instructed (specific training(s) they instructed; month they instructed the training); and two items that required instructors to rate their level of technical competence (comfort in instructing additional distance learning courses; skilled in using the distance learning format). The questionnaires also included three open-ended items encouraging instructors to elaborate on: (1) strengths and weaknesses of the distance learning format; (2) significant challenges to the use of the distance learning format and suggestions for improvements; and (3) best practices/lesson learned including any additional comments for using distance learning in other health and safety training in the future.

The *CPWR Distance Learning Evaluation: Trainees' version* contained 45 items and used electronic branching to tailor items according to survey respondent (e.g., workers, trainers, union representatives). The survey required all respondents to rate items concerning: (1) Instructor's effectiveness (e.g., "The instructors were well-prepared."); (2) Content effectiveness (e.g., "The content was accurate and up-to-date."); (3) Format effectiveness (e.g., "The group discussions were helpful in trainees exchanging ideas with others."); (4) Transfer of Learning (e.g., "The training prepared the trainee to work safely on the job."); and (5) Organizational/Supervisory Support of Training. Items are rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The questionnaire also required respondents to rate general effectiveness concerning: (1) Instructor(s); (2) Content; (3) Format; (4) Overall on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). The safety-related knowledge and skill items (from the CPWR Course Evaluation Form) are included on the questionnaire to assess retention of knowledge (e.g., "The course helped me to improve my ability to Recognize health hazards on the job."). Respondents rated the extent to which the course has improved their current knowledge and skills on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The questionnaires also included three open-ended items encouraging respondents to elaborate on: (1) most valuable aspects of training; (2) least valuable aspects of training; (3) if training met their training-related needs and suggestions for improvement. The questionnaire also included two items that gather information specific to the training (specific training(s) attended; month(s) attended); and two items that regarding their level of technical competence (comfort in taking additional distance learning courses; skill with the distance learning format). Demographic information was gathered regarding: (1) union membership (member, trainer, union representative); (2) union affiliation; (3) professional tenure (pre-apprentice, apprentice, journeyworker); (4) gender; and (5) race/ethnicity.

The trainers' version of the questionnaire contained 4 additional items. Specifically, trainers were required to rate extent to which they felt prepared to train their workers on a scale ranging from 1 (not at all prepared) to 5 (very prepared). The questionnaire also contains three open-ended items encouraging trainers to elaborate on: (1) strengths and weaknesses of the distance learning format; (2) significant challenges to the use of the distance learning format and suggestions for improvements; and (3) best practices/lesson learned including any additional comments for using distance learning in other health and safety training in the future.

The union representatives' version of the questionnaire contained 2 additional open-ended questions. The first item asked about the extent to which the training met the needs of their members and trainers, including the strengths and weaknesses of the use of distance learning. The final question asked them to provide any additional comments about the use of distance learning for other occupational health and safety courses.

The evaluation was administered to all participants who received the synchronous online training (workers, trainers, union representatives) as well as the CPWR instructors who delivered the training. CPWR's Training Program Directors actively participated in the survey administration including identifying all training participants and instructors, disseminating the email containing study description and survey link, and encouraging participants to complete the evaluation. The emails were sent approximately 3 to 6 months following the inception of the distance learning courses (September 11, 2020). A follow-up email was sent to thank survey respondents and encourage additional participation on October 1, 2020. The CPWR Instructors received the email containing study description, survey link, and encouragement for completing the evaluation on September 30, 2020.

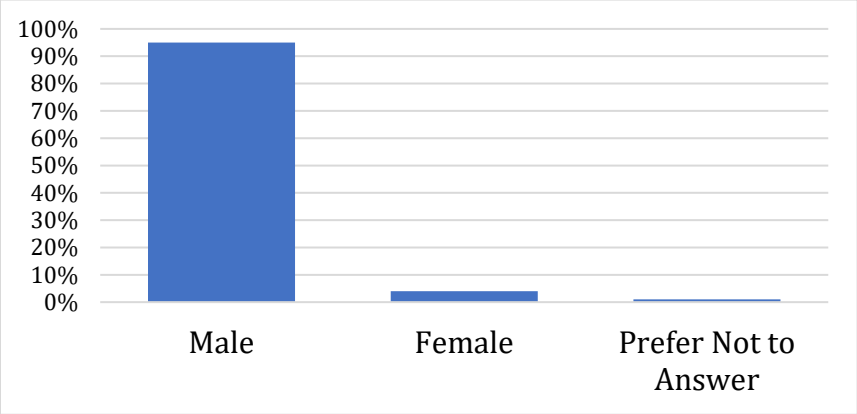
I. Survey Respondents

There were a total of 100 respondents to the evaluation. Specifically, respondents included 91 individuals attended the training (trainees) and 9 CPWR Instructors.

Trainee and CPWR Instructor Demographics

Gender of Trainees. Among those responding, the majority of trainees completing the evaluation were male (see Figure 4). More specifically, 95% of those responding are male, 4% female, and 1% preferred not to answer.

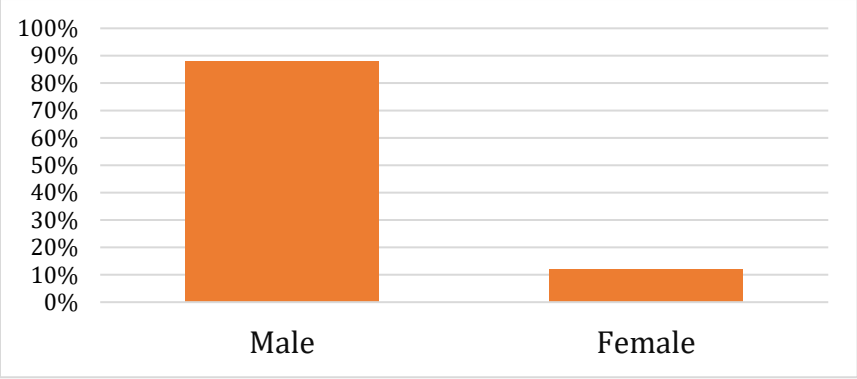
Figure 4. Gender of Trainees.



Note. N=73.

Gender of CPWR Instructors. Similar to the trainees, the majority of CPWR Instructors who responded are male. As shown in Figure 5, 88% of those responding are male, while 12% are female.

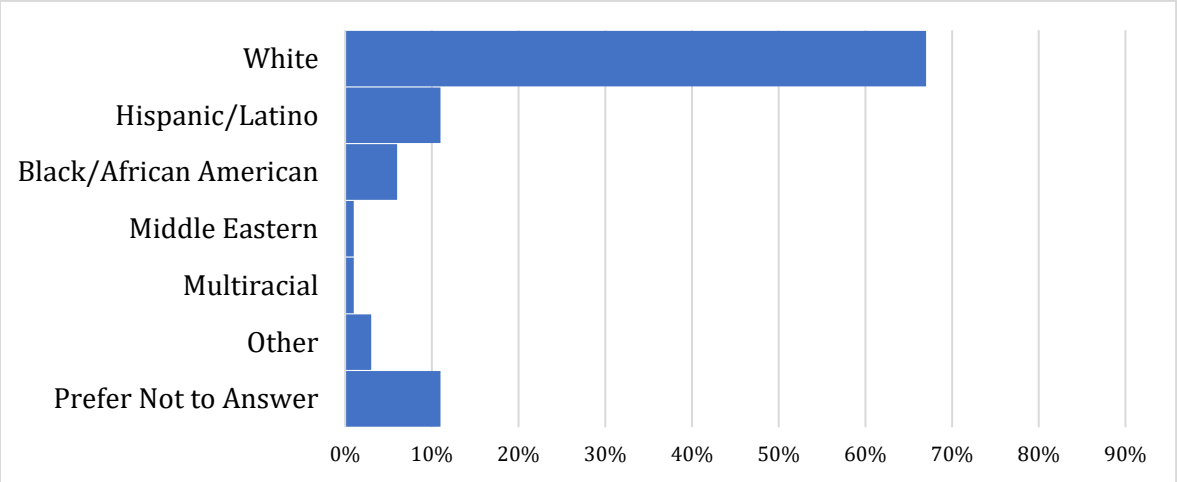
Figure 5. Gender of CPWR Instructors.



Note. N=9.

Race/Ethnicity of Trainees. The results indicated, that while the majority of respondents were White, there was otherwise a small but varied representation with respect to race/ethnicity of trainees (see Figure 6). More specifically, among survey respondents, the following ethnicities were reported: White 67%; Hispanic or Latino 11%; Black or African American 6%; Middle Eastern or North African 1%; Multiracial or Multiethnic 1%; Other race/ethnicity 3%; and 11% preferred not to answer.

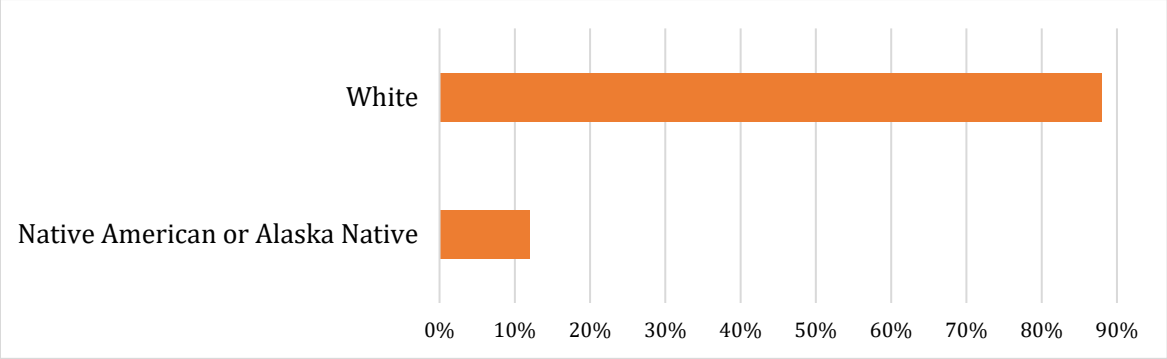
Figure 6. Race/Ethnicity of Trainees.



Note. N=73.

Race/Ethnicity of CPWR Instructors. As depicted in Figure 7, that the vast majority of respondents were White (88%) with one instructor identifying as Native American or Alaska Native (12%).

Figure 7. Race/Ethnicity of Trainees.



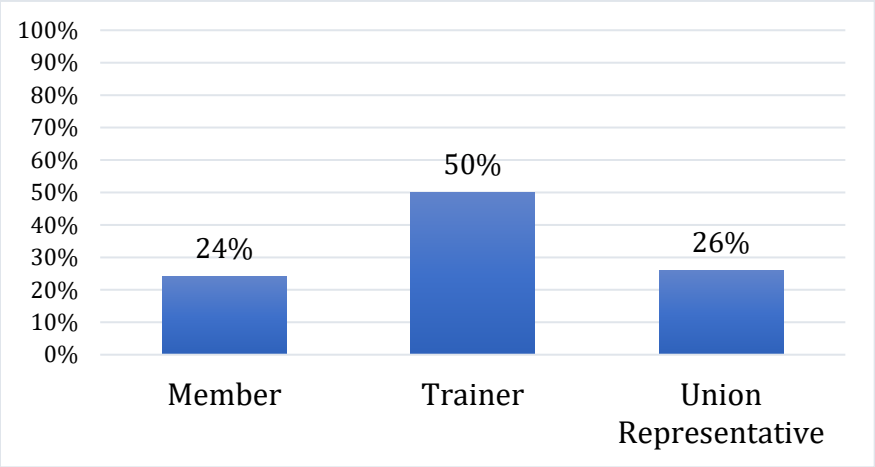
Note. N=9.

Trainee Work and Professional Experience

Information regarding the work and professional experience of trainees were gathered. Specifically, respondents were asked to indicate their occupation, membership level, and trade membership.

Occupation of Trainees. The respondents indicated that half of those receiving training are trainers, with the remaining trainees reporting, in fairly equal proportion, that they serve as either union representatives or union members (see Figure 8) in their organizations.

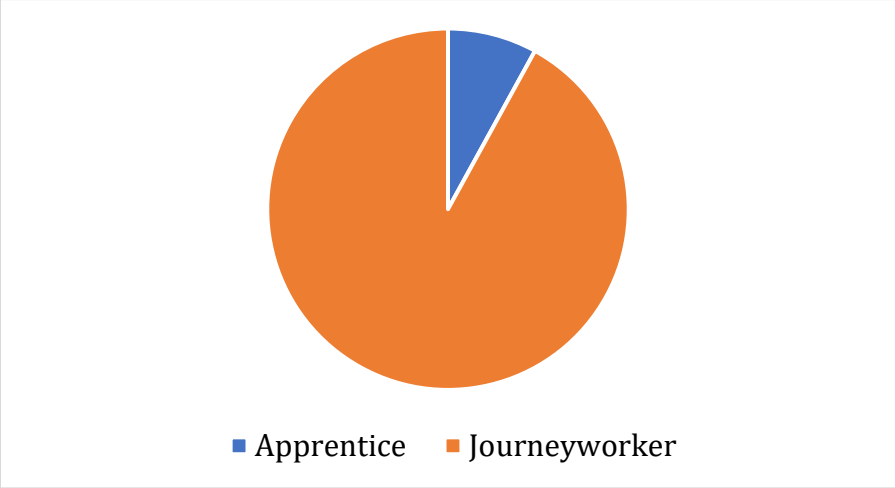
Figure 8. Occupation of Trainees Participating in the Evaluation.



Note. N=75.

Union Membership of Trainees. As Figure 9 depicts, the vast majority of trainees responding to the evaluation are journeyworkers (92%). A small percentage of respondents were apprentices (8%).

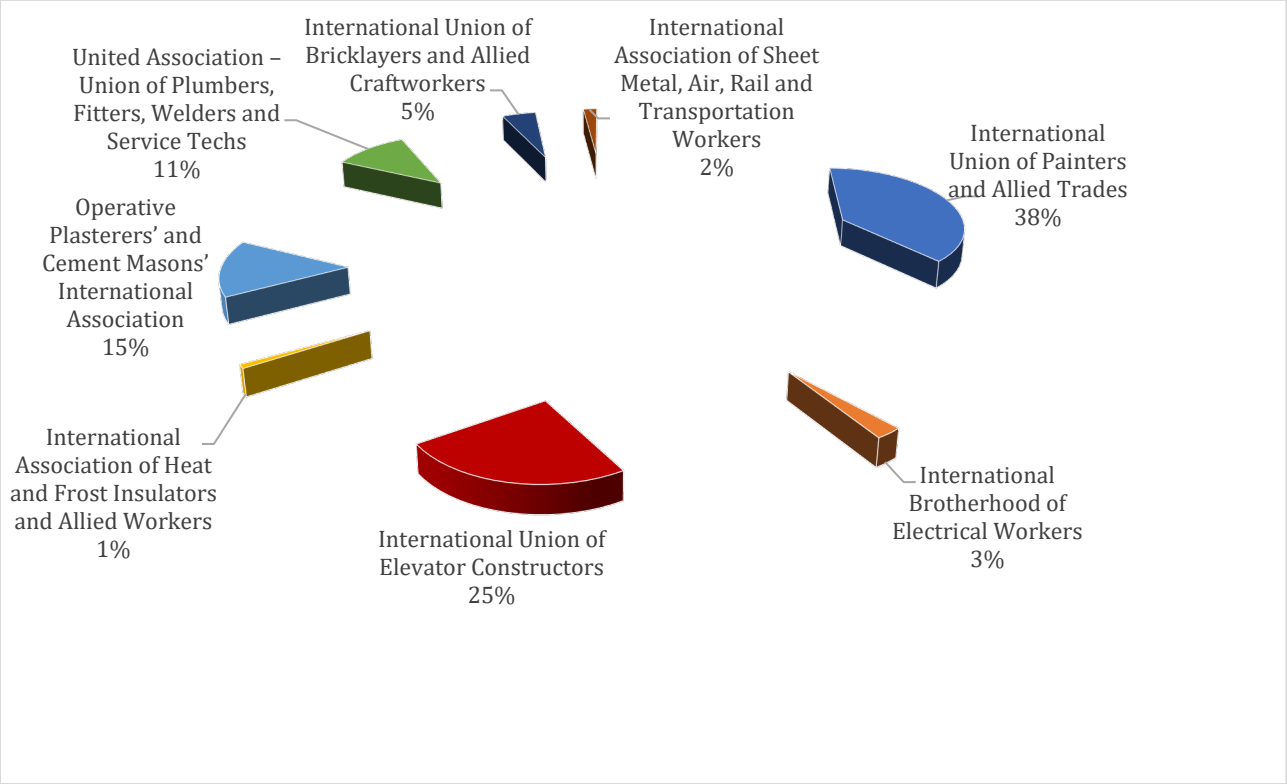
Figure 9. Union Membership of Trainees.



Note. N=75.

Union Affiliation of Trainees. The survey respondents represented eight NABTU affiliates (see Figure 10). The largest majority of trainees were members of the International Union of Painters and Allied Trades (38%), followed by International Union of Elevator Constructors (25%), and to a lesser extent Operative Plasterers' and Cement Masons' International Association (15%) and United Association – Union of Plumbers, Fitters, Welders and Service Techs (11%). A small percentage of trainees responding were International Union of Bricklayers and Allied Craftworkers (5%), International Brotherhood of Electrical Workers (3%), International Association of Sheet Metal, Air, Rail and Transportation Workers (2%) and International Association of Heat and Frost Insulators and Allied Workers (1%).

Figure 10. Trade Membership of Trainees.



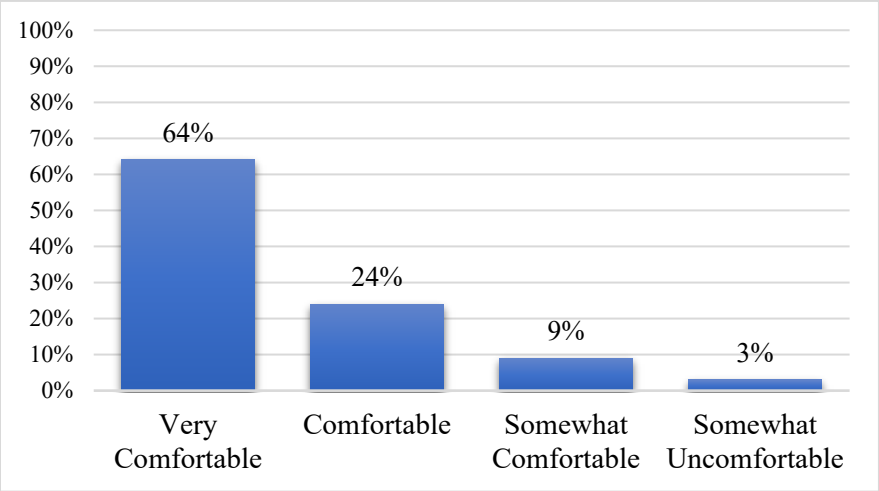
Note. N=73.

CPWR Instructor and Trainee Technological Competence

Both CPWR instructors and trainees reported their level of technological competence. Technological competence included two related characteristics of CPWR Instructors and trainees: (1) Comfort; and (2) Skill.

Trainees' Comfort with the Technology. Trainees reported their comfort in attending online training. As shown in Figure 11, the vast majority (88%) of respondents indicated that they were Very Comfortable or Comfortable in taking additional courses online. However, a small contingent did state that they were only Somewhat Comfortable or even Somewhat Uncomfortable taking distance learning courses.

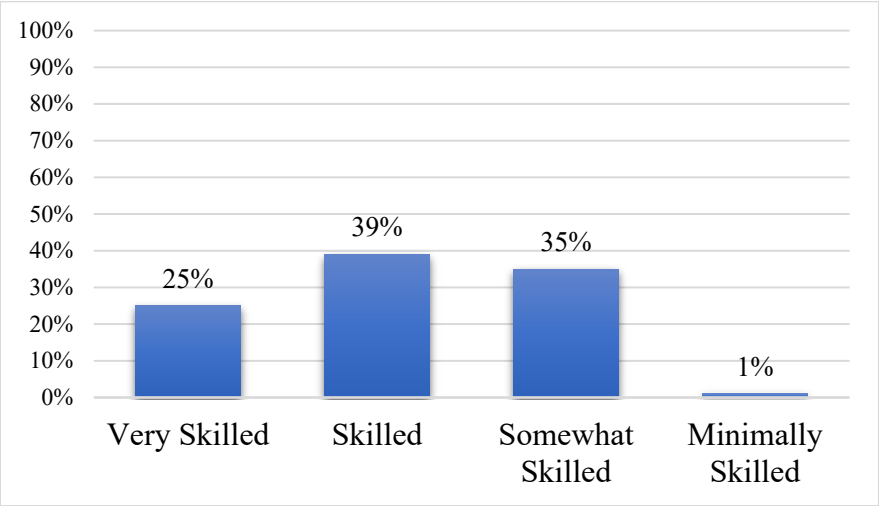
Figure 11. Trainees' Comfort in Taking Distance Learning Courses.



Note. N=75.

Trainees' Skill in Using the Technology. However, trainees reported somewhat less confidence in their skill in using the distance learning format to attend the online courses. As shown in Figure 12, the majority of respondents (74%) stated that they were Skilled or Somewhat Skilled with the online format. A smaller percentage indicated that they were Very Skilled with one respondent indicated minimal skill in using the technology.

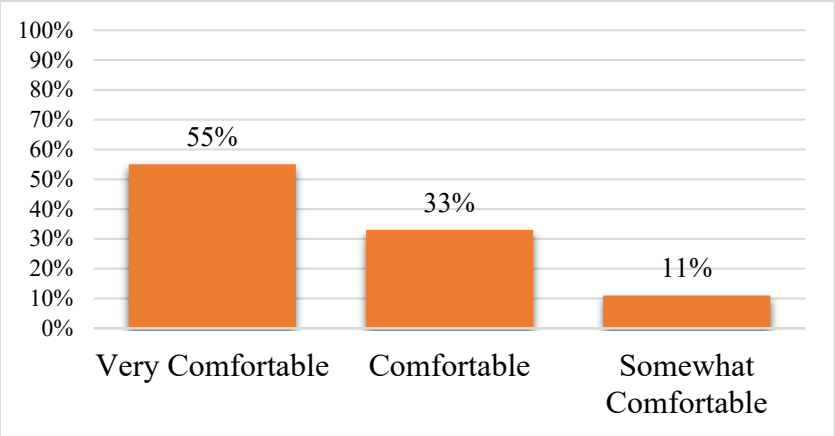
Figure 12. Trainees' Skill in Using the Distance Learning Technology.



Note. N=75.

CPWR Instructors' Comfort with the Technology. CPWR Instructors reported their comfort with distance learning to deliver additional online trainings (see Figure 13). The vast majority of instructors (88%) reported that they were Very Comfortable or Comfortable with using the distance learning format with a small percentage indicated that they were only Somewhat Comfortable with the technology.

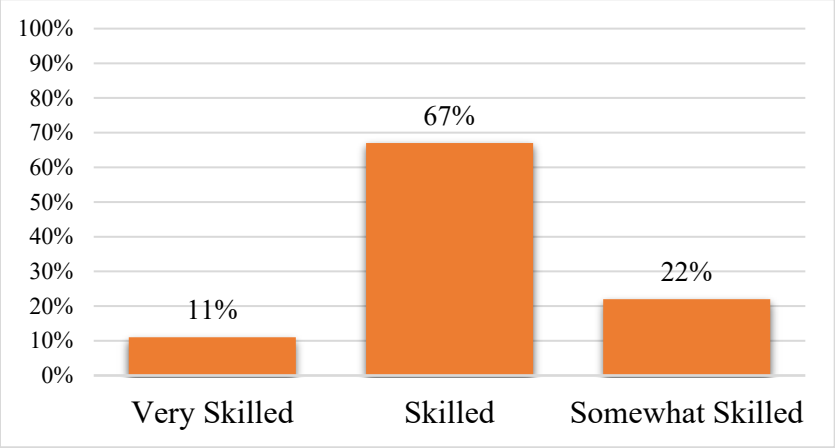
Figure 13. Instructors' Comfort with the Distance Learning Format.



Note. N=9.

Instructors' Skill in Using the Technology. Relative to reported comfort, CPWR instructors reported less confidence in their skill in using the distance learning technology. As depicted in Figure 14, the majority of instructors stated that they were Skilled in using the distance learning technology. A smaller percentage indicated that they were Somewhat Skilled with the smallest percentage reporting that they were Very Skilled in using the technology.

Figure 14. Instructors' Skill in Using the Distance Learning Technology.

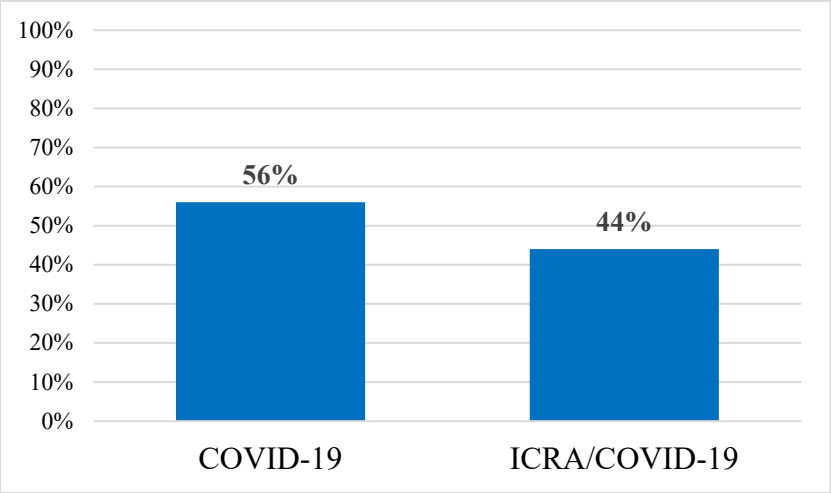


Note. N=9.

Online Training Courses

Training Attended by Trainees. Of those reporting, slightly more than half (56%) of the trainees attended the COVID-19 Awareness (1-hour) training. As Figure 15 shows, 44% of the trainees attended the ICRA/COVID-19 Awareness (6-hour) training.

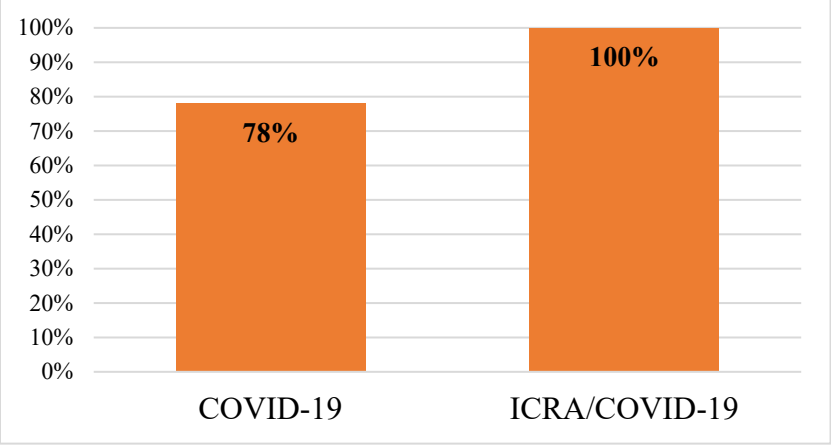
Figure 15. Online Trainings Attended by trainees.



Note. N=75.

Trainings Presented by CPWR Instructors. The majority of CPWR Instructors reported experience presenting both distance learning courses. Of those responding, all instructors had presented the ICRA/COVID-19 Awareness (6-hour) training , whereas all but one instructor had also presented the COVID-19 Awareness (1-hour) training (see Figure 16).

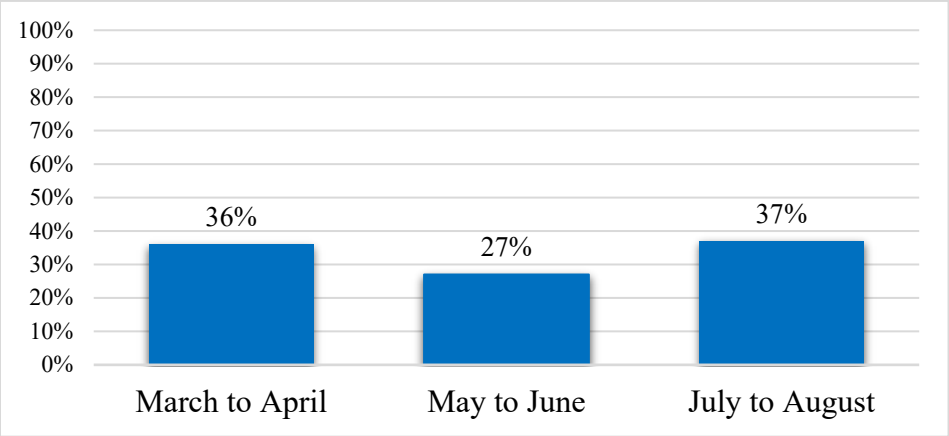
Figure 16. Online Trainings Presented by CPWR Instructors.



Note. N=9.

Date Trainee Attended Training. The dates trainees reported attending the distance learning training were fairly evenly distributed. As shown in Figure 17, the largest percentage of respondents attended training during July to August (37%) and March to April (36%), whereas 27% attended in the May to June timeframe.

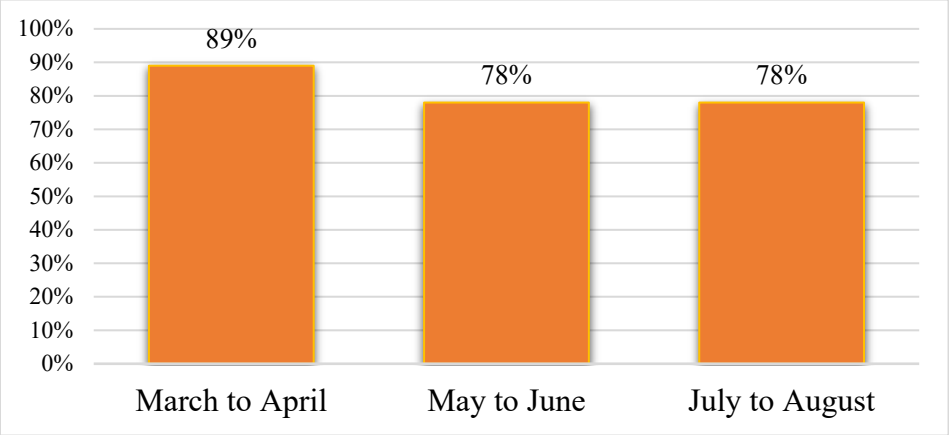
Figure 17. Months Trainees Attended Online Training.



Note. N=75.

Date CPWR Instructor Presented Training. CPWR Instructors reported presenting the online trainings fairly consistently over the 6 month timeframe (see Figure 18). Eight of the nine CPWR Instructors reported presenting the trainings during the beginning of the pandemic (89%) with a large majority also presenting during May to June (78%) and July to August (78%).

Figure 18. Months CPWR Instructors Presented Online Training.



Note. N=9.

Training Effectiveness Ratings

Descriptive Analysis. Descriptive statistics were conducted on the *CPWR Distance Learning Evaluation* for each item and category of effectiveness according to survey respondent of training attended (trainees, CPWR Instructors). Table 11 presents the means, standard deviations, and number of survey respondents. Item statistics for CPWR Trainee Course Evaluations are presented in Appendix D.

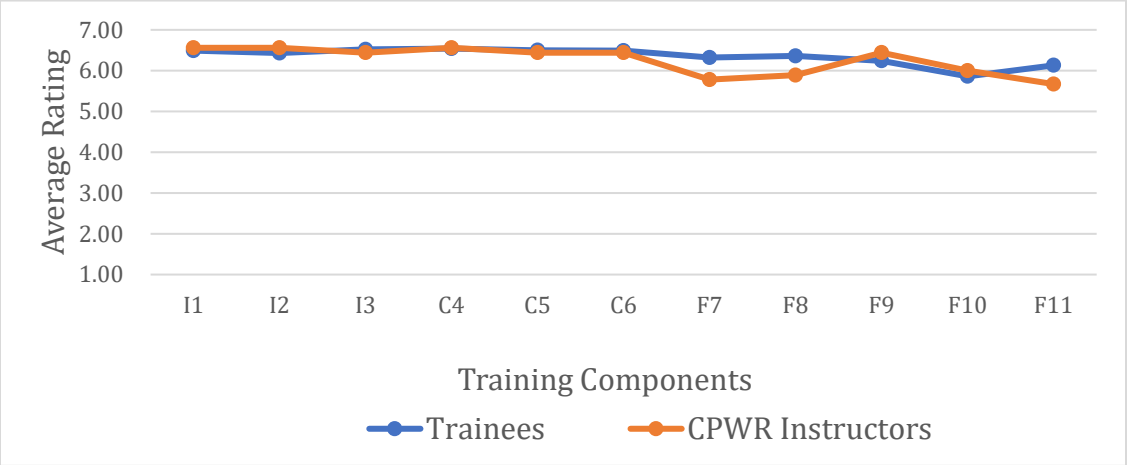
Table 11. Descriptive Statistics of Training Effectiveness Ratings for Training Participants and CPWR Instructors.

	Trainees			CPWR Instructors		
Evaluation Items	*N*	*Mean*	*SD*	*N*	*Mean*	*SD*
Instructor Effectiveness	**91**	**6.48**	**0.85**	**9**	**6.52**	**0.44**
1. The training was properly coordinated and arranged.	91	6.49	0.83	9	6.56	0.50
2. The module(s) were well-organized.	91	6.43	0.95	9	6.56	0.50
3. The instructor(s) were well-prepared.	91	6.52	0.99	9	6.44	0.50
Training Content Effectiveness	**89**	**6.51**	**0.91**	**9**	**6.48**	**0.50**
4. The training adequately covered the learning objectives.	91	6.54	0.84	9	6.56	0.68
5. The content was accurate and up-to-date.	90	6.50	0.99	9	6.44	0.50
6. The training was presented according to the needs of the trainees (e.g., language, cultural, educational level).	89	6.49	1.01	9	6.44	0.50
Training Format Effectiveness	**90**	**6.18**	**0.90**	**9**	**5.96**	**0.72**
7. The time allotted for each module was sufficient for my learning.	91	6.32	0.96	9	5.78	0.92
8. The activities and exercises were relevant and reinforced the learning objectives.	91	6.36	0.94	9	5.89	0.99
9. The group discussions were helpful in exchanging ideas with others.	90	6.24	1.05	9	6.44	0.68
10. I contributed comments or questions during the training.	91	5.86	1.34	9	6.00	0.67
11. The training format enhanced my learning.	91	6.13	1.16	9	5.67	1.15
General Effectiveness Items						
12. Content Effectiveness	91	6.49	0.70	9	5.78	1.75
13. Instructor(s) Effectiveness	91	6.65	0.72	9	5.89	1.79
14. Format Effectiveness	91	6.33	0.81	9	5.67	1.76
15. Overall Effectiveness	91	6.43	0.94	9	5.67	1.70

Note. Instructor, Training Content, and Training Format Effectiveness items rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). General Effectiveness Items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective).

In general, trainees and CPWR Instructors report *high ratings of effectiveness across items with the highest ratings provided to items associated with Instructor Effectiveness (see Figure 19)*. Importantly, both trainees and CPWR Instructors report*, on average, the lowest ratings for training method effectiveness*. However, results also demonstrate that *trainees attending the distance learning sessions report higher levels of training effectiveness, on average, than CPWR Instructors presenting the sessions.*

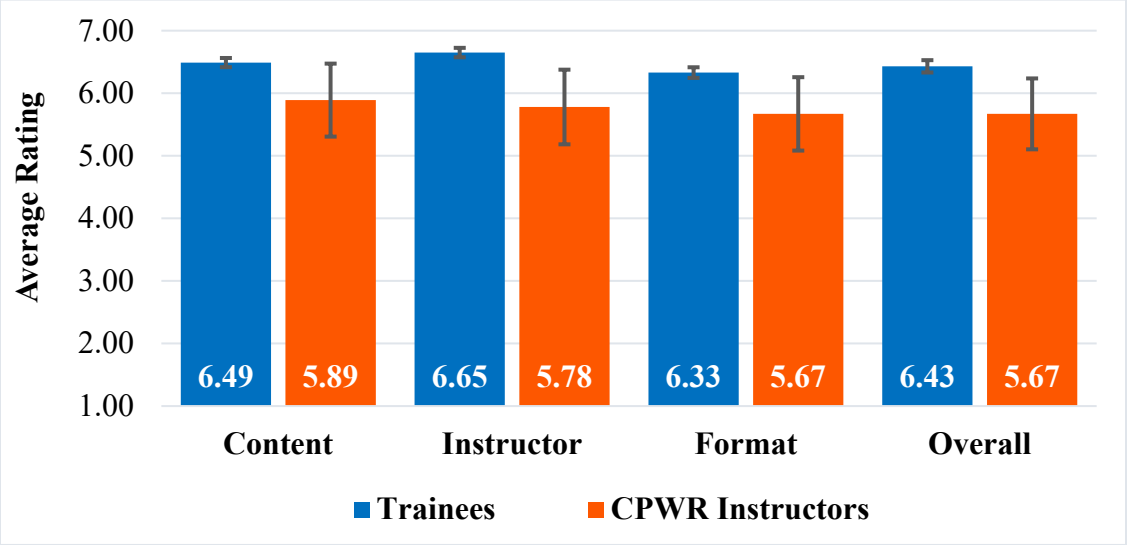
Figure 19. Trainees' and CPWR Instructors' Mean Ratings of Training Effectiveness.



Note. N=91. Items rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). I=Instructor-related items. C=Content-related items. F=Format-related items.

Similar results are evidenced in the ratings of overall effectiveness (see Figure 20). The trainees report, on average, the distance learning format is highly effective and cite Instructors, overall, as the most effective component of the training. CPWR Instructors, while providing generally positive ratings report lower ratings relative to the trainees, indicate that Content was the most effective aspect of the training. Noteworthy, while the ratings are highly positive, both sets of respondents provide the lowest ratings of overall effectiveness to the *distance learning format* suggesting room for improvement to training in this format.

Figure 20. Trainees' and CPWR Instructors' Mean Ratings of General Training Effectiveness.



Note. N=91 Trainees. N=9 Instructors. General Effectiveness Items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Error bars represent the standard error of the mean.

Post-Training Learning and On-the Job Performance

Descriptive Analysis. Descriptive statistics were conducted on the items and categories associated with learning and performance of the *CPWR Distance Learning Evaluation.* Table 12 presents the means, standard deviations, and number of survey respondents.

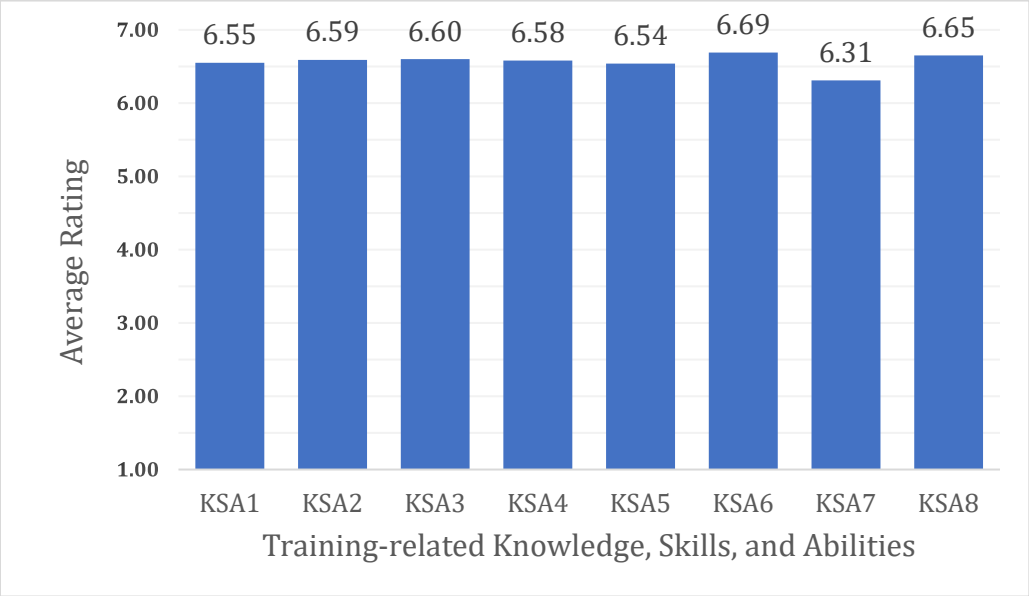
Table 12. Descriptive Statistics of Trainee's Post-training (3 to 6 months) Learning and Performance Outcomes.

	Trainees		
Evaluation Items	*N*	*Mean*	*SD*
Training-related Knowledge and Skills	**79**	**6.56**	**0.46**
1. Understand the hazards/dangers of working with/around the topic(s) taught in this class.	**80**	6.55	0.61
2. Recognize health hazards on the job.	**80**	6.59	0.52
3. Recognize unsafe work conditions and practices.	**80**	6.60	0.51
4. Recognize the signs and symptoms that may be related to hazardous environments and exposures.	**80**	6.58	0.52
5. Understand when a job hazard needs me to take immediate action.	**80**	6.54	0.52
6. Use appropriate personal protective equipment.	**80**	6.69	0.46
7. Understand my legal rights.	**80**	6.31	0.80
8. Understand the importance of jobsite safety plans and emergency response planning.	**79**	6.65	0.50
On-the-job Performance	**91**	**6.25**	**1.02**
9. The training prepared me to work safely during the COVID-19 pandemic.	**91**	6.33	1.00
10. I have used the content and skills learned in this training on the job.	**91**	6.18	1.24
Training Support in the Workplace	**91**	**6.40**	**1.08**
11. My supervisor supports the use of the skills learned in this training	**91**	6.35	1.13
12. My organization supports the use of the skills learned in this training.	**91**	6.45	1.09

Note: Items rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

Learning. In general, trainees report *high levels of safety-related knowledge and skills three to six months following training* (see Figure 21). These ratings suggest that trainees maintained the enhanced knowledge and skills learned reported in Study 1 (directly following the distance learning courses). Noteworthy, trainees reported the *highest ratings for the knowledge and skills associated with appropriate use of personal protective equipment and importance of jobsite safety plans and emergency response planning*, whereas they provided the lowest ratings for *Understanding their legal rights.*

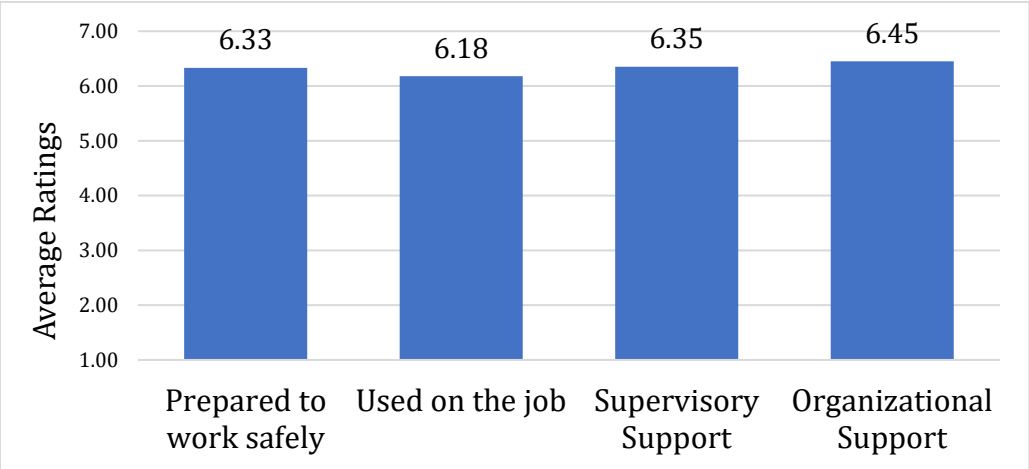
Figure 21. Participant's Learning 3 to 6 months Following Training.



Note. N=91. Items rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). KSA=Safety-related knowledge and skill items.

On-the-Job Performance and Support. The remaining items were focused on the transfer of the safety-related knowledge and skills learned during training to improved safety on the job and support for this safety at the worksite (see Figure 22). Results demonstrate that the trainees reported the online courses not only prepared them to work safely on the job, but they had also used the training to ensure their safety at the worksite. Along a similar vein, the trainees cited that there was strong support for the training at the worksite, with slightly higher ratings given to the organizational support relative to supervisory support for working safely.

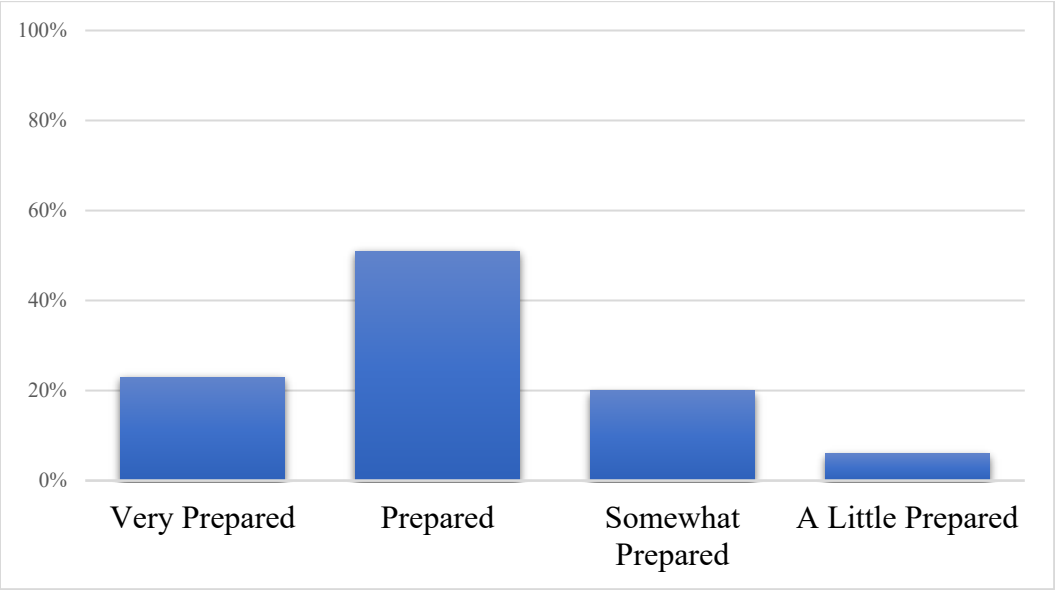
Figure 22. Participants Training-related Safety Performance and Support at the Workplace.



Note. N=91. Items rated on a scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

Performance of Trainer's Attending Training. One additional item on the CPWR Distance Learning Evaluation was included to assess the effectiveness of the distance learning for trainers who had attended the courses. More specifically, those participants who had subsequent responsibility for training others were asked to indicate the extent to which they felt the distance learning course had prepared them to train their members. As show in Figure 23, 74% of the trainers responding reported that, as a result of the distance learning course, they were either *Very Prepared* or *Prepared* to train others. While not a specific safety-related item per se, this serves as an indicator of transfer of the training to improved performance for trainers.

Figure 23. Distance Learning in Preparing Trainers to Train Their Members.



Note. N=35.

Comparative Analyses of Trainings Using Distance Learning Format

As a result of the pandemic, the transition to remote/online learning was rapid and unexpected. The trainings delivered during the COVID-19 pandemic were designed and presented in real time to meet the immediate and on-going health and safety needs of the workers. Additional analyses in Study 1 addressed questions regarding the effects of various training elements on learner outcomes directly following training. To complement these findings, additional analyses were conducted to compare the influence of training design elements and trainee characteristics on longer-term learner outcomes (e.g., 3 to 6 months following the training).

I. Training Design and Delivery

Length of Training. Within the occupational health and safety domain, highly engaging, hands-on face-to-face training is considered the gold standard. The use of distance learning in delivering worker health and safety training is generally regarded as less interactive and less engaging. Therefore, it is expected that the less engaging training would be associated with reduced learner attentiveness, particularly for longer courses. It was asserted that the length of distance learning courses would be inversely related to positive training outcomes (i.e., longer online courses would result in lower ratings). Comparative analyses of the COVID-19 Awareness (1-hour) and ICRA/COVID- 19 Awareness (6-hour) on learner outcomes were conducted. It should be noted that the ICRA-COVID-19 Awareness course was designed

to be delivered in two blocks of 3 hour sessions. One-way ANOVAs were performed on training outcomes (see Appendix E). Results of the analyses revealed *no significant differences among longer-term (3 to 6 months post-) training outcomes according to length of training.* These findings are consistent with Study 1 results examining effect of length of training on immediate training outcomes.

Date Attended Training. Various events occurring during the pandemic could likely impact training outcomes. For example, on April 27, 2020, the *NABTU and CPWR COVID-19 Standards for U.S. Construction Sites* were established. It was asserted that these historical events may have a significantly positive affect on learning outcomes of those attending the COVID-19 courses. Comparative analyses of the learning outcomes of those attending the COVID-19 courses during each 2 month block (i.e., March to April; May to June; July to August) were conducted (see Appendix F). The results demonstrated *no significant differences among reported safety-related knowledge and skills 3 to 6 months following training according to date attended training.* These results suggest that the phase of the pandemic also did not affect longer-term learning outcomes. These findings are consistent with Study 1 results examining the date of training attended on outcomes immediately following training.

II. Trainee Characteristics

Characteristics of the trainees themselves directly influence the effectiveness and impact of health and safety training. In order to gain a greater understanding of the role that trainee characteristics play in successful transition to the distance learning format, two broad categories of trainee characteristics were explored. The first set of characteristics include work and occupational experience and the second involve technological competence of the trainees.

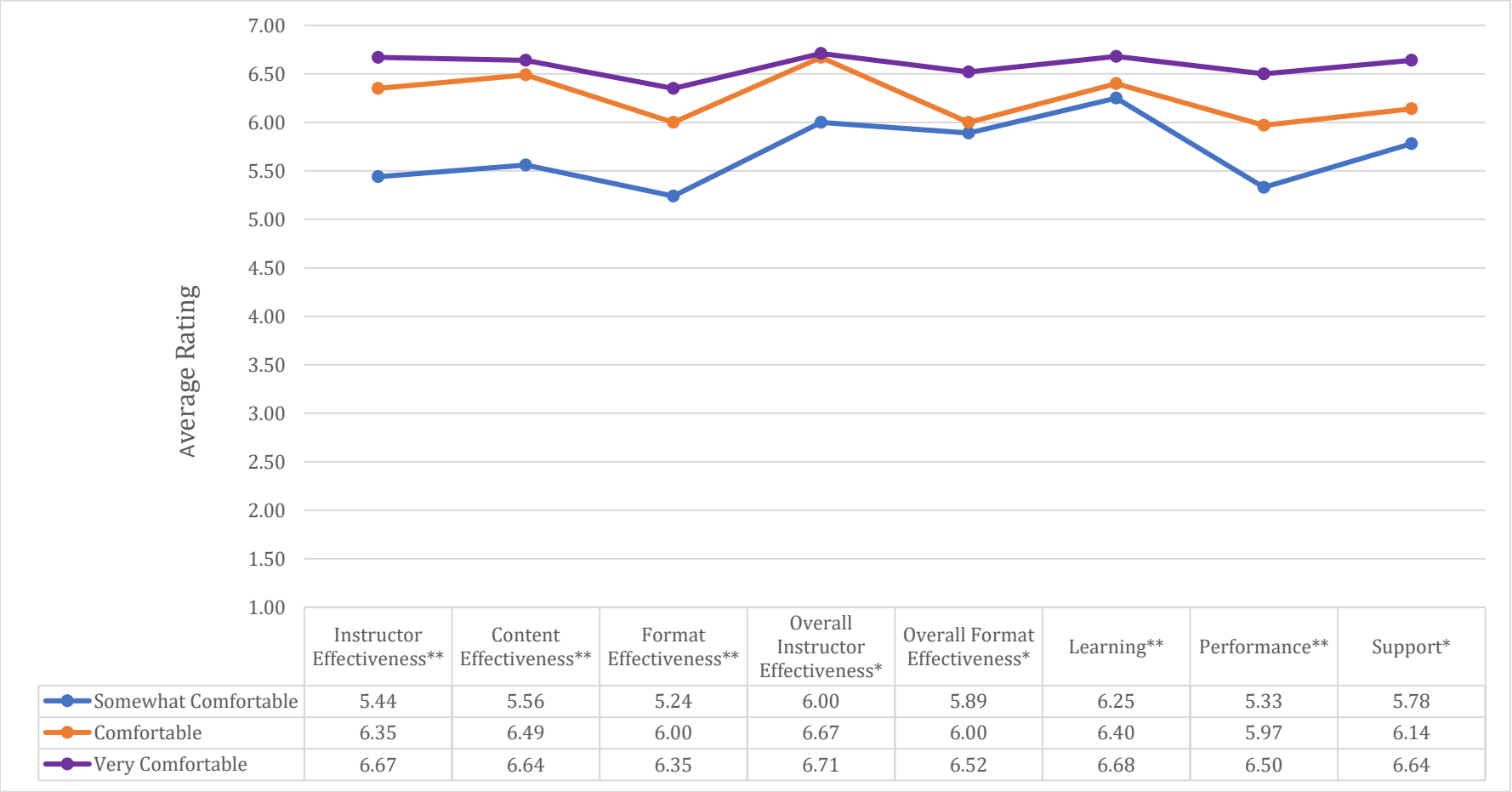
Work/Occupational Experience. The vast majority of respondents were journeyworkers (92%) with only 7 apprentices responding, thereby not allowing for comparisons. However, the occupational role they serve within the unions (member, trainer, union representative) varied among the respondents and allowed for comparative analyses. One-way ANOVAs were performed on training outcomes (see Appendix G). Results of the analyses revealed *no significant differences among longer-term (3 to 6 months post-) training outcomes according to occupational role of trainees.*

The respondents also represented a wide variety of trade memberships. Comparative analyses were conducted to explore the effect of trainees' trade membership on longer-term training outcomes (3 to 6 months following training). One-way ANOVAs were performed on training outcomes (see Appendix H). Results of the analyses demonstrated *no statistically significant differences in ratings of effectiveness, and longer-term learning, and performance outcomes between trainees from the various trades*.

Technological Competence. Because of the rapid pace of the transition to distance learning during the pandemic, technological competence of trainees quickly emerged as an essential element for training success. Similar to research in related domains, technological competence was measured using two related trainee characteristics: (1) Comfort; and (2) Skill.

Trainees' Comfort with the Technology. In the present study, trainees' comfort with the technology in attending online training ranged from *Very Comfortable* to *Somewhat Comfortable*. Comparative analyses were conducted to explore the effect of Comfort with the Technology on successful training outcomes. One-way ANOVAs were performed on effectiveness, learning, and performance ratings (3 to 6 months following training) for those who were Somewhat Comfortable, Comfortable, and Very Comfortable (see Appendix I). As graphically depicted in Figure 24, results of the analyses demonstrate the significant influence of trainees' Comfort with the Technology on many of the training outcomes (trainees' reactions, learning, performance).

Figure 24. Effect of Level of Trainee Comfort with the Technology on Training Outcomes.



	Instructor Effectiveness**	Content Effectiveness**	Format Effectiveness**	Overall Instructor Effectiveness*	Overall Format Effectiveness*	Learning**	Performance**	Support*
Somewhat Comfortable	5.44	5.56	5.24	6.00	5.89	6.25	5.33	5.78
Comfortable	6.35	6.49	6.00	6.67	6.00	6.40	5.97	6.14
Very Comfortable	6.67	6.64	6.35	6.71	6.52	6.68	6.50	6.64

Note. N=70. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning, Performance, and Support items rated on a scale ranging from 1(Strongly Disagree) to 7 (Strongly Agree). $^{**}p<.001$ Mean ratings of Instructor Effectiveness, Content Effectiveness (Somewhat Comfortable vs. Comfortable, Very Comfortable); Format Effectiveness, Learning, and Job Performance (Somewhat Comfortable vs. Very Comfortable). $^{*}p<.05$ Mean Ratings of Overall Instructor Effectiveness, Overall Format Effectiveness, and Support (Somewhat Comfortable vs. Very Comfortable)

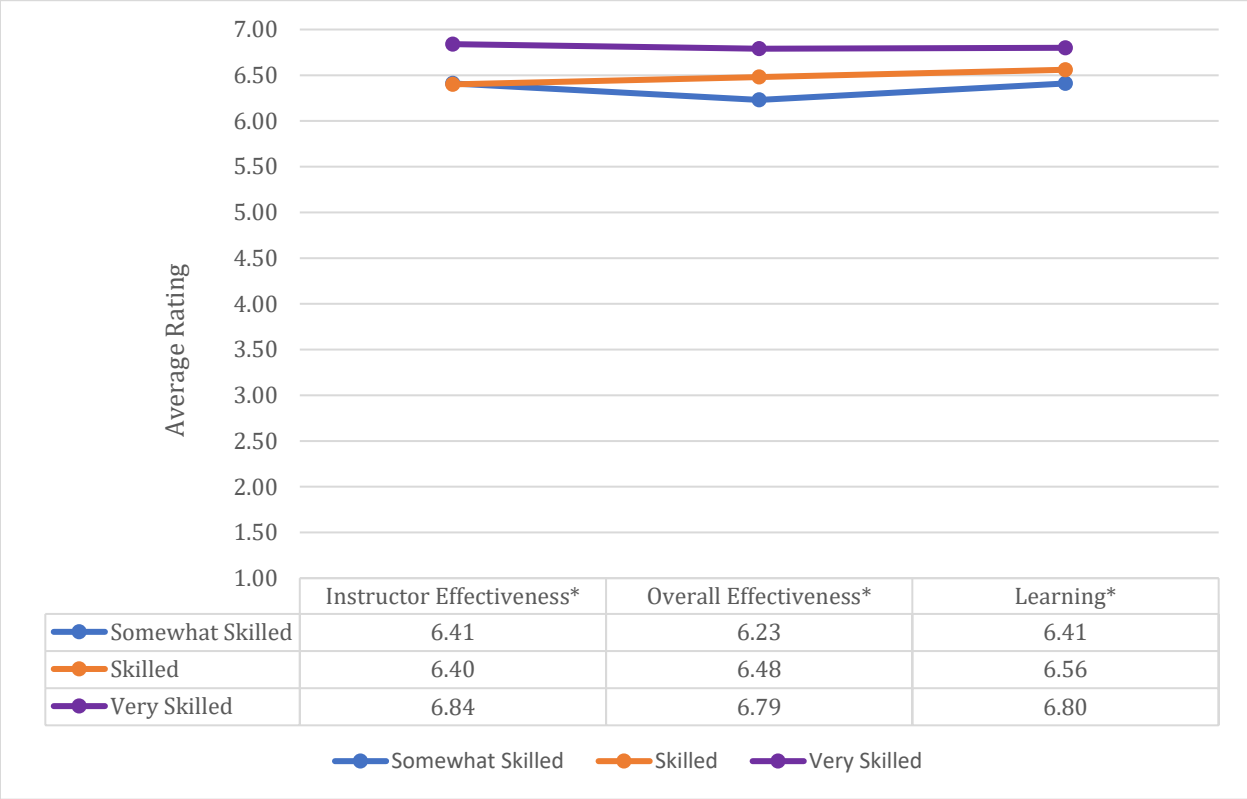
Specifically, post-hoc comparisons revealed that trainees who were *Very Comfortable and Comfortable with Technology reported higher ratings of Instructor and Content Effectiveness than those who were Somewhat Comfortable with Technology*. Further, those *Very Comfortable with the Technology also report higher ratings of Format and Overall Effectiveness, as well as greater Learning and on-the-job Performance and Support than trainees who were only Somewhat Comfortable with the Technology*.

These results suggests that trainees' Comfort with Technology is an important factor for ensuring distance learning successfully meets trainees' work-related safety needs. Therefore, making certain that the trainees are comfortable with the technology is essential in achieving successful training outcomes when designing and delivering training in a distance learning format.

Trainees' Skill in Using the Technology. In the present study, trainees' Skills in Using the Technology to participate in distance learning ranged from Very Skilled to Somewhat Skilled. Comparative analyses were conducted to explore the effect of Skill in Using the Technology in achieving successful training outcomes for distance learning courses. One-way ANOVAs were performed on effectiveness, learning, and performance ratings (3 to 6 months following training) for those reporting they were Somewhat Skilled, Skilled, and Very Skilled in Using Technology (see Appendix J). As graphically depicted in Figure 25, results of the analyses show that Skill in Using the Technology significantly influenced trainings ratings of effectiveness (Instructor, Overall) and learning for distance learning courses.

Post-hoc comparisons showed that trainees reporting lower skills levels (Somewhat Skilled and Skilled) who *reported lower ratings of Instructor Effectiveness than trainees who are Very Skilled in Using the Technology*. Further, those *Very Skilled in Using the Technology also report higher ratings of Overall Effectiveness and greater Learning than trainees who were only Somewhat Skilled in Using the Technology*.

Figure 25. Effect of Trainee Skill in Using the Technology on Training Outcomes.



	Instructor Effectiveness*	Overall Effectiveness*	Learning*
Somewhat Skilled	6.41	6.23	6.41
Skilled	6.40	6.48	6.56
Very Skilled	6.84	6.79	6.80

Note. N=70. Rating scale ranges from 1 (Very Ineffective) to 7 (Very Effective). *p<.05 Mean Ratings of Instructor Effectiveness (Somewhat Skilled, Skilled vs. Very Skilled); Overall Effectiveness and Learning (Somewhat Skilled vs. Very Skilled).

Taken together, these findings demonstrate **importance of the technological competence for trainees**. The trainees' Comfort with the Technology, and to a lesser extent Skill in Using the Technology had a significant influence on their learning using the distance format. The results also provide preliminary evidence that less comfort with the technology negatively influences their ability to transfer the learned information to improved performance at the worksite. These results obviate the need for building and supporting trainees' confidence with and expertise in the distance learning format to ensure the greatest impact of the training.

Qualitative Findings

The findings from the descriptive and comparative analyses provide evidence of the effectiveness and impact of the occupational health and safety trainings designed and delivered in distance learning format. To gain a more thorough understanding of why these results occurred, qualitative data was gathered from trainees and CPWR Instructors. Specifically, the following sections highlight critical factors for success including best practices and lessons learned with the use of the distance learning format.

Meeting Workers' Training Needs. The COVID-19 Awareness and ICRA/COVID-19 Awareness trainings were designed and delivered in real-time to meet the workers' safety needs during the pandemic. Trainees, who included union members, union trainers, and union representatives were asked to elaborate on the extent to which the training met these needs including the use of the distance learning technology

in delivering the training (see Appendix K). The comments were overwhelmingly positive that the training effectively met the needs of the attendees. Union representatives also stated that the training helped to keep members and trainers informed during the pandemic. Respondents reported that the content and materials were up-to-date and relevant. They also commended the instructors for actively encouraging discussions and interactions to engage the participants. The use of distance learning was commended as a must during the pandemic with many acknowledging they were learning the format in real-time.

Most and Least Valuable Aspects of Training Identified by Trainees. Trainees were asked to specify the most and least valuable aspects of the training. Several general themes emerged among the **Most Valuable** facets of training (see Appendix L). The respondents most often cited that the **content,** including the practical application to the workplace, was very valuable in enhancing their understanding of the virus, its transmission, and how to keep themselves and others safe at work ("The content was very helpful in teaching others in my work environment the importance of social distancing"). **CPWR Instructors' knowledge and experience** were identified as key drivers of success with the distance learning format. One respondent stated that "the online training worked for me because of very good information and very good instructors who kept us engaged throughout." CPWR Instructors' learning methods are characterized by a **highly interactive approach** that included discussions and question and answer sessions and cited as instrumental to the positive learning experience. In particular, respondents indicated the importance of the **breakout sessions** used for small group exercises and discussions that engage learners and encourage information sharing. Use of the **Zoom platform** that allows for trainers and trainees to see one another and follow the PowerPoint slides in a synchronous format also helped to simulate the traditional face-to-face format. Respondents also noted that, while they preferred the face-to-face format, they were grateful to CPWR who "made use of distance learning techniques which made it inclusive to a wide range of students during a time when in-person training is impossible."

Trainees also commented on the **Least Valuable** facets of training (see Appendix M). Comments regarding least valuable aspects of the training centered around the use of distance learning. Several respondents stated that **face-to-face is their preferred format**, with some citing that the **transition was unplanned** and they were still **acclimating to the new distance learning format** ("Change is always tough"). A few of the respondents were critical of the learning methods, particularly the **limited interaction** with one stating "As always, I miss the in-person interaction and discussions not available because of COVID." The use of distance learning caused related issues of difficulty raising questions during class and breakout discussions. Inability to see fellow trainees in person during class also created **issues that interfered with learner engagement.** One trainee cited that a knowledge assessment would have helped with **gauging learner understanding** during the course. These issues are exacerbated by the **technical issues experienced by the trainees** including weak Internet connections and use of smartphones to attend classes. It should be noted, however, that the **largest number of responses were generally positive** and indicated that there were no aspects that were invaluable ("I found value in all of it").

Strengths and Weaknesses of Training Identified by CPWR Instructors and Union Trainers

Information regarding the strengths and weaknesses of the training from the perspective of trainers was gathered by trainers attending the training as well as CPWR Instructors presenting the training (see Appendix N). With respect to **strengths**, the **knowledge and expertise of the instructors** were cited as a major strength of the training. Their **use of breakout rooms and discussions** engage learners and reinforce the concepts presented. Trainers also reported that **content** of the training was **informative and relevant** to the **issues facing workers during the pandemic**. CPWR instructors stated that the **training materials and content was adapted to facilitate presentation** in the distance format. Importantly, the instructors and CPWR were praised for the conversion of the training to **meet the immediate needs of**

the workers. One respondent stated that the "distance learning provided timely and job site relevant training to union members and signatory contractors who were returning to work after being told to shelter in place. We all needed immediate guidance on how we move forward completing projects and how we all stay safe while doing it."

The **weaknesses** of the training centered around **the limitations that the distance learning format poses relative to face-to-face instruction**. The trainers and CPWR instructors express a **preference for the in-person interactions and discussions**. They further reported that without the ability to see non-verbal cues, it was difficult to "read the room" and gauge the level of understanding, particularly when the participants did not have their cameras on at all times. While the **breakout sessions** simulated the in-person small group exercises, trainers reported that they were difficult to manage. The **hands-on exercises and demonstrations** were a greater challenge for the distance learning format. **Characteristics of the trainees** were also cited as problematic (e.g., level of interest, attention span, technological competence). Trainers and CPWR instructors reported that **technical** (volume levels) and **logistical issues** (time zones) presented additional challenges in the distance learning format.

Challenges Training Identified by CPWR Instructors and Union Trainers

Challenges to using the distance learning format in providing occupational health and safety training were also identified from the perspective of trainers (CPWR Instructors; Union Trainers). Two overarching themes emerged across respondents (see Appendix O). The first general category was related to **technological issues.** These challenges included having appropriate **equipment** (computers versus smartphones) and **Internet accessibility** that were capable of supporting the chosen platform as well as the **learning curve** associated with using the technology (e.g., sharing screens, being camera-ready). The second category of challenges were related to the use of the technology to support **interactions and engagement of learners** in the format (e.g., use of additional instructors).

Best Practices/Lessons Learned

Based on their experiences using the technology, CPWR Instructors identified best practices and lessons learned in using the online format for worker health and safety trainings (See Appendix P). Consistent with the previously reported findings, the instructors cited that, because of their expertise, **there was preference toward traditional face-to-face training.** However, the **safety and flexibility of the distance format** was acknowledged as critical during the pandemic. They stated the importance of using various types of **interactive methods and techniques** (e.g., different styles of breakout sessions, question and answer polling, Kahoot, Quizlet) **to keep the learners engaged and attentive** throughout the training. **Instructor preparation** was identified as the most critical factor for success and, **optimally at least two instructors** should be used to deliver the training. Similar to the face-to-face format, it was suggested that **instructor coordination meetings** are necessary to allow for greater management of the instructional team (lead instructor, co-instructor, technology assistant). Further, **practice** in delivering the content in the distance platform (e.g., Zoom) prior to the actual training was fundamental. This practice involves testing of lighting and camera placement to be "camera ready" for the session. If possible, use of two monitors for each instructor allows those instructing to **view the content and online class simultaneously** and affords the opportunity to "read the room" while teaching (more similar to the traditional classroom experience). One instructor cited that "As the leader in safety training, we should strive to be the best not only with the materials we teach, but also how we present ourselves on screen." They also acknowledged that this **requires trainers to be as skilled as possible** on the distance technology.

The Union Trainers and Representatives also provided information regarding Best Practices/Lesson Learned. Similar to the CPWR Instructors, they felt that during the pandemic, distance learning is "the safest most effective method via Live online training." To standardize this new format, trainers suggested

that structured **distance learning orientations** should be held. The trainers also felt that a "**Zoom etiquette**" should be developed and distributed to trainees to reduce unnecessary interruptions and distractions during training. Along the same vein, trainers should receive a formal **orientation** to the platform that includes current information on training using distance learning format, particularly for courses that require a great deal of hands-on instruction.

Suggestions for Improvement

Lastly, those receiving the distance learning training were asked to provide suggestions for improvement (see Appendix Q). Overall, the **comments were very positive** and highlighted key characteristics for success as well as suggestions for improvement. Consistent with the quantitative ratings, **instructors were cited as essential elements for effectively delivering training** in a distance format (e.g., "Instructors were knowledgeable and informative"). One respondent suggested, given their expertise, that the instructors should **include more personal experiences to highlight the content**.

Similarly, while the comments were generally positive with the content provided, they suggested that it is important to **keep the content informative and relevant to the learners**. In particular, respondents indicated that more in-depth and advanced information could be presented based on participants' needs and that **more industry- and organizationally-specific content** would enhance the learning in general. While participants felt the pace of the course was appropriate, consideration should be given to **adding breaks**. Participants also **requested copies of course materials** (e.g., PowerPoint slides, handouts) to facilitate note-taking during the training and use as reference following course completion.

Several suggestions were given that addressed use of the distance learning in general and Zoom in particular. The respondents cited that **technical difficulties** (Internet speed) interfered with the training and the discussions and sharing of information associated with the face-to-face training is more difficult in the Zoom format. They suggested using **more methods and techniques that garner interaction and participation from the trainees** during the presentations (e.g., polls, Kahoot-type game or quiz) might encourage discussions **and sharing of information and real world examples from trainees**. They also suggested that these polls and quizzes **assess learner knowledge and understanding during the course** and allow for a **review of key points** and draw in more discussion. It was also suggested that this could occur prior to the session by having **the trainees email questions and areas of concern prior to the course** that could be highlighted during discussions. Another very important area of concern is in **conducting hands-on demonstrations of equipment remotely.** Several respondents suggested **providing the personal protective equipment to all participants and trainers ahead of the training session**. In this way, it is on-hand for the trainers and trainees for live demonstrations during the session and to use at the worksite following the training.

Noteworthy, in addition to suggestions for improvement there was a **large portion of comments that were generally positive and appreciative for CPWR providing the training during the pandemic** ("It was well done. I have seen several presentations on COVID-19 and this was right at the top of the list."; "Safety can never stop no-matter what obstacle are put in front of us. Great job for CPWR staff and instructors to adapt and overcome to reach the members").

Collectively, these qualitative comments highlight important themes for the successful design and delivery of occupational health and safety courses using distance delivery. Suggestions were presented that consider the needs of both the trainees and the trainers. In particular, respondents felt that additional information is critical for those who are gaining experience and knowledge with the distance format. It should be noted that the best practices, lessons learned, and suggestions for improvement posed by the respondents are consistent with those reported for successful outcomes in related domains (Dietrich, et al. 2020; Dowling-Hetherington, et al. 2020; Khurshid, et al. 2020, McKinnie, 2020; NIEHS, 2020; US

Department Education, 2010). Therefore, general principles for excellence in distance learning for occupational health and safety training have been developed and are presented in the next section.

General Principles for Excellence in Distance Learning for Occupational Health and Safety Training

The distance learning courses (COVID-19 Awareness; ICRA/COVID-19 Awareness) were designed and developed in response to a pandemic, but moving forward, its effectiveness will depend on the interest and buy-in from the trainees and their organizations. It is important that trainees, trainers, and training organizations are invested in the distance learning online experience.

The following section highlights general principles to assist those designing and delivering occupational health and safety training in a distance learning format to achieve the desired learning and performance outcomes. These recommendations are presented for trainers and training organizations to consider prior to, during, and following the training event and are consistent with the recommended best practices in adult learning and instructional excellence in occupational health and safety training.

Before Training

One of the overarching principles for training excellence in the distance learning format is being prepared and organized prior to the training session. The following are advanced to enhance the preparation for and organization of the training.

1. Assess trainees' needs. It is critically important to **learn about trainee needs and preferences** ahead of the training session. This information can be gathered when trainees register for the session and can be included in a short survey that assesses trainees' needs (e.g., technological, language, organizational and industry-specific) to enhance relevance and better ensure interaction during training. Trainees can also be encouraged to email the instructor with specific questions or industry- trade- or organizationally-specific questions prior to the session. In addition, trainees can be encouraged to post questions and share information on a social learning page or message board to encourage participation and interaction among trainees before the course starts. The more one that is known about the audience in advance of training, the more likely that the training will be relevant and useful in enhancing safety at their workplace.

2. Provide orientation trainings for trainers and trainees. Participants have uneven access to and varied expertise with the technology. Therefore, to create a supportive virtual environment conducive to learning, orientation training is encouraged for both trainers and trainees. **Orientation training provides basic information and guidelines that are expected for <u>all</u> participants**. These sessions include structured information including: fundamental of accessing and using the platforms (e.g., Zoom; https://zoom.us/events); expectations for the virtual classroom (roles and responsibilities); distance learning etiquette (see Table 13); and a checklist that trainees and trainers can use before, during, and following the training.

Table 13. Recommended Trainee Etiquette for Distance Learning Success

Etiquette for Online Training Success
• Download training information ahead of time, including all handouts and PowerPoints so that information is available during training even if technical difficulties arise.
• Complete all pre-training assignments and assessments to provide any specific needs or questions to the instructors before training begins. In addition, any specific questions about the content or job/trade-specific questions should be posed ahead of the first session so that they can be addressed during training.
• Test your computer compatibility with the platform ahead of the training. Log-in to the session at least 5-10 minutes ahead of time to ensure that it is running properly.
• Present a professional online presence. Dress professionally and be aware of your online background.
• Limit distractions/multitasking. Trying to pay attention to multiple devices or tasks decreases the quality of learning. Instead, focus on the training.
• Mute your microphone when not speaking to avoid adding unexpected background noise into the training session.
• Leave video/camera on at all times during class (do not revert to blank screen).
• Share comments and questions in text chat and raise hand to ask questions.

3. Post all course-related information. Along the same vein, trainers should **post and make available all course information**, including training objectives, course outline, materials (e.g., PowerPoint slides, handouts) and training agenda, to participants ***in advance*** **of the training session**.

4. Practice, practice, practice (with feedback). Trainers should **conduct a rehearsal of their presentation in the distance learning format**, particularly in the case of new content and/or instructional techniques. This is not meant to be exhaustive, but rather a run through of each topic using all the tools for the presentation in the sequence that will appear in the training, at least once. This can be done informally, or more formally as part of a demonstration to a more experienced trainer with feedback.

5. Conduct Trainer Coordination Meetings. Similar to the face-to-face format, the lead trainer should **coordinate trainer meetings (pre-training, following each training session) to manage the activities of the training team** (lead trainer, co-trainer, technology assistant). These meetings clarify expectations and roles and responsibilities to assist trainers in honing the requisite skills to meet the needs of the learners in the distance learning environment. Historically, these sessions have been utilized as part of the instructional activities for the face-to-face training sessions, and this strategy should be similarly incorporated into the instructional activities for the distance learning courses. Worth noting is that these sessions tend to occur informally between sessions and at the end of each day during face-to-face trainings. It is recommended that the informal session also be conducted as a short debrief for the online training.

During Training

Instructor knowledge and skill was consistently identified as a key driver of effective training in distance learning format. CPWR instructors are consistently recognized as leaders in use of interactive training techniques that encourage active participation, knowledge sharing, and integration of relevant content that can be directly applied to the workplace. The following is offered to support these techniques in the distance learning format.

6. Encourage active participation and interaction. Similar to recommendations for face-to-face training, instructors are encouraged to **solicit specific regular interaction from the learners.** A

hallmark of the CPWR Worker Training is use of exercises, activities, and discussions to engage trainees and enhance communications and information sharing. This practice is equally critical for success in distance learning but may entail using unfamiliar technology and techniques (polls, breakout sessions, Kahoot!, Quizlet). These techniques also will allow the trainers to "read the room" virtually by checking for learner understanding in real time. It is important that careful attention is given to using the technology in ways that the platform to ensure participation. For example, while trainees are familiar with face-to-face small group exercises, online breakout sessions involve appropriate techniques to ensure effectiveness (see Table 14). Similarly, trainers can encourage regular use of the platform during lectures and group discussions (raising hand, using chat) to maintain attention and participation during less interactive sections of the training.

Table14. Best Practices to Encourage Participation in Distance Learning.

Best Practices: Breakout Rooms
• Set expectations at the beginning of the breakout exercise.
• Include a mix of participants for each breakout session
• Provide clear instructions for the breakout activity
• Assign a facilitator for each breakout room
• Provide the expected duration of the breakout session
• Indicate how trainees can get assistance, if needed, during the breakout session

7. If possible, have a co-instructor for each session. The **co-instructor can assist with content delivery, the technology** (technical difficulties of trainees, chat responses), **and assume the role primary instructor in the case of technical difficulties** of the primary instructor (screen freezing, connection dropped). Technical issues may interfere with training and how they are handled is important. Having at least two instructors, one of whom supporting technical needs, facilitates this process.

8. Be flexible and open. Being organized does *not* mean being inflexible. It is important that trainers create an open and flexible learning environment to accommodate the range of trainees learning needs and make them feel respected and supported. **Monitor pace and content according to trainees' level of understanding.** Being organized will allow for flexibility when needed (when the unexpected occurs).

Following Training

As with face-to-face instruction, training should be continuously improved. In addition, the distance learning format provides additional opportunities sharing up-to-date information and resources following training.

9. Evaluate training to ensure continuous quality improvement of the training. At the conclusion of the training, **courses should be evaluated to assess effectiveness and learning outcomes**. These evaluations **should be completed by both the trainers and trainees** to gather multiple perspectives of the training. This information can be synthesized to ensure more accurate and thorough depiction of effectiveness and provide feedback for continuous quality improvement of the training.

10. Share resources and information. It is important to continue the information sharing and continued access to resources following course completion. The distance learning format is a very viable and efficient means for sharing this information. For the trainees, these resources include **recordings of the online training, training-related information from the CPWR Clearinghouse, and other relevant online resources**. For trainers, it is also helpful to provide the most current information on **best practices and recommended new learning technologies and platforms.**

These recommendations are offered as a working document (see Appendix R) such that they may be revised as additional evidence is gathered. That is, as additional platforms and learning methods are used to deliver occupational health and safety training, these recommendations should be further developed.

General Discussion and Suggestions for Future Research

The current project involved a comprehensive evaluation system designed to assess effectiveness of distance learning in delivering occupational health and safety training. The evaluation system was designed to address the following: (1) comparisons of safety training delivered in a face-to-face versus distance learning format; (2) effectiveness of newly developed online COVID-19 Awareness courses in addressing emerging worker safety needs; and (3) best practices and lessons learned for enhancing effectiveness of the use of distance learning for delivering occupational health and safety training courses.

The current report provide preliminary evidence that distance learning is an effective method for delivering occupational health and safety training. **Comparisons of training outcomes gathered directly following training revealed that, that while face-to-face delivery was rated slightly higher, the distance delivery format was very effective and resulted in high levels of learning.** Importantly, **no significant differences in safety-related knowledge and skills were found** between participants in the face-to-face versus online training suggesting **that high levels of learning were occurring regardless of format.**

The study of effectiveness and impact of the online trainings on longer-term training outcomes supported these findings. Both **those receiving the training as well as those CPWR instructors who provided the training reported high levels of effectiveness (content, format, instructor).** The evaluation also revealed that the COVID-19 curriculum, newly designed and delivered by distance learning format, resulted in **enhanced safety-related knowledge and skills 3 to 6 months following the training and led to improved worker safety during the pandemic.** Therefore, the results suggests the **viability of using the distance learning format to successfully deliver a training designed in "real time" in response to an emergency event (pandemic).** However, moving forward, the results also provide insight into improving the continued use of distance learning.

The study also demonstrates the **use of real time evaluation to identify best practices and lessons learned that can be adopted for the new technology**. Across sources, the **instructors were recognized as key drivers of success** with respect to expertise in rapidly translating the learning principles used in the face-to-face training to the less familiar distance learning format. The distance instruction was **successfully designed and delivered following principles of adult instruction and excellence in instructional design** as a guide. The **best practices and tips for trainers and trainees expand upon these principles and provide general guidelines to be followed before, during, and following the training.** These guidelines are not exhaustive but are intended as a first step in the continuous quality improvement process for the online training.

Additional research is needed to continue our **understanding of the trainee characteristics and training features critical for success in technology-based formats** (Bell et al., 2017). The present findings suggest that trainees' technological competence is important to achieving desired training outcomes. More specifically, **trainees' *comfort with* and, to a lesser extent, *skill in using the technology* has a significant influence on perceptions of training effectiveness, learning and subsequent safety performance on the job**. However, it is not clear the extent to which these characteristics can be enhanced by orientation to the distance learning methods prior to training or supported by instructors during the training. Research in related disciplines have found that although Comfort with Technology is an important indicator of success (Chen, Kaczmarek, & Ohyama, 2020; Futch, et al., 2016; Rodriguez, Kingston, & Montanez, 2008), this characteristic tends to change very little over time (Cook & Thomson, 2020). Further research is needed **to gain a better understanding of its**

malleability and influence on distance learning for occupational health and safety training, particularly given the increased use of distance learning during the pandemic. In addition, examination of these training characteristics across a wide range of demographics (gender, race, ethnicity) and work experiences (pre-apprentices, apprentices) should be gathered.

Similarly, **additional research is needed to examine different modalities and features of distance learning (and different training providers) to gain a greater understanding of its use in the occupational health and safety domain**. The present report found strong support for highly interactive synchronous online training using highly experienced and knowledgeable teams of trainers. Best practices and general principles for success may be relevant only to this particular type of distance format in delivering this specific content using highly experienced teams of instructors**. More research is needed to examine key pedagogical features of success for various types of distance learning formats, content, and training providers.** A specific course or series of courses (e.g., OSHA courses) could be selected and compared across the various union providers. In this way, specific training characteristics or combinations of characteristics that lead to positive training outcomes could be directly examined and identified.

Because of the flexibility afforded by the distance learning format, **one critical question of interest is the role that length and timing of training session play in training effectiveness**. While the present results did not find significant differences according to length of training, related disciplines have found shorter sessions tend to enhance learning outcomes and provide trainees with greater flexibility in attending training (Breckwoldt, et al., 2016; Chen, Kaczmarek, & Ohyama, 2020). Similarly, integrating new techniques, such as those recently developed to enhance trainee attentiveness by combatting Zoom fatigue (e.g., Silent Meetings), could be integrated into the distance learning methods and assessed for effectiveness. **Systematic evaluations of the methods and techniques used in distance learning will provide evidence that can be used to improve fidelity of the training to approximate the learning environment engendered in the face-to-face (gold standard) format.**

The challenges to face-to-face training during the pandemic called for rapid and unplanned transitions to the online training. In response, the present study focused on direct comparisons between technology-based and traditional trainings, without considering the potential for combinations of these techniques in the occupational health and safety training systems. Moving forward, however, **strategic decision-making will be needed into how to best use the distance technology in improving occupational health and safety training systems in coordination with face-to-face trainings.** For example, **blended learning methods and flipped classrooms** are two increasingly common training configurations that call for use of both face-to-face and distance learning in various combinations. **Future research could examine their use in delivering occupational health and safety training including the optimal use of different formats and sequencing of distance learning and in-person instruction in these combined training efforts.**

Note that the lack of face-to-face interaction was often cited as a potential roadblock to networking and resource sharing among participants**. It is unclear the extent to which the reduced in-person interactions in the distance learning format influences relationship outcomes (e.g., peer support, trust, cohesion).** Future research should consider including these interpersonal and relationship variables in the assessment of the effectiveness of the online formats.

Finally, while beyond the scope of the present report**, consideration should be given to the larger organizational aspects of the distance learning training.** Organizational-level issues such as creating a contingent of expert trainers and instructional designers that are facile in various platforms of distance learning, adoption/use of Learning Management systems, certification process for the distance learning

courses are examples of organizational level decisions that must be addressed when transitioning to the distance learning or blending learning formats.

Conclusion. The present evaluation provides preliminary evidence supporting the effectiveness of the distance learning format in delivering occupational health and safety training. Trainee characteristics and training factors affecting effectiveness and impact are identified as well as recommendations for continuous quality improvement. Finally, suggestions for future research of use of the distance technology in occupational health and safety training systems are advanced. Taken together, these findings and general recommendations can be used to ensure successful and sustained integration of synchronous online occupational health and safety trainings.

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Glossary of Definitions

Distance learning – general term for instruction in which trainer and learner are not in the same location (i.e., geographically distant). Also referred to as remote learning.

Online learning – training in which the instruction is provided using the Internet

Blended learning – training that combines elements of both distance and traditional face-to-face instruction

Synchronous – training is presented in "real time" to the learner; trainer and trainees can interact and communicate live to each other

Asynchronous – training is posted online and learners access the instruction on their own time

Appendix A

CPWR Trainee Course Evaluation Form

Course: _____ Date(s): _____ Location: _____

Please check the appropriate box (☑) after each question.

The instructor(s):	**Rarely**			**Most of the time**	**Always**
1. Described the course and lesson objectives clearly.	☐	☐	☐	☐	☐
2. Explained how the course content applies to my job or trade.	☐	☐	☐	☐	☐
3. Presented the material clearly, so that I could understand it.	☐	☐	☐	☐	☐
4. Kept the class focused on the learning objectives.	☐	☐	☐	☐	☐
5. Encouraged class participation.	☐	☐	☐	☐	☐
6. Reviewed key points.	☐	☐	☐	☐	☐
7. Gave helpful feedback to the class on the exercises and activities.	☐	☐	☐	☐	☐
8. Made good use of the student materials / manuals.	☐	☐	☐	☐	☐

This course helped me to improve my ability to:	**N/A**	**Very little**		**Some**		**A lot**
9. Understand the hazards/dangers of working with/around the topic(s) taught in this class.	☐	☐	☐	☐	☐	☐
10. Recognize health hazards on the job.	☐	☐	☐	☐	☐	☐
11. Recognize unsafe work conditions and practices.	☐	☐	☐	☐	☐	☐
12. Recognize the signs and symptoms that may be related to hazardous environments and exposures.	☐	☐	☐	☐	☐	☐
13. Understand when a job hazard needs me to take immediate action.	☐	☐	☐	☐	☐	☐
14. Use appropriate personal protective equipment.	☐	☐	☐	☐	☐	☐
15. Understand my legal rights.	☐	☐	☐	☐	☐	☐
16. Understand the importance of jobsite safety plans and emergency response planning.	☐	☐	☐	☐	☐	☐

Please turn over to complete side 2 ⇨

Revised August 2018

Teaching methods and materials:

We are interested in knowing your opinion of how helpful different teaching methods are for learning the material covered in this class (Mark N/A if the instructor didn't use a particular method)

		N/A	Didn't help at all		Helped some		Really helped
17.	Lectures (Instructor only talked and responded to questions)	☐	☐	☐	☐	☐	☐
18.	Classroom discussions / small group activities	☐	☐	☐	☐	☐	☐
19.	Demonstrations (such as a PPE "show and tell" or equipment inspection)	☐	☐	☐	☐	☐	☐
20.	Classroom-based activities / exercises (crossword puzzle, questionnaire, Kahoot!, etc.)	☐	☐	☐	☐	☐	☐
21.	Hands-on activities / exercises / simulations	☐	☐	☐	☐	☐	☐
22.	Course manual/handouts	☐	☐	☐	☐	☐	☐
23.	PowerPoints	☐	☐	☐	☐	☐	☐
24.	Video / YouTube / DVD	☐	☐	☐	☐	☐	☐
25.	Other: _____	☐	☐	☐	☐	☐	☐

		Not at all		Some		Completely
26.	**Overall**, how well did this class meet the objective of helping you to develop the knowledge, skills, and confidence you need to work safely?	☐	☐	☐	☐	☐

How could this course be improved?

_____

_____

_____

_____

_____

_____

THANK YOU VERY MUCH for your time and cooperation. Please contact CPWR with any additional comments, questions, or feedback by emailing training@cpwr.com or calling (301) 578-8500.

Revised August 2018

Appendix B

Item Statistics for CPWR Trainee Course Evaluation Forms
Face-to-face and Distance Learning Courses

Correlations among the categories of effectiveness, learning, and overall effectiveness are presented below, along with coefficient alpha calculations of reliability.

Correlations and Reliabilities for Item Categories and Overall Ratings

	Instructor Effectiveness	Training-related Knowledge/Skills	Training Method Effectiveness	Overall Effectiveness
Instructor Effectiveness	(.88)			
Training-related Knowledge/Skills	.58**	(.91)		
Training Method Effectiveness	.64**	.65**	(.88)	
Overall Effectiveness	.58**	.57**	.60**	--

Notes. **Correlation is significant at the $p<0.01$ level (2-tailed). Reliabilities on the diagonal.

The results indicate adequate internal consistency among items in each category (reliability) and strong correlations among categories. Results suggest related but distinct categories, as indicated by correlations below .80.

Appendix C

Additional Analyses of Trainings Using the Distance Learning Format

I. Length of Training

Instructor Effectiveness

Course Length	N	Mean	SD	p-value
1-hour COVID-19	173	4.63	0.60	.189
6-hour ICRA/COVID-19	151	4.71	0.40	

A one-way ANOVA was run to explore the instructor effectiveness means by length of training, $F(1, 322) = 1.73$, $p = .189$, $\eta^2 = .01$. There were no statistically significant differences in ratings of instructor effectiveness between courses.

Training Methods Effectiveness

Course Length	N	Mean	SD	p-value
1-hour COVID-19	173	4.38	0.76	.498
6-hour ICRA/COVID-19	151	4.43	0.59	

A one-way ANOVA was run to explore the training method effectiveness item means by length of training, $F(1, 322) = 0.46$, $p = .498$, $\eta^2 = .00$. There were no statistically significant differences in ratings of training method effectiveness between courses.

Overall Training Effectiveness

Course Length	N	Mean	SD	p-value
1-hour COVID-19	170	4.61	0.64	.719
6-hour ICRA/COVID-19	151	4.64	0.55	

A one-way ANOVA was run to explore the overall means by length of training, $F(1, 319) = 0.13$, $p = .719$, $\eta^2 = .00$. There were no statistically significant differences in ratings overall between courses.

Training-related Knowledge and Skill Gains

Course Length	N	Mean	SD	p-value
1-hour COVID-19	173	4.58	0.69	.606
6-hour ICRA/COVID-19	151	4.62	0.56	

A one-way ANOVA was run to explore the training-related knowledge and skills means by class format, $F(1, 322) = 0.27$ $p = .606$, $\eta^2 = .00$. There were no statistically significant differences in ratings of training-related knowledge and skills between courses.

II. Date Attended Training

Training-related Knowledge and Skills Gains by Date Attended Training

Date Attended Training	N	Mean	SD	p-value
Pre- NABTU Standards	89	4.58	0.63	.773
Post NABTU Standards	235	4.60	0.63	

A one-way ANOVA was run to explore the learning (training-related knowledge and skills) means by time, $F(1, 322) = 0.08$, $p = .773$, $\eta^2 = .00$. There were no significant differences in learning gains between participants who attended the training before the establishment of the *NABTU and CPWR COVID-19 Standards for U.S. Construction Sites* (NABTU Standards) were established versus those who attended the training after the NABTU Standards were established.

Appendix D

Item Statistics for CPWR Trainee Distance Learning Evaluation

Correlations among the categories of Instructor Effectiveness, Content Effectiveness, Format Effectiveness, On-the-job Performance, Training Support, and Learning are presented below, along with coefficient alpha calculations of reliabilities.

Correlations

	N	Instructor effectiveness	Content Effectiveness	Format Effectiveness	On-the-job Performance	Training Support	Learning
Instructor Effectiveness	91	(.91)					
Content Effectiveness	91	.884**	(.96)				
Format Effectiveness	91	.818**	.791**	(.87)			
On-the-job Performance	91	.799**	.825**	.779**	(.78)		
Training support	91	.679**	.620**	.628**	.773**	(.92)	
Learning	80	.534**	.536**	.546**	.526**	.490**	(.92)

Note. ** Correlation is significant at $p<.01$ level (2-tailed). Reliabilities on the diagonal in parentheses.

The results indicate adequate internal consistency among items in each category (reliability) and strong correlations among categories.

Appendix E

Additional Analyses of Trainings Using the Distance Learning Format

Length of Training

Comparative analyses were conducted to explore the effect of length of training (1 hour vs 6 hour) on training outcomes 3 to 6 months following training presented in distance format. As depicted in the table below, there were no statistically significant differences in ratings of effectiveness, learning, and performance outcomes between shorter (COVID-19 Awareness - 1 hour) and longer (ICRA/COVID-19 - 6 hour) courses.

Longer-term Outcomes by Type of Training Attended

		COVID-19 Awareness (1-hour)		ICRA/COVID-19 Awareness (6-hour)			
Training Outcome	**N**	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***
1. Mean Instructor Effectiveness	75	6.40	0.75	6.49	1.07	0.18	.67
2. Mean Content Effectiveness	75	6.50	0.90	6.44	1.09	0.06	.94
3. Mean Format Effectiveness	75	6.10	0.83	6.18	1.09	0.14	.71
4. Overall Content	75	6.45	0.77	6.52	0.57	0.15	.69
5. Overall Instructors	75	6.55	0.94	6.70	0.47	0.69	.40
6. Overall Format	75	6.29	0.97	6.36	0.55	0.17	.68
7. Overall Effectiveness	75	6.45	0.89	6.52	0.51	0.13	.71
8. Training-related knowledge/skills	75	6.58	0.47	6.53	0.47	0.20	.65
9. On-the-Job Performance	75	6.25	0.98	6.21	1.13	0.02	.87
10. Training Support	75	6.49	0.68	6.32	1.24	0.57	.45
11. Trainers Prepared to Train	35	3.83	0.92	4.00	0.71	0.36	.55

Note. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Preparedness to Train rated on a scale ranging from 1 (Not at all Prepared) to 5 (Very Prepared).

Appendix F

Additional Analyses of Training Using Distance Learning Format

Date Attended Training

Comparative analyses were conducted to explore the effect of date training was attended (March/April; May/June; July/August) on longer-term training outcomes (3 to 6 months following training). As depicted in the table below, there were no statistically significant differences in ratings of effectiveness, learning, and performance outcomes between those attending courses in the March/April, May/June, or July/August time frame.

Longer-term Outcomes by Date Attended Training

		March/April;		May/June;		July/August			
Training Outcome	***N***	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***
1. Mean Instructor Effectiveness	75	6.42	0.74	6.35	1.42	6.54	0.51	0.26	.77
2. Mean Content Effectiveness	75	6.36	1.04	6.50	1.36	6.56	0.51	0.28	.75
3. Mean Format Effectiveness	75	6.24	0.81	5.95	1.37	6.16	0.70	0.57	.57
4. Overall Instructor	75	6.52	1.01	6.65	0.75	6.68	0.47	0.32	.72
5. Overall Content	75	6.44	0.89	6.50	0.61	6.50	0.51	0.06	.94
6. Overall Format	75	6.22	1.01	6.40	0.75	6.36	0.62	0.32	.72
7. Overall Effectiveness	75	6.37	1.01	6.50	0.61	6.57	0.50	0.51	.60
8. Training-related Knowledge and Skills	75	6.55	0.50	6.56	0.48	6.58	0.44	0.02	.97
9. On-the-job Performance	75	6.30	1.05	6.28	1.39	6.14	0.74	0.17	.84
10. Training Support	75	6.57	0.62	6.28	1.56	6.36	0.80	0.63	.53
11. Trainers Prepared to Train	35	4.21	0.58	4.00	0.63	3.60	0.99	2.23	.12

Note. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Preparedness to Train rated on a scale ranging from 1 (Not at all Prepared) to 5 (Very Prepared).

Appendix G

Additional Analyses of Training Using Distance Learning Format

Work/Occupational Experience

Comparative analyses were conducted to explore the effect of trainees' work/occupational experience (member, trainer, union representative) on longer-term training outcomes (3 to 6 months following training). As depicted in the table below, there were no statistically significant differences in ratings of effectiveness, learning, and performance outcomes between members, trainers, and union representatives.

Longer-term Outcomes by Work/Occupational Experience

	Union Member		Union Trainer		Union Representative			
Training Outcome	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***
12. Mean Instructor Effectiveness	6.28	0.88	6.43	1.06	6.65	0.45	0.77	.46
13. Mean Content Effectiveness	6.21	1.20	6.50	1.03	6.70	0.44	1.20	.30
14. Mean Format Effectiveness	6.01	0.94	6.15	1.10	6.24	0.59	0.28	.75
15. Overall Instructor	6.26	1.15	6.68	0.62	6.83	0.38	3.02	.05
16. Overall Content	6.16	0.96	6.61	0.55	6.56	0.51	3.00	.05
17. Overall Format	6.05	1.13	6.34	0.71	6.56	0.51	1.86	.16
18. Overall Effectiveness	6.16	1.12	6.53	0.56	6.72	0.46	2.98	.05
19. Training-related Knowledge and Skills	6.56	0.49	6.53	0.47	6.63	0.47	0.23	.79
20. On-the-job Performance	6.11	1.20	6.22	1.15	6.39	0.56	0.34	.71
21. Training Support	6.13	0.96	6.46	1.08	6.61	0.63	1.25	.29

Note. N= 75. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

Appendix H

Additional Analyses of Training Using Distance Learning Format

Work/Occupational Experience: Trade Membership

Comparative analyses were conducted to explore the effect of trainees' trade membership on longer-term training outcomes (3 to 6 months following training). As depicted in the table below, there were no statistically significant differences in ratings of effectiveness, learning, and performance outcomes between trainee's from the various trades.

Longer-term Outcomes by Trade Membership

		Elevator Constructors		Operative Plasterers' and Cement Masons		Painters and Allied Trades		Plumbers, Fitters, Welders & Service Techs			
Training Outcome	***N***	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***
22. Mean Instructor Effectiveness	65	6.67	0.46	6.64	0.43	6.35	1.22	6.48	0.60	0.58	.62
23. Mean Content Effectiveness	65	6.79	0.40	6.61	0.49	6.33	1.18	6.63	0.48	1.20	.31
24. Mean Format Effectiveness	65	6.20	0.71	6.44	0.54	5.98	1.23	6.24	0.76	0.67	.57
25. Overall Instructor	65	6.78	0.43	6.82	0.41	6.63	0.69	6.67	0.50	0.43	.73
26. Overall Content	65	6.61	0.50	6.55	0.52	6.56	0.58	6.56	0.53	0.05	.98
27. Overall Format	65	6.56	0.51	6.45	0.69	6.37	0.74	6.22	0.67	0.57	.63
28. Overall Effectiveness	65	6.67	0.49	6.55	0.52	6.48	0.58	6.56	0.53	0.43	.73
29. Training-related Knowledge and Skills	65	6.68	0.46	6.67	0.48	6.40	0.46	6.70	0.42	1.95	.13
30. On-the-job Performance	65	6.69	0.49	6.32	0.72	6.00	1.25	6.33	0.75	1.97	.12
31. Training Support	65	6.67	0.66	6.77	0.41	6.17	1.33	6.50	0.50	1.49	.22
32. Trainers Prepared to Train	34	4.00	0.00	3.14	0.90	4.09	0.75	4.00	--	2.91	.05

Note. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Preparedness to Train rated on a scale ranging from 1 (Not at all Prepared) to 5 (Very Prepared).

Appendix I

Additional Analyses of Training Using Distance Learning Format

Trainees' Technological Competence: Comfort with the Technology

Comparative analyses were conducted to explore the effect of trainees' technological competence on longer-term training outcomes (3 to 6 months following training). As depicted in the table below, trainees' Comfort with the Technology significantly influenced ratings of effectiveness, learning, and performance outcomes.

Longer-term Outcomes by Comfort with the Technology

	Somewhat Comfortable		Comfortable		Very Comfortable					
Training Outcome	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***	η^2	**Post-hoc differences**
Mean Instructor Effectiveness**	5.44	1.84	6.35	0.45	6.67	0.62	8.51	.00	.19	Somewhat Comf vs. Comf, Very Comf
Mean Content Effectiveness**	5.56	1.79	6.49	0.47	6.64	0.83	517	.00	.13	Somewhat Comf vs. Comf, Very Comf
Mean Format Effectiveness**	5.24	1.79	6,00	0.55	6.35	0.75	6,17	.00	.15	Somewhat Comf vs. Very Comf
Overall Instructor*	6.00	0.87	6.67	0.49	6.71	0.80	3.49	.03	.09	Somewhat Comf vs.Very Comf
Overall Content	6.11	0.60	6.39	0.50	6.58	0.74	2.07	.13	.05	NA
Overall Format*	5.89	0.93	6.00	0.49	6.52	0.83	4.58	.01	.11	Somewhat Comf vs.Very Comf
Overall Effectiveness	6.11	0.60	6.33	0.49	6.60	0.82	2.21	.11	.06	NA
Training-related Knowledge and Skills**	6.25	0.49	6.40	0.46	6.68	0.43	5.30	.00	.13	Somewhat Comf vs.Very Comf
On-the-job Performance**	5.33	1.75	5.97	0.74	6.50	0.86	6.25	.00	.15	Somewhat Comf vs.Very Comf
Training Support*	5.78	1.86	6.14	0.87	6.64	0.67	4.32	.01	.11	Somewhat Comf vs.Very Comf
Trainers Prepared to Train	3.67	0.82	3.88	0.60	4.00	0.92	0.38	.69	.02	NA

Note. N=75.). **p<.001. *p<.05. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Preparedness to Train rated on a scale ranging from 1 (Not at all Prepared) to 5 (Very Prepared

Appendix J

Additional Analyses of Training Using Distance Learning Format

Trainees' Technological Competence: Skill in Using the Technology

Comparative analyses were conducted to explore the effect of trainees' technological competence on longer-term training outcomes (3 to 6 months following training). As depicted in the table below, trainees' Skill with the Technology significantly influenced ratings of Instructor and Overall Effectiveness and Learning.

Longer-term Outcomes by Skill in Using the Technology

	Somewhat Skilled		Skilled		Very Skilled					
Training Outcome	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F***	***p***	η^2	**Post-hoc differences**
Mean Instructor Effectiveness*	6.41	0.63	6.40	0.75	6.84	0.32	3.46	.03	.09	Somewhat Skilled, Skilled vs. Very Skilled
Mean Content Effectiveness	6.47	0.52	6.40	1.03	6.88	0.28	2.68	.07	.07	NA
Mean Format Effectiveness	6.00	0.77	6.18	0.74	6.52	0.63	2.74	.07	.07	NA
Overall Instructor	6.50	0.71	6.62	0.98	674	0.45	0.51	.60	.01	NA
Overall Content	6.38	0.57	6.45	0.83	6.63	0.60	0.74	.48	.02	NA
Overall Format	6.15	0.73	6.24	0.99	6.63	0.50	2.15	.12	.06	NA
Overall Effectiveness*	6.23	0.51	6.48	0.99	6.79	0.42	3.29	.04	.09	Somewhat Skilled vs. Very Skilled
Training-related Knowledge and Skills*	6.41	0.46	6.56	0.48	6.80	0.32	4.29	.01	.11	Somewhat Skilled vs. Very Skilled
On-the-job Performance	6.17	0.72	6.24	1.04	6.58	0.65	1.39	.25	.04	NA
Training Support	6.48	0.71	6.40	0.72	6.63	0.78	0.59	.55	.02	NA
Trainers Prepared to Train	3.87	0.64	3.80	0.94	4.75	0.50	2.46	.10	.14	NA

Note. N=75.). *p<.05. Effectiveness items rated on a scale ranging from 1 (Very Ineffective) to 7 (Very Effective). Learning and Performance items rated on scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Preparedness to Train rated on a scale ranging from 1 (Not at all Prepared) to 5 (Very Prepared

Appendix K

Extent to Which COVID-19 Trainings Delivered In Distance Learning Format Met Training Needs: All Respondents

Question: Please explain if the training met your specific training needs. Please include suggestions for improving the COVID-19 training and ICRA/COVID-19 training and use of distance learning in your answer.
Training Needs Met
Training did meet my specific needs as an organizer.
The class was everything that I was looking for.
Yes- it met my needs
Yes, it taught me how to react to most situations.
Yes, it met my needs for now.
Yes, it met all needs
The training met our needs.
The training did meet my training needs.
Yes - it was very informative and being afraid to computers it was not bad at all.
Yes, it meet the training needs. I am more aware of my surroundings.
The training absolutely met my needs!
The training absolutely met my expectations!
Met all needs
Yes
Yes
Yes
I thought the training session was adequate.
Yes and no, I am no longer in the field, but make job visits.
Distance Learning
During these troubled times distance training is a must. I can see no way to improve how you operated the project
I thought the training went well it was my first introduction to online learning. It strengthened my thoughts there would be a viable way to instruct the classes during a time when we have to stay inside.
It was as good as it can be next to being in person
It was very good for me because I was sick at home but I was still able to take the class.
With online your options are limited. Maybe in breakout rooms have them be longer and use the white board then have the facilitator share them with main session.
I liked being able to Zoom the training. It was more comfortable and I was able to learn better.
The only challenge about the training is not on your schedule end, with me and our organization it will be mostly the members aptitude to use a computer
Training was effective, in person learning is best. Too many distractions on zoom from other participants doing multiple things at same time. Setting parameters would be effective. Not watching someone poolside.
Content/Materials

The class opened my eyes to the dangers of COVID-19 and the ways to present the information to students or members.
Material was updated and current
It met all the areas I was wanting to learn about.
Good basis for understanding protocols for workplace
Everything was up to date
It's the Power Point and just the facts of what you need to do the meat and the potatoes
The training was spot on and very specific.
It was good general training. Industry specific would be better but also I understand very difficult to do.
Course was very USA orientated. Did not research Canadian health and workplace standards. An hour or two of reading and it would have been relative. Basic workplace health and safety knowledge would have made course credible and relevant for Canada.
ICRA Certification
Certification in IRCA would be great.
Meets standards for ICRA certification would be great.
Interaction/Discussion
The training gave me content, learning exercises thru discussions and scenarios for the students and the ability to learn from other instructors from other parts of North America because as we see daily everyone's Covid-19 situation is ever changing at work/school and our daily life.
Smaller groups so there could be interaction
Better if the teachers were more connected with the students
Time Allotted
I would not mind if the presenters had more time on their subjects. Maybe slot an hour and a half for the session as opposed to just the hour.
Instructors
The trainer was well-informed and it was very eye opening
Instructor's knowledge of the subject.
Repeating too much drains the effect.
My only recommendation is to train and familiarize your CPWR instructors on how to use the virtual platform used to conduct your training. Tom had good command of Zoom but some of the other instructors struggled a bit with it.
General Positive
Very well done and very timely.
I'm very grateful for the work CPWR does. Thank you.
Nice job!
Yes, enjoyed the presentation
Not Applicable/None
N/A
N/A
None

Extent to Which COVID-19 Trainings Delivered in Distance Learning Format Met Training Needs: Union Representatives

Question: After completing the distance learning COVID-19 training or ICRA/COVID-19 training, do you feel the training met the needs of your members and trainers? Please explain areas of STRENGTHS and WEAKNESSES of the use of distance learning in your response.
Content
Very informative on new COVID-19
Helped me to keep my members informed
Yes, it was exactly what we were in need of. It was the right amount of time to commit to it.
Distance Learning Format
Strengths, you can stay in your office if a member needs something.
Good face to face information with content to back it up is always a learning plus.
The only weakness is the need to do the training online due to the pandemic. As with all training, butts in the seats is best.
General Positive
100%
Yes
Yes
Yes

Appendix L

MOST Valuable Aspects of COVID-19 Training Delivered in Distance Learning Format: All Respondents

Question: Which aspects of the training (e.g., format, content, teaching/learning methods) and use of distance learning were MOST valuable to you? Please explain.
Instructor Effectiveness
Instructors' knowledge of the topic was very good as well as their presentation.
Presenter was well prepared and delivered the presentation in a direct efficient manner. Job well done!
Teaching was good and well explained
The on-line training worked for me because of very good information and very good instructors who kept us engaged throughout.
Discussion/Interaction
Discussion and examples of what it is.
Discussion topic and examples of what they are referring to.
It was a very accessible and interactive class. Everyone felt comfortable asking questions to the instructors.
Most important was the conversation with the trainers and others in the session.
Breakout Rooms, and poll questions
Breakout rooms
Break out rooms
Breakout section, you can talk to smaller group
Breakout rooms, one-on-one training
Content
Content
Content
Content, as this was all new to us at the time.
Actual content was insightful
The content for myself is always the most important.
How to take care of yourself and prevent any hazards from affecting me or others
Material was done in a comprehensive way considering the delivery method.
I, as an instructor, find my "happy zone" where I will try to feed the students whether apprentices or journeypeople this content in way that they grasp the severity and need for urgency for taking this Covid-19 pandemic seriously.
The info on our PPE, things like disinfectant must lay wet before wiping the importance of always leading by example by wearing mask
The content was very helpful in teaching others in my work environment the importance of social distancing
To understand how this virus works and how to react to certain situations.
All COVID-19 information is always useful and valuable.
The most valuable part of the training was how to get COVID-19 and how to work around the virus.
The importance of the guidelines that should be followed to help prevent the spread of COVID and other diseases.

I believe the content was the most valuable because it enhanced my knowledge on the current Covid-19 situation.
Medical and scientific stats and facts about spreading and containing Covid-19.
Understanding my Legal rights
New information concerning COVID 19
Nothing I did not know already
Application of Information
Information, science based with practical application, is what we as instructors use as our foundation.
Pertinent to current building and training environment and convenient.
Knowing the risks that we are taking returning back to work.
Experiential Methods
Hands on exercises, group discussions in smaller groups with follow-up presentations to the whole classroom, I strongly endorse as part of training, which this class achieved. Yet in a distance learning situation unless it is in a "zoom" sort of set up (i.e. many participants simultaneously) that aspect is lost.
I was particularly appreciative of the group exercises because it allowed for better understanding person to person
Exercises
Visual Aids/Visual Platform
Charts
The visual aids such as charts with Information you can also see.
Seeing the actual data
The format was useful being face to face with the presenters online.
The actual digital platform (Zoom) used to deliver the virtual training. The course content was great but it was great to see Tom having good command of the platform. Some of the other CPWR instructors had a hard time with the platform but Tom had good command of it.
The Power Point was easy to understand and follow
It's the PowerPoint
PowerPoints
Use of Distance Learning
Made use of distance learning techniques which made it inclusive to a wide range of students during a time when in-person training is impossible.
Convenience
The distance learning is very important right at this moment you don't know if you are carrying the virus if you don't have any symptoms. To help stop the COVID 19 spread.
it was excellent. the only thing that would be better would be live and in person
General Positive
This was by far the best all-around training that I have ever participated in
The whole presentation - thank you

Appendix M

LEAST Valuable Aspects of COVID-19 Training Delivered in Distance Learning Format: All Respondents

Question: Which aspects of training (e.g., format, content, teaching/learning methods) and use of distance learning were LEAST valuable to you? Please explain.
Distance Learning Format
The distance learning part, just not my thing.
Being on-line and not being in person.
It's always more effective face to face
Format, not so concerned on how I receive the information as long as I have access to it.
Change is always tough, so virtual training is the only thing that experienced instructors had some small issues with.
Interaction
Not having the ability to interact
As always, I miss the in person interaction and discussions nor available because of COVID.
Didn't have as much help on work I was confused or struggling with
Takes more time to get answers to questions if you think of them after the class
Sometimes the breakout rooms are not a benefit overall if the materials are not read in advance of the course.
I think it should be mandatory to have your video on and participate in all break outs with volume on.
Allowing participants to utilize phones is convenient but isn't practical for learning or confirming participant engagement. Participants should have to use devices conducive to learning the content.
Technical Issues
Internet was a bit weak at times for sound and connection.
It a bit hard with internet connections at times.
Content
Repeat of COVID symptoms
Instructor did not understand workplace health and safety for Canada.
Political commentary.
Knowledge Assessment
Nothing was invaluable but I wish we had a test or some questions at the end
Learning/Teaching Methods
Learning methods
Lecture
Lecture
General Positive
I would like to see another class offered as a follow up.
I thought the whole training was valuable
I think the whole class was very interesting.
All the information was very valuable.
All content in this training was useful so it doesn't seem fair to say "LEAST valuable".

Everything is great!
I learned from all of it.
I found value in all of it
I found value in all material presented.
I thought it all equally informative
None/Not Applicable
N/A
N/A
N/A
n/a
n/a
None
None
None
No
No training for myself is invaluable. How and what I take from my training when it finally comes down to presenting it to the specific type of audience and the time, prior knowledge, job application in ICRA /Covid-19 or Covid-19 available to the class, will usually set the value level of what aspects of the training I have received .

Appendix N

Strengths and Weaknesses of COVID-19 Training Delivered in Distance Learning Format: Trainers Attending Training

Question: As a trainer, what do you feel are the STRENGTHS and WEAKNESSES of the CPWR distance learning COVID-19 and ICRA/COVID-19 Instructor Training session? Please provide specific examples.
Strengths
Instructor Expertise
Instructors very knowledgeable of their material
I think the speakers are very knowledgeable.
Instructors know the material.
Instructors know their topic.
The instructors gain buy-in.
Content
Content and materials
Very informative
Immediacy of COVID Training Delivery
Distance learning provided timely and job site relevant training to union members and signatory contractors who were returning to work after being told to shelter in place. We all needed immediate guidance on how we move forward completing projects and how we all stay safe while doing it.
Delivery
Discussions/Interaction
The reinforcement of the concepts with the breakout sessions were very valuable. The breakout sessions were engaging and provide a valuable diversion from listening to content.
It is far better than a webinar with no student/instructor interaction or only a chat box option.
General Positive
I felt the training session was very useful as presented.
All good
Weaknesses
Lack of Hands-on
In-person training allows for physical hands-on training exercises that virtual training do not
Breakout sessions are great, but the participant does not actually get to do or touch the physical exercise.
Breakout Room Issues
Breakout room management.
Breakout rooms can take away from the flow of the class if they are heavy in reading materials.
Attendee Issues
Participants were distracting not realizing they were on camera.
Attention span shortened
Technical Issues
Sometimes can't hear the information (volume)
General Positive

I didn’t find any weaknesses
General Negative
I am not a fan of distance learning

Strengths and Weaknesses of COVID-19 Training Delivered in Distance Learning Format: CPWR Instructors

Question: What do you feel are the STRENGTHS and WEAKNESSES of the CPWR distance learning COVID-19 and ICRA/COVID-19 trainings? Please provide specific examples.
Strengths
Instructor Expertise
We are lucky to have instructors who are experts in their different topics and always strive to be prepared and up to date for their classes.
Knowledgeable instruction of subject matter.
Strengths are the experienced and knowledgeable staff.
Participants for most trainings were craft instructors and active participants. This made the breakout rooms very successful.
Materials
The materials were very professional and easy to present.
The training materials were adapted well for this format.
Content
The COVID-19 information was great well put together and helped to inform the craftworkers of the dangers of the virus and how best to protect themselves and family.
General Positive
Very informative
Weaknesses
Lack of Face-to-Face
Maybe I am old school but, I am a believer in reading student's body language and this format does not allow that.
Nothing like being in classroom with students, this format doesn’t allow that.
Breakout sessions are fine but seem to fall a little short of actual in person group sessions.
Student Characteristics
When participants were apprentices some were not as interested but those that had family members that had been ill were very active and good case studies the other students could relate to.
Logistics of Distance Learning
Weaknesses when there are bad connections or people are less than comfortable with technology.
The biggest weakness I think we have is our instructors in different time zones and having students in a class from New York, Alaska, and Hawaii at the same time is tough to coordinate. Finding a comfortable time for everyone.
Sometimes can't hear the information (volume).
Length of Course
Time could have been expanded some to allow for more questions.

Appendix O

Challenges in Delivering COVID-19 Training in Distance Learning Format: CPWR Instructors

Question: As an instructor, did you experience any significant CHALLENGES using distance learning to deliver the COVID-19 training and ICRA/COVID-19 training? What SUGGESTIONS can you offer to address these challenges?
Technology Learning Curve
At first, overcoming the fear of teaching on the Zoom platform, learning to share screens, videos, etc. and becoming comfortable teaching in front of a camera and computer screen - being in a room by yourself and not in front of a live class. For new instructors, several training sessions to practice would be helpful.
Learning Zoom and adapting my teaching to it.
Not really. Just learning all the ins and outs of zoom delivery systems. Involvement and repetition is the cure!
Not personally...and the more I do it, the more comfortable I will be. I enjoy it.
Equipment
I could use a second monitor as all I have is a laptop.
Some hardware and bandwidth challenges.
Internet connections and allowing students to participate on their cell phones. Talking and participating in a class, where we are showing and discussing information off of a PowerPoint slide, cannot be effective when they are driving a car and their phone is sitting in a carrier. Should require them to be stationary and on a computer. Have had issues with tablets and Chromebooks also, which some don't support the Zoom functions.
Interaction
Getting students to interact but have no suggestions on how to fix that.
Always having a backup instructor is vital.

Challenges in Delivering COVID-19 Training in Distance Learning Format: Trainers Attending Training

Question: Did you experience any significant CHALLENGES in training your members using distance learning to deliver the COVID-19 training and ICRA/COVID-19 training?
Technological Issues
Yes, the technology is a big setback for me
Just minor issues with older members being hesitant to use technology.
Just internet issues not related to this course.
The significant challenges were out of the control of participants and providers; namely intermittent connectivity or lag time in the video feed or volume of participants. It wasn't often and usually was with the participants' Internet.
Accessibility Issues
Not everyone has hardware or Internet access
Interaction
Harder to read classroom.
No, just keeping them active
Haven't Yet Instructed Training

Haven't had the opportunity yet
I have not done any online training yet
Political/Personal Issues
It seems different folks have allowed politicization of the pandemic, and some local members have adopted beliefs not based on the science.
General Positive
We have had only one training and it went well
No, it made me more confident.
No/None
None
No
No

Appendix P

Reported Best Practices/Lessons Learned of Health and Safety Training Delivered in Distance Learning Format: CPWR Instructors

Question: What were the Best Practices/Lessons Learned from instructing the COVID-19 and ICRA/COVID-19 trainings? Please provide any additional comments you may have about the use of distance learning for other health and safety training courses in your response.
Interaction/Learner Engagement
Interactive training to maintain interest is invaluable. In some of the craft trainings of OSHA 502 the use of different styles of breakout rooms and report backs such as jigsaw puzzle with participants to share answers to projects, group polling, Kahoot, case studies etc...
Convenience of distance learning is great. The challenge is keeping the learners engaged. If they come to training with a positive attitude its very helpful. (not unlike in person training) Offering information that is new is always the goal. Having the learner leave the session with a sense of worth is the key.
Preference for Classroom Learning
Trying to get past my feelings about in classroom learning. I also spent more time reviewing classroom material, so I was more prepared.
Wish it was all in-person but this is the runner up and it's great.
Instructor Preparation
Instructor Coordination Meetings!! Getting together to work out what we were going to do was vital. Practice what we were going to do and make sure everything was functioning on instructor's computers was important.
Practice materials to be taught also being in front of a camera. This is an interesting way to teach from the way we have taught in the past and as instructors this type of training is something we will need to become more adept at to raise the bar of our training.
As the leader in safety training we should strive to be the best not only with the materials we teach, but also how we present ourselves on screen. Training on basic lighting and camera placement so we have a professional look would help us raise the bar.
Technology
All that is available through Zoom to be as effective as possible at a distance.
So, having accessibility to other distance training aids like Kahoot, Quizlet etc. so we can add components that are still on message that help to keep students (younger) students engaged would be a big help.
Equipment
Two monitors would allow you to see your presentation and the students.

Reported Best Practices/Lessons Learned of Health and Safety Training Delivered in Distance Learning Format: Union Trainers

Question: Please provide additional comments you may have about the use of distance learning for the COVID-19 and ICRA/COVID-19 courses or for other health and safety training courses.
Orientation to Distance Learning
Develop a zoom etiquette to distribute to participants when sending out the invite. Possibly distribute it as a pdf but also make it mandatory to read and agree to when accepting the invite. I'm not sure how to do that but this could reduce possible interruptions or distractions.
Provide an instructor orientation into the training platform itself (Zoom) prior to the actual training course.
I would like to have more information on teaching online courses that usually require a great deal of hands on
Importance of Distance Learning

Until the end of the current pandemic, I believe we are using the safest most effective methods via Live online training.
I think we have no other options as yet. We need to embrace the new normal.
Materials
Power points with the Facts.
Interaction
Actually doing some activity instead of just sitting listening.
General Positive
Just keep up the great work in coming up with other ideas for us
Well done!
I like it!
Not Applicable/None
No comment
None
N/A

Reported Best Practices/Lessons Learned of Health and Safety Training Delivered in Distance Learning Format: Union Representatives

Question: Please provide additional comments you may have about the use of distance learning for other health and safety training courses.
Need for Distance Learning
It is a necessity at this time!
Are there other classes available?
General Positive
Great course
Not Applicable/None
None at this time.
N/A

Appendix Q

Suggestions to Improving COVID-19 and ICRA/COVID-19 Trainings in Distance Learning Format: Union Members, Union Trainers, and Union Representatives

Question: How could this course be improved?
Instructors
Instructors Expertise
Gary always is very informative in a relaxed and efficient manner.
Instructors were very knowledgeable on topic.
Instructors were knowledgeable and informative.
Very qualified instructors... Thanks Guys
Instructors could have included more personal experience to highlight the power point bullets.
Please ask Spence to speak up a bit.
Instructors: General Positive
Instructors did a great job.
As always, Gary did a fantastic job!
Both instructors did a great job!
The instructors did a very good job.
I think the instructors did a great job.
The Instructors did a great job with the online course presentation.
Thank you to all for putting on this training program.
Content
Current and Relevant
All in all, our members will benefit from the course as is and make them and their workplace safer.
Learned important facts about covid19 that were not discussed on the news.
The course provided helpful information based on what is known at this time.
Very informative course.
Continue updating as more becomes known.
We need to stress on the fact this is airborne, Droplets is a term for larger particle. Information is stating that airborne particles can be so small you cannot see them and that 6 feet is based on old research it can be further than that. With that I know PPE should be the last resort but mask might become a norm.
More Advanced/In-Depth Information
Provide information that is useful above an elementary level. The group in attendance were union managers and OSHA instructors.
More medical information pertaining to caring for someone or yourself infected with Covid-19.
More in-depth conversation about negative and positive pressure barriers when changing locations. Better description of the order and need for each.
Add more detail to the TTT. if a class is 8 hours for instructor to teach, TTT should be longer so you have added detail to share as you teach the class.

If you read the paper watch the news or follow your state guidelines and are involved with your State and City Building Trades this information is very redundant. Mostly common sense.
Had information most people knew.
More Industry- and Organizationally-Specific Information
I personally would have liked to have heard more about the current pandemic, and how sites that are in areas where they weren't shut down, how/what measures are being applied to the site, and tile/terrazzo trades specifically. While it's probably hard to get a good baseline on that as this is a fluid thing currently.
For me the course was really an overview of things that I already know about COVID-19 and prevention. The instructors tried to give ideas of how different trades may mitigate the exposure and observe the proper social distancing. The ideas were very generalized and leave a lot of unknowns for the people who take the course. I think this course might be more effective if given along with a company's adapted policies and procedures to comply with the new regulations so that people know what they actually need to do while working. If they were tied together it would help understand what precautions to take and how exactly to do so.
Not sure how you can improve it. A lot of information has already been out there because of the situation. Maybe discuss what your options are when your employer can't get the proper PPE but you are willing and wanting to work. Thanks for the class.
Talk more about plumbing related risks.
It could be more construction oriented.
The course could be improved by making it a little more industry specific for each trade. I know this would be a very difficult task.
More trade specific information.
Less time spent on the virus and more time on industry-specific preventive measures
It could have more information about the transmission and life expectancy of Covid-19 thru the ductwork systems on the jobsite.
In the discussions about hospital work make it more about protecting the worker not the patients.
Need to include how this safety affects our area
The guys weren't even from Massachusetts. Maybe a class related to our safety according to state would be better. Wouldn't recommend this class to a single person.
Very repetitive
Format
Pace/Length of Course
Some of the instructors went a little too fast in their presentation.
I thought the appropriate amount of time was spent presenting the material.
Seemed brief but to the point
Perhaps needs to be a bit longer.
Add one more break
1 more added break
Materials
Supply a pdf file containing the course material.
More PowerPoints

Please provide me with a copy of the PowerPoint presentation. Thank you for the class!
Include handout of course materials to be used for note taking.
It would be nice to receive the power point used in the class, so we could look it over ourselves later on if we had new questions come up. To be able to use the power point as a reference sheet.
Need video on set up containment
Use of Zoom Platform
Overall, I enjoyed this new platform of learning. Thank you
The core info is there, however the presentation needs work, I acknowledge that the Zoom platform is a challenge for instructors, but there were long stretches where the power point was simply read to me.
Zoom is not the same as real world interaction. But with the current situation being as it is, was a great outlet to learn and interact with Brothers and Sisters from the Building Trades.
Video conferencing is difficult to entice group participation, but I think these two Instructors did a great job.
It would probably be better presented in a short 15 min. video that you could watch at your leisure.
Advanced Technology: Technical Issues
Better internet connection or speed or maybe both
There were some technical difficulties also.
Interaction/Class Participation
more class participation
more class participation
more discussion less power point
It is very insightful to have the large student body from which to draw actual real world experiences from.
I think the class went very well and the input and interaction from the students was very beneficial.
More interaction instead of lecture
More interaction
My group was very quiet. Maybe some participation and class discussions would have been helpful
More Q and A with attendees. Maybe a Kahoot type game or quiz
If there were any questions coming into the class would it have been possible for the students to send a quick email with their questions and possibly talked about them when it was relevant to a certain part of the presentation?
Maybe a few poll/quiz questions to keep audience engaged.
Make it more entertaining and ask us questions so that we have no choice but to be involved
Using other methods other than reading every word from every PowerPoint slide.
Hands-on: Equipment

Provide a 3M N95 reusable Mask with interchangeable cartridge filters to everyone who takes the course prior to returning to work.
Having examples of ppe on hand to show live may be helpful.
Have the instructors have some related props for demonstration purpose. Ex: Face Mask types
Provide safety masks.
Provide safety masks.
Assessing Learner Knowledge/Understanding
Maybe a small review test just to drive the highlights home.
Checking in with us to see if we had any questions which provided the opportunity for class discussion.
General Negative
The class could be improved by having the class in-person.
Online is a difficult way to learn
In person, as well as the instructors did, I prefer in person training.
The class could improve by having it in-person.
It was a pointless class. I learned nothing. Useless.
General Positive
Very good course and presented correctly. I feel ICRA related training will become a norm as training in the way we looked at it is changing. I believe 100% in face to face training but if we cannot it is a responsibility for us to train them on how to be safe. We sometimes forget about the art of safety. We are forced in this time not to do face to face training, but we have members working today. We had to look at the art side and find the next best avenue. Safety can never stop no-matter what obstacle are put in front of us Great job for CPWR staff and instructors to adapt and overcome to reach the members
Course was presented very well given the way the Instructors were required to teach the class.
Trainers and training material will always be adjusted and modified to the audience involved. I think the material was well designed and delivered in a comfortable and professional manner. Great job by everyone involved. Thank you
I was satisfied with the course, and if it were longer with more content, I would have gladly participated. I am glad I was invited to be part of this learning group. Thanks.
It was well done. I have seen several presentations on COVID-19 and this was right at the top of the list.
Excellent course
It does not need to be improved it is good how it is.
I thought it was good the way it was, thank you
Good class
NA
No

I thought it was done well.
n/a
The class was complete
Very informative
Thank you.
All good!
Thanks
Can’t think of any
The course is fine the way it is taught.
Keep helping us to be aware
I think the class went great and does not need to improve.
Great
I feel that the course is great just the way it is.
Was good
great class
The course was well presented that’s all
I thought it was informative and well done
Perfect
Very well done
The course was well presented that’s all
I thought it was informative and well done
Perfect
Very well done
Class was well worth the time it was very informative and presented well.
Everything was great - both days were really good for learning new things.
None at this time.
I thought it was very well presented.
Awesome!! Thank you!!
Was good
Thank you
General COVID-19 Issues
By finding a way to end COVID 19 today
Develop a Vaccine for COVID 19 or understand infection and transmission of the virus better.

Appendix R

General Principles for Excellence in Distance Learning for Occupational Health and Safety Training

It is important that trainees, trainers, and training organizations are invested in the distance learning on-line experience. The following highlights general principles to assist those designing and delivering occupational health and safety training in a distance learning format to achieve the desired learning and performance outcomes.

These recommendations are presented for trainers and training organizations to consider prior to, during, and following the training event and are consistent with the recommended best practices in adult learning and instructional excellence in health and safety training.

Before Training

One of the overarching principles for training excellence in the distance learning format is being prepared and organized prior to the training session. The following are advanced to enhance the preparation for and organization of the training.

1. Assess trainees' needs. It is critically important to **learn about trainee needs and preferences** ahead of the training session. This information can be gathered when trainees register for the session and can be included in a short survey that assesses trainees' needs (e.g., technological, language, organizational and industry-specific) to enhance relevance and better ensure interaction during training. Trainees can also be encouraged to email the instructor with specific questions or industry- trade- or organizationally-specific questions prior to the session. In addition, trainees can be encouraged to post questions and share information on a social learning page or message board to encourage participation and interaction among trainees before the course starts. The more one that is known about the audience in advance of training, the more likely that the training will be relevant and useful in enhancing safety at their workplace.

2. Provide orientation trainings for trainers and trainees. Participants have uneven access to and varied expertise with the technology. Therefore, to create a supportive virtual environment conducive to learning, orientation training is encouraged for both trainers and trainees. **Orientation training provides basic information and guidelines that are expected for all participants**. These sessions include structured information including: fundamental of accessing and using the platforms (e.g., Zoom; https://zoom.us/events); expectations for the virtual classroom (roles and responsibilities); distance learning etiquette (see "Etiquette for Online Training Success" below); and a checklist that trainees and trainers can use before, during, and following the training.

Etiquette for Online Training Success
• Download training information ahead of time, including all handouts and PowerPoints so that information is available during training even if technical difficulties arise.
• Complete all pre-training assignments and assessments to provide any specific needs or questions to the instructors before training begins. In addition, any specific questions about the content or job/trade-specific questions should be posed ahead of the first session so that they can be addressed during training.
• Test your computer compatibility with the platform ahead of the training. Log-in to the session at least 5-10 minutes ahead of time to ensure that it is running properly.
• Present a professional online presence. Dress professionally and be aware of your online background.
• Limit distractions/multitasking. Trying to pay attention to multiple devices or tasks decreases the quality of learning. Instead, focus on the training.
• Mute your microphone when not speaking to avoid adding unexpected background noise into the training session.
• Leave video/camera on at all times during class (do not revert to blank screen).
• Share comments and questions in text chat and raise hand to ask questions.

3. Post all course-related information. Along the same vein, trainers should **post and make available all course information**, including training objectives, course outline, materials (e.g., PowerPoint slides, handouts) and training agenda, to participants ***in advance*** **of the training session**.

4. Practice, practice, practice (with feedback). Trainers should **conduct a rehearsal of their presentation in the distance learning format**, particularly in the case of new content and/or instructional techniques. This is not meant to be exhaustive, but rather a run through of each topic using all the tools for the presentation in the sequence that will appear in the training, at least once. This can be done informally, or more formally as part of a demonstration to a more experienced trainer with feedback.

5. Conduct Trainer Coordination Meetings. Similar to the face-to-face format, the lead trainer should **coordinate trainer meetings (pre-training, following each training session) to manage the activities of the training team** (lead trainer, co-trainer, technology assistant). These meetings clarify expectations and roles and responsibilities to assist trainers in honing the requisite skills to meet the needs of the learners in the distance learning environment. Historically, these sessions have been utilized as part of the instructional activities for the face-to-face training sessions, and this strategy should be similarly incorporated into the instructional activities for the distance learning courses. Worth noting is that these sessions tend to occur informally between sessions and at the end of each day during face-to-face trainings. It is recommended that the informal session also be conducted as a short debrief for the online training.

During Training

Instructor knowledge and skill was consistently identified as a key driver of effective training in distance learning format. CPWR instructors are consistently recognized as leaders in use of interactive training techniques that encourage active participation, knowledge sharing, and integration of relevant content that can be directly applied to the workplace. The following is offered to support these techniques in the distance learning format.

6. Encourage active participation and interaction. Similar to recommendations for face-to-face training, instructors are encouraged to **solicit specific regular interaction from the learners.** A hallmark of the CPWR Worker Training is use of exercises, activities, and discussions to engage trainees and enhance communications and information sharing. This practice is equally critical for success in distance learning but may entail using unfamiliar technology and techniques (polls, breakout sessions, Kahoot!, Quizlet). These techniques also will allow the trainers to "read the room" virtually by checking for learner understanding in real time. It is important that careful attention is given to using the technology in ways that the platform to ensure participation. For example, while trainees are familiar with face-to-face small group exercises, online breakout sessions involve appropriate techniques to ensure effectiveness (see "Best Practices to Encourage Participation: Breakout Rooms" below). Similarly, trainers can encourage regular use of the platform during lectures and group discussions (raising hand, using chat) to maintain attention and participation during less interactive sections of the training.

Best Practices to Encourage Participation: Breakout Rooms
• Set expectations at the beginning of the breakout exercise
• Include a mix of participants for each breakout session
• Provide clear instructions for the breakout activity
• Assign a facilitator for each breakout room
• Provide the expected duration of the breakout session
• Indicate how trainees can get assistance, if needed, during the breakout session

7. If possible, have a co-instructor for each session. The **co-instructor can assist with content delivery, the technology** (technical difficulties of trainees, chat responses), **and assume the role primary instructor in the case of technical difficulties** of the primary instructor (screen freezing, connection dropped). Technical issues may interfere with training and how they are handled is important. Having at least two instructors, one of whom supporting technical needs, facilitates this process.

8. Be flexible and open. Being organized does *not* mean being inflexible. It is important that trainers create an open and flexible learning environment to accommodate the range of trainees learning needs and make them feel respected and supported. **Monitor pace and content according to trainees' level of understanding.** Being organized will allow for flexibility when needed (when the unexpected occurs).

Following Training

As with face-to-face instruction, training should be continuously improved. In addition, the distance learning format provides additional opportunities sharing up-to-date information and resources following training.

9. Evaluate training to ensure continuous quality improvement of the training. At the conclusion of the training, **courses should be evaluated to assess effectiveness and learning outcomes**. These evaluations **should be completed by both the trainers and trainees** to gather multiple perspectives of the training. This information can be synthesized to ensure more accurate and thorough depiction of effectiveness and provide feedback for continuous quality improvement of the training.

10. Share resources and information. It is important to continue the information sharing and continued access to resources following course completion. The distance learning format is a very viable and efficient means for sharing this information. For the trainees, these resources include **recordings of the online training, training-related information from the CPWR Clearinghouse, and other relevant online resources**. For trainers, it is also helpful to provide the most current information on **best practices and recommended new learning technologies and platforms.**

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