

September 25, 2023

Differing Effects of In-person and Online Methods of Delivering JHSC Certification Part 1 Training



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Differing Effects of In-person and Online Methods of Delivering JHSC Certification Part 1 Training

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Abbreviations

F2F, face-to-face

HSA, Health and Safety Association

JHSC, joint health and safety committee

MLITSD, Ministry of Labour, Immigration, Training and Skills Development

OHS, occupational health and safety

OHSA, Occupational Health and Safety Act

Executive Summary

Introduction

The COVID-19 pandemic accelerated the ongoing trend toward online learning in many spheres of life, including occupational health and safety (OHS) training. However, uncertainty remains as to whether online delivery methods are as effective as in-person methods. A recent rapid review of systematic reviews, which compared the effectiveness of face-to-face (F2F) and instructor-led synchronous distance learning modalities for work-related training (both in-service and occupational preparation), suggested that similar levels of knowledge could be achieved following training. However, the research available for the rapid review was mostly conducted with highly educated workers and students in health care, so its generalizability to a more diverse group of workers is unknown. As well, OHS training was not represented in the body of research.

The study presented here helps address the research gaps just described. It centers on a provincially regulated standardized OHS training, the first of a two-part joint health and safety committee (JHSC) certification training. By collaborating with three training providers serving varied industrial sectors, a diverse group of study participants was recruited. The primary research question was: *How do face-to-face (F2F) learning, online instructor-led synchronous distance learning and online self-paced e-learning training delivery methods differ in their post-training knowledge achievement* among Ontario workers undergoing Joint Health and Safety Committee (JHSC) Certification Part 1 training? Secondary research questions asked about other factors affecting knowledge achievement, other training outcomes, and learner suggestions for improving the training.

Methods

The study centred on a pre-post survey of learners undergoing JHSC Certification Part 1 training with one of three Ontario training providers: Infrastructure Health & Safety Association (IHSA), Public Services Health & Safety Association (PSHSA), and Workplace Safety & Prevention Services (WSPS). Learners were delivered training in one of three self-selected modalities: 3-day face-to-face (F2F) learning, 3-day online instructor-led synchronous distance learning or online self-paced e-learning (approx. 13 hrs.). They were recruited to the study between January and

September 2022. Data were collected from 899 learners, representing a participation rate of 26%.

JHSC-related knowledge was the primary study outcome, measured before and after training. Five other study outcomes (engagement during training, perceived utility of the training, perceived applicability of the training, self-confidence to use learning, and intention to use learning) were measured after training. Multiple regression analyses were used to estimate the effect of modality upon knowledge and the other measures, while accounting for other factors that might affect learning (education, English as a first language, manual/non-manual job, JHSC tenure, age, gender, workplace size, pre-training knowledge, HSA). Learners were also asked open-ended questions about their suggestions for improvements in training content and delivery.

Results

The learners were highly varied in their individual characteristics (e.g., age, education), job (e.g., manual/non-manual, unionization) and workplace characteristics (workplace size, industrial sector), within each modality. Some of these characteristics differed across modalities too. As well, there was a marked pre-training difference in how much learners said they liked the modality in which they were enrolled. Whereas participants in F2F and e-learning modalities had substantial proportions, 52% and 40%, reporting they liked their respective modality 'a lot', the corresponding value for distance learners was 16%.

Modality was associated with a difference in post-training knowledge score (% of knowledge questions answered correctly, 0% - 100% theoretical range): in comparison with those receiving distance learning, those receiving F2F training scored a statistically significant 2.5% higher on a post-training knowledge measure, after accounting for other factors. Those receiving e-learning scored almost the same as those receiving distance learning (a statistically non-significant 0.4% higher). It follows that the expected difference in score between e-learning and F2F learning, if it had been possible to compare them directly, would have been about 2.1%. All of these differences are considered to be 'not practically significant' because they are much lower than the criterion of 10% established with training experts involved with this study.

Several factors were found to affect the post-training knowledge score independently of modality: education, manual/non-manual job (i.e. whether physical effort required), JHSC tenure, number of employees in the workplace, pre-training knowledge score, and which HSA delivered training.

For the five secondary outcomes, average scores were favourable for all modalities. However, across these measures, scores obtained from F2F learners were more favourable than scores from distance learners, which were in turn were more favourable than scores from e-learners, after accounting for other factors. Statistically significant between-modality differences were seen for three of the measures: engagement during training, perceived utility of the learning and self-confidence to use the learning.

In response to two open-ended prompts about improving training content and delivery, learners responded with far more positively-oriented responses, such as 'very well conducted' (over 56-71%, depending on modality and prompt), than with improvement-oriented responses (29-44%). Some content-related improvement-oriented themes emerged from the data related to navigating the Occupational Health and Safety Act (all modalities), and, in e-learning, explaining PEMEP (people environment, materials, environment, process), and the repetitiveness of content. With regards to training delivery, predominant improvement-oriented themes included engagement (across modalities), narration or narrator's voice in e-learning and technical issues with the distance learning online platform. Positive aspects frequently commented upon included the trainers in F2F/distance learning and the convenience of e-learning.

Discussion

The study had several methodological strengths, including the training having the same learning objectives across modalities, the use of a learner sample with diverse characteristics, and the use of multiple regression analytical methods to reduce interference by other factors when estimating between-modality differences in outcomes. The study had some limitations too, including the scope of the outcome measures. It would have been ideal to measure the skills for which the training was intended to prepare the learner, such as finding information from the Occupational Health and Safety Act, using a hazard management tool, or conducting an investigation. We note too that outcomes were measured shortly after the training.

We therefore do not know directly whether there would have been modality differences in knowledge retention or the transfer of knowledge to the workplace (i.e. learners' actual JHSC practices in the workplace).

Practical implications

This study provides evidence that F2F, distance and e-learning are equivalent in their ability to ensure JHSC-related knowledge achievement of learners following JHSC Certification Part 1 training. The evidence therefore suggests that all three modalities equally equip learners with the fundamental knowledge needed to be a certified JHSC member. This finding of modality equivalency in knowledge achievement is likely generalizable to other short-term OHS trainings, and other occupationally-related trainings too, in which the aim is to impart new knowledge.

In contrast, the finding of modality equivalency should not be generalized to outcomes not measured in this study, including skill acquisition or transfer of learning to the workplace, especially given the differences seen in post-training confidence to use the learning. All modalities achieved on average, high levels of self-confidence in the learner, which research has shown is just as important as knowledge with regards to the transfer of knowledge to the workplace. Nevertheless, statistically significant differences in self-confidence in using the learning were measured. Self-confidence was greatest with F2F learning, followed by distance learning, followed by e-learning. The extent to which these differences would lead to differences in OHS practice in the workplace is unknown.

We consider now the specific context of Ontario JHSC certification training, in which most Part 1 learners will subsequently take Part 2 certification training, currently offered in F2F and distance modalities only. It is not yet known whether the differences in self-confidence seen in Part 1 are later mitigated in Part 2 or further magnified, depending on the modality used in Part 2. Further magnification of differences in self-confidence would be of concern, because of the known relationship between self-confidence and actual transfer of learning to the workplace. In the context of OHS systems in Ontario workplaces, we do not yet have a good understanding of the extent to which modality in certification training, Parts 1 and 2 combined, impacts the ability of certified members to fully participate. Given the large number of workers who undergo JHSC certification training each year, even small differences, once aggregated across all Ontario workplaces, could be meaningful.

Introduction

The COVID-19 pandemic accelerated an ongoing trend toward online learning in many spheres of life, including occupational health and safety (OHS) training. However, uncertainty remains as to whether online delivery methods are as effective as in-person methods. A recent rapid review of systematic reviews (Robson et al., 2022), which compared the effectiveness of face-to-face (F2F) and instructor-led synchronous distance learning modalities for work-related training (both in-service and occupational preparation), suggested that similar levels of knowledge could be achieved following training. However, the research available for the rapid review was mostly conducted on highly educated workers and students in health care, so its generalizability to a more diverse group of workers is unknown. As well, OHS training was not represented in the body of research.

The study presented here helps address the research gaps just described. It centers on a provincially regulated standardized OHS training, the first part of a two-part joint health and safety committee¹ (JHSC) certification training (MLITSD 2023a). For JHSCs in the province of Ontario, which are typically required in workplaces with 20 or more employees, at least one worker and one employer representative must complete the two-part certification training. The content of JHSC Certification Part 1 training consists of the legal aspects of OHS related to JHSCs and workplace parties (e.g., roles, responsibilities, rights) and activities conducted by JHSC members, including hazard identification, risk assessment and control, workplace inspections, and incident investigations. The JHSC Part 1 training is delivered in three modalities in Ontario: F2F, online instructor-led synchronous distance learning, and online self-paced e-learning modules.² By collaborating with three training providers serving varied industrial sectors, a diverse group of study participants was recruited.

Research questions

There were four research questions addressed by the study.

¹ JHSCs are worker-employer structures which advise on OHS matters (see MLITSD 2023c).

² A fourth and less commonly delivered modality is a blend of F2F and e-learning, which is not considered in this study.

Primary research question

1. How do face-to-face (F2F) learning, online instructor-led synchronous distance learning and online self-paced e-learning training delivery methods differ in their post-training knowledge achievement among Ontario workers undergoing Part 1 joint health and safety committee (JHSC) certification training?

Secondary research questions

2. Which other factors (e.g. education) are associated with post-training knowledge achievement (after accounting for training delivery method)?
3. How do face-to-face (F2F), distance, and e-learning training delivery methods differ in other training outcomes (learner engagement, perceived utility, perceived applicability, self-confidence, intention-to-use) among these workers?
4. What suggestions do learners have for improving the content and delivery of the training?

Conceptual model

The conceptual model shown in Figure 1 depicts the relationship among the concepts measured in the study. The model is not intended to be a comprehensive model of learning transfer, but rather, an illustration of the causal relationships among the concepts measured in the study. It is based upon the following well-recognized research syntheses (Alvarez et al., 2004; Blume et al., 2010; Burke & Hutchins, 2007; Burke et al., 2006; 2011; Colquitt et al., 2000; Kraiger et al., 1993).

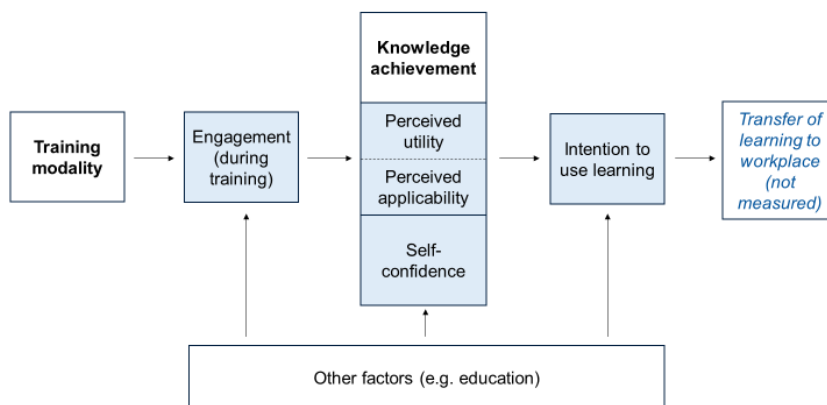


Figure 1: Model of the relationship among study concepts

Methods in Brief

This section describes the study methods briefly. More details can be found in Appendix A: Methods in detail. Methods were approved by the Health Sciences Research Ethics Board of the University of Toronto.

The study centred on a pre-post survey of learners undergoing JHSC Certification Part 1 training with one of the three Ontario training providers. Learners were delivered training in one of three modalities: face-to-face (F2F) learning, online instructor-led synchronous distance learning and online self-paced e-learning. The study design was observational rather than experimental in nature, since participants were not allocated to different training modalities randomly, but instead chose their own modality. As per the program standard (MLITSD 2023a), F2F and distance learning involved three days of instruction, 6.5 hours per day (usually delivered on successive days), for a total of 19.5 hours. Self-paced e-learning was designed to last 13 hours in total and could be spread over as much as a month, according to the learner's preference.

Selection of training providers

The three providers involved in the study were selected because they were delivering Part 1 training in at least two of the three modalities in moderate to high volumes. All three were Ontario sector-based Health and Safety Associations (HSAs) [MLITSD 2023b]: Infrastructure Health & Safety Association (IHSA), Public Services Health & Safety Association (PSHSA), and Workplace Safety & Prevention Services (WSPS). These organizations have a provincial mandate to support enterprises in selected sectors through training, education and consulting. They receive core funding from the provincial government and generate revenue through the sale of products and services.

Recruitment of learners

Learners were recruited to the study between January and September 2022. For each HSA in the study, learners were recruited from all modalities in which participant numbers were projected to be sufficient for analysis. This led to learners being recruited from one HSA across three modalities, and from the other two HSAs across two modalities. Depending on the HSA and modality involved, recruitment

was initiated either at the point of course registration or at the start of training. Potential participants were told they would receive \$60 in appreciation of their participation if both surveys were completed. Survey data were collected from 899 learners both pre- and post-training: F2F, 250 learners; distance, 298 learners; and e-learning, 351 learners. This represents a participation rate of 26% overall.

Survey measurement

The survey procedure is described in Appendix A and the pre- and post-training questionnaires can be viewed in Appendix B.

Knowledge. JHSC-related knowledge was the primary study outcome. Surveys measured knowledge both before and after training with multiple-choice and true-false questions. Twelve questions were asked before training and 24 questions were asked after. Questions were all based on those in the three standardized post-training tests developed by the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) for training providers to use in their routine assessment of learning achievement. Questions were adopted for the study either verbatim or by making minor modifications. An example question is, “Which of the following is/are examples of physical hazards?” and possible responses were the following: noise, chemicals, both noise and chemicals, none of the above.

The knowledge questions used post-training were different from those used pre-training. As such, they are valid for between-group comparisons of pre-training knowledge or of post-training knowledge, as done in this study, but not for within-group pre-post estimates of knowledge gain. In analyses, answers to knowledge questions were expressed as a percent correct score out of 100 (theoretical range of 0% to 100%).

Secondary study outcomes. Five other study outcomes (engagement during training, perceived utility of the training, perceived applicability of the training, self-confidence to use learning, and intention to use learning) were measured after training with the following questions:

- How engaging was the training?
- How useful is what you learned in the training?
- How applicable to your workplace is what you learned in the training?
- How confident do you feel using what you learned at the training?

- How likely are you to use what you learned in the training?

Responses to these questions were measured on a 6-point scale, e.g., 1 = not at all engaged to 6 = extremely engaged. In analyses, answers to secondary training outcome questions were treated as continuous variables.

Other study variables. Also included in the questionnaire were questions about the individual learner (age, gender, education, English as a first language, race/ethnicity, first letter of home postal code), their job (work role, manual/non-manual job (i.e. whether requiring physical effort), union membership), and their workplace (number of employees, industry sector). There were questions about the JHSC context too (their tenure, whether employer/worker representative, reason for taking training, planning to take Certification Part 2 training.)

Suggestions for improvement. An item was included in the survey to elicit suggestions for two types of course improvement: “Please share any suggestions you might have about ways in which training could be improved.” Two free text boxes accompanied the request, one labeled “Suggestions about the content of the training” and the other “Suggestions about the way the training was delivered.”

Statistical analysis

Analyses were conducted separately on the following training modality comparisons:

- Comparison 1: Face-to-face (F2F) and distance-1 (HSA pair 1)
- Comparison 2: E-Learning and distance-2 (HSA pair 2)

One HSA was represented in both comparisons (because they had learners in all three modalities in the study), whereas the other two HSAs were represented in only one comparison each (because they had learners in only two modalities in the study). There were thus two HSAs involved in each comparison, with a different pair involved in each. The distance learning groups used in the two comparisons differ accordingly (described in the report as distance-1 and distance-2, respectively).

Statistical analyses were carried out using SAS 9.4 software, unless otherwise indicated. Descriptive statistics (means, standard deviations, frequencies, correlations) were computed to describe the learners’ characteristics and study variables. Multivariable linear regression modeling was used with each of the comparisons to estimate the difference associated with training modality for each of knowledge and the secondary study outcomes, while adjusting for other factors that

might affect those measures (education, English as a first language, manual/non-manual job, JHSC tenure, age, gender, workplace size, pre-training knowledge, HSA). Model selection is described in Appendix A. Tests of statistical significance used the conventional criterion of $\alpha = 0.05$, so that p-values lower than this indicate statistical significance.

Further details about variables derived from the survey for analysis can be found in Appendix C.

Qualitative analysis

Responses to the open-ended items soliciting suggestions for improvement about training content and delivery were coded and themes were identified (Braun & Clarke, 2006). Each response could receive more than one code. For each item, themes were organized into three major categories: Positive Comments, Suggestions/Areas for Improvement, Other. The approach to creating themes was primarily and initially inductive. In a later stage of the analysis of responses related to content, efforts were made to organize themes in alignment to the content areas found in the JHSC Certification program standard (MLITSD 2023a).

Results

Characteristics of learners by modality

The number of learner participants in the study was 899 (F2F, 250; distance, 298; e-learning, 351).³ The learners were highly varied in their individual and workplace characteristics, within each modality, as shown in Table 1.

Table 1 also shows there are substantial differences across modalities in the characteristics of learners. Those receiving training in distance or e-learning modalities, compared with F2F, were more likely to be female, have college/university education, be in a non-manual job, and be in the service sector. These differences are in part reflective of how clientele differs across the training providers (and training providers not being distributed evenly over the modalities). It also reflects how some types of learners are more likely to be found in particular modalities. That is, even within a given HSA, differing distributions of learner characteristics are seen across modalities. Additional information is available in Appendix D.

Reasons for taking training

As shown at the bottom of Table 1, there was diversity in the reasons learners reported for taking the training. About half (48.5%) said their JHSC needed a new certified member, while 19.1% said that all JHSC members took training in their organization. Other reasons included being a health and safety representative (7.2%), keeping training up to date in case their (potential) employer required it (6.8%), completing the requirements for the National Construction Safety Officer program (4.3%), or other reasons (12.8%).

³ These 899 participants answered at least 11 of 12 knowledge questions in the pre-training survey and the five secondary outcome questions in the post-training survey. A slightly smaller number ($n = 887$) also provided answers to at least 22 of the 24 knowledge questions and these were used in the analysis with knowledge as the outcome.

Table 1 Characteristics of study participants by training modality

Characteristic	F2F (n = 250)		Distance (n = 298)		E-learning (n = 351)		Total (n = 899)	
	n	% of total	n	% of total	n	% of total	n	% of total
Age (yrs.)								
<35	115	46.0	126	42.3	124	35.3	365	40.6
35-44	71	28.4	83	27.9	111	31.6	265	29.5
45-54	46	18.4	59	19.8	75	21.4	180	20.0
55+	16	6.4	28	9.4	32	9.1	76	8.5
NR	2	0.8	2	0.7	9	2.6	13	1.5
Gender								
Male	187	74.8	129	43.3	138	39.3	454	50.5
Female	61	24.4	163	54.7	205	58.4	429	47.7
Other/NR	2	0.8	6	2	8	2.3	16	1.7
Education								
≤ secondary/ apprentice/trade	119	47.6	65	21.8	67	19.1	251	27.9
College/CEGEP	72	28.8	115	38.6	109	31.1	296	32.9
University	57	22.8	117	39.3	167	47.6	341	37.9
NR	2	0.8	1	0.3	8	2.3	11	1.2
English as 1st language								
Yes	205	82.0	253	84.9	287	81.8	745	82.9
No	43	17.2	44	14.8	56	16.0	143	15.9
NR	2	0.8	1	0.3	8	2.3	11	1.2
Manual job*								
Yes	141	56.4	90	30.2	121	34.5	352	39.2
No	107	42.8	207	69.5	222	63.3	536	59.6
NR	2	0.8	1	0.3	8	2.3	11	1.2
Workplace size (# people)								
< 20	58	23.2	35	11.7	27	7.7	120	13.4
20-49	69	27.6	84	28.2	111	31.6	264	29.4
50-250	96	38.4	125	42.0	150	42.7	371	41.3
> 250	25	10.0	53	17.8	54	15.4	132	14.7
NR	2	0.8	1	0.3	9	2.6	12	1.3
Sector								
Construction	149	59.6	61	20.5	19	5.4	229	25.5
Manufacturing	33	13.2	32	10.7	72	20.5	137	15.2
Other goods-producing	13	5.2	11	3.7	11	3.1	35	3.9
Wholesale & retail trade	10	4.0	27	9.1	20	5.7	57	6.3
Transportation & warehousing	18	7.2	22	7.4	20	5.7	60	6.7

Characteristic	F2F (n = 250)		Distance (n = 298)		E-learning (n = 351)		Total (n = 899)	
	n	% of total	n	% of total	n	% of total	n	% of total
Education	1	0.4	7	2.4	31	8.8	39	4.3
Health care & social assistance	2	0.8	64	21.5	74	21.1	140	15.6
Public administration	7	2.8	23	7.7	19	5.4	49	5.5
Other services	10	4.0	44	14.8	66	18.8	120	13.4
Other	2	0.8	4	1.3	7	2.0	13	1.5
NR	5	2.0	3	1.0	12	3.4	20	2.2
Unionized								
Yes	80	32.0	68	22.8	67	19.1	215	23.9
No	168	67.2	229	76.9	276	78.6	673	74.9
NR	2	0.8	1	0.3	8	2.3	11	1.2
JHSC tenure								
< 6 mos.	165	66.0	200	67.1	216	61.5	581	64.6
6 mos. to 2 yrs.	44	17.6	49	16.4	66	18.8	159	17.7
> 2 yrs.	39	15.6	48	16.1	61	17.4	148	16.5
NR	2	0.8	1	0.3	8	2.3	11	1.2
Reason for taking training								
• JHSC needed a new certified member	105	42.0	150	50.3	181	51.6	436	48.5
• All JHSC members take Certification 1 training	37	14.8	60	20.1	75	21.4	172	19.1
• Am HS representative (no JHSC at workplace)	27	10.8	19	6.4	19	5.4	65	7.2
• Keeping JHSC training up to date in case employer needs it	22	8.8	18	6.0	21	6.0	61	6.8
• Completing requirements for the NCSO program	27	10.8	10	3.4	2	0.6	39	4.3
• Other	30	12.0	40	13.4	45	12.8	115	12.8
• NR	2	0.8	1	0.3	8	2.3	11	1.2

HS representative, health and safety representative; n, number of participants; NCSO, National Construction Safety Officer; NR, not reported. * Manual was defined in the questionnaire as requiring physical effort. Appendix D includes more characteristics, reports the characteristics of distance-1 and distance-2 groups separately, and includes statistical test of differences.

Pre-training preferences for respective modalities

Table 2 shows that participants in F2F and e-learning modalities had a stronger preference for their respective modality than distance learners did for theirs: 52% in F2F and 40% in e-learning reported they usually liked learning ‘a lot’ in their respective modality, compared with 16% in distance learning.

Table 2: Participant pre-training preferences for their respective modality

‘How much do you usually like learning...’	‘...in person with an instructor’	‘...online with a live instructor’	‘...online with self-paced modules’			
<i>Answered by:</i>	<i>F2F (n = 250)</i>	<i>Distance (n = 298)</i>	<i>E-learning (n = 351)</i>			
A lot	129	51.6	48	16.1	139	39.6
Quite a bit	82	32.8	88	29.5	96	27.4
Somewhat	25	10.0	87	29.2	76	21.7
A little bit	10	4.0	27	9.1	24	6.8
Not at all	0	0.0	20	6.7	9	2.6
<i>No experience with this</i>	2	0.8	27	9.1	7	2.0
<i>NR</i>	2	0.8	1	0.3	0	0.0

The table has responses to three different questions, each pertaining to a different modality. All three questions began with ‘How much do you usually like learning...’. The remainder of the question for F2F learners was ‘in person with an instructor (in-class learning)’; for distance learners, ‘online with a live instructor (distance/virtual classroom learning)’; and for e-learners, ‘online with self-paced modules and no instructor (e-learning).’

n, number of participants; NR, not reported.

Between-modality differences in post-training JHSC-related knowledge scores – descriptive results

Figure 2 compares the pre- and post-training knowledge scores (measured as % of questions answered correctly on knowledge test) for learners in F2F and distance-1 training modalities. Both pre- and post- training knowledge scores are similar across the two modalities. The differences in post-training knowledge scores are not statistically significant. Figure 3 compares the pre- and post-training knowledge scores for learners in e-learning and distance-2 groups. As in the first comparison, both pre- and post-training knowledge scores are similar and the post-training between-modality difference is not statistically significant.

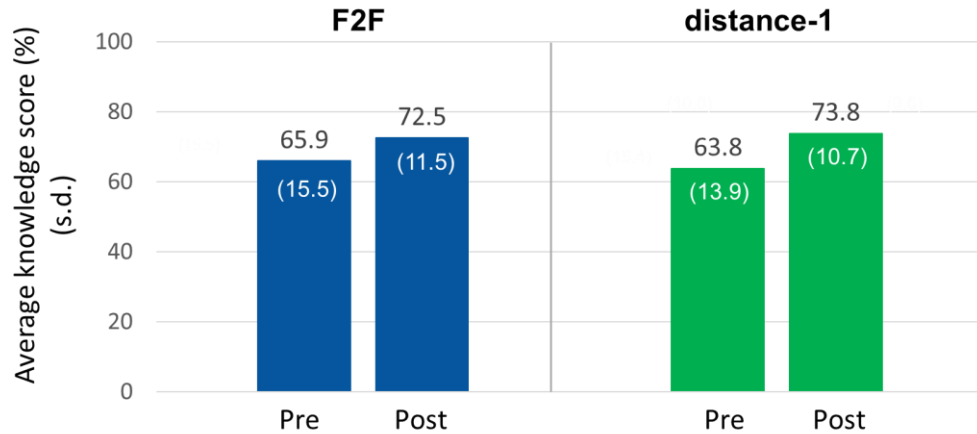


Figure 2: JHSC knowledge score pre- and post-training: F2F vs. distance-1

Average pre- and post-training knowledge scores for F2F and distance-1 groups (n = 247 and n = 192 participants, respectively). Score is the % of knowledge questions in the survey answered correctly. Average score is shown outside the bar and standard deviation inside the bar. Differences between the two pre-training values and between the two post-training values, respectively, are not statistically significant.

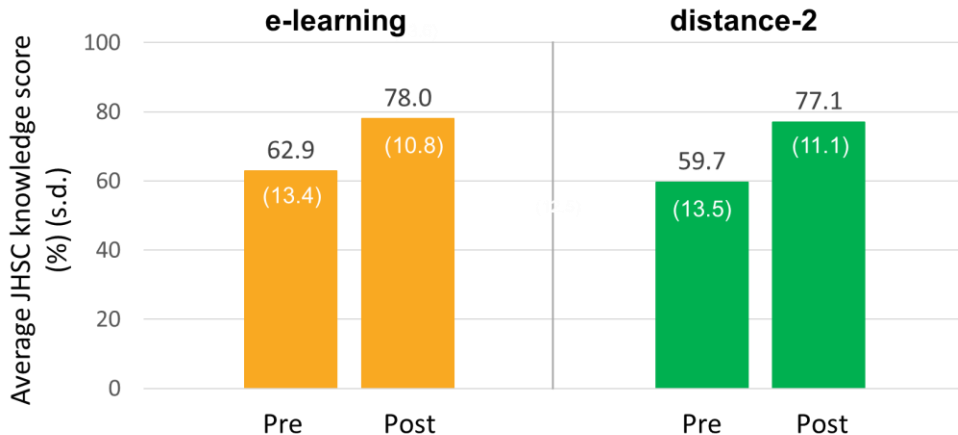


Figure 3: JHSC knowledge score pre- and post-training: e-learning vs. distance-2

Average pre- and post-training knowledge scores for e-learning and distance-2 groups (n = 343 and n = 201 participants, respectively). Score is the % of questions answered correctly on knowledge test. Average score is shown outside bar and standard deviation is shown inside bar. Differences between the two pre-training values are statistically significant (p = 0.008). Differences between the two post-training values are not statistically significant.

Since the left-hand and right-hand panels in each of Figures 2 and 3 are similar, they suggest that post-training knowledge achievement was not substantially affected by training modality. But there is uncertainty about drawing such a conclusion because of the differing characteristics, such as education, manual/non-manual job, and JHSC tenure, across modalities (Table 1 and Appendix D). Such characteristics could also affect post-training scores, potentially ‘confounding’ the results about modality. Multiple regression modeling was therefore also used to estimate the between-modality difference in post-training knowledge score. This technique takes into account any other differences between the groups being compared, so that the separate effect of modality is estimated, as are the separate effects of each of the other variables included in the model.

Between-modality differences in post-training JHSC-related knowledge scores – multiple regression results

The results from two separate multiple regression analyses are summarized in Table 3. One analysis showed that *learners taking F2F instruction achieved an estimated 2.5% higher in post-training knowledge score than those taking distance learning*, after taking into account learner differences in age, gender, JHSC tenure, manual/non-manual job, education, English as a first language, workplace size, pre-training knowledge, and which HSA delivered training. The difference of 2.5% is *statistically significant*. The second analysis showed that *learners taking e-learning instruction scored an estimated 0.4% higher in post-training knowledge score than those taking distance learning*, after taking into account learner differences, but this difference is *not statically significant*.

Table 3: Differences in post-training knowledge score associated with modality (multiple regression results)

Modality comparison	Difference in post-training knowledge score (%)	95% confidence interval
F2F versus distance-1	2.5	0.3, 4.7
e-learning versus distance-2	0.4	-1.4, 2.2

The table shows the estimated difference in post-knowledge score associated with the difference in modality, based on results of two separate multiple regression analyses shown in Appendices E and F. The analyses take into account learner differences in age, gender, JHSC tenure, manual/non-manual job (i.e., requiring physical effort), education, English as a first language, workplace size, pre-training knowledge score, and which HSA delivered training. The 95% confidence interval is the range in which the true value of the difference is likely to fall. Statistically significant results are shown in **boldface**.

Synthesis of the two regression analyses: effect of training modality on post-training knowledge score

Figure 4 illustrates the effect of modality on the post-training knowledge score, combining the results from the above two regression analyses. The overall average post-training knowledge score of 75.0% for all distance learners in the study, is used as the reference. Regression modeling then suggests that, on average, and after accounting for other factors, F2F instruction would result in a knowledge score of 77.5%. The difference of 2.5% is statistically significant yet small, when considered relative to the theoretical range of knowledge score (0% to 100%). Regression modeling also suggests that e-learning would result in a knowledge score of 75.4%. The difference of 0.4% is even smaller and is statistically insignificant. Figure 4 also makes apparent that an *imputed estimate of the F2F-to-e-learning difference in knowledge score can be made: 2.5% - 0.4% = 2.1%*. In summary, the range of inter-modality differences in post-training knowledge scores (both regression estimates and the imputed difference) ranges from 0.4% to 2.5%.

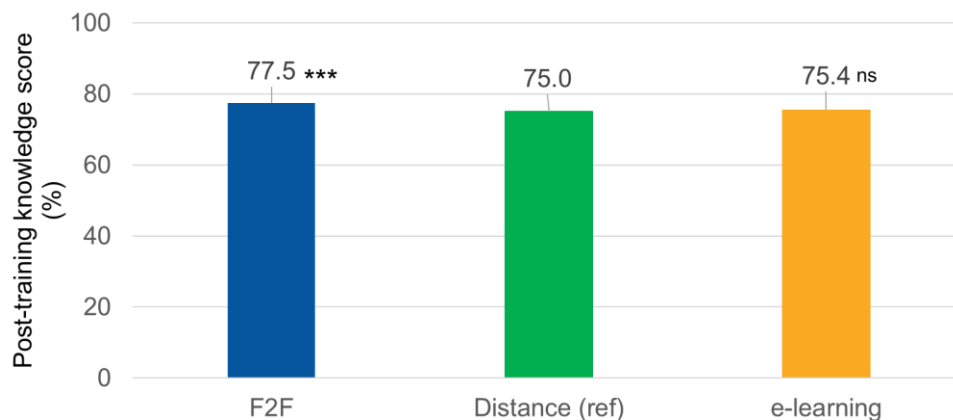


Figure 4: Illustration of the effect of modality alone on post-training knowledge score (based on regression analysis)

Using the average post-training knowledge score of 75.0% for distance learners as the reference, the effect of only modality, isolated from the effects of other variables, on the post-training scores for F2F and e-learning is illustrated (based on the regression models summarized in Table 3 and shown in detail in Appendices E and F). The statistical significance of the estimated F2F-distance difference of 2.5% and the estimated e-learning-distance difference of 0.4% is shown: ***, $p < 0.001$; ns, not significant.

Other factors affecting post-training knowledge score

In Table 4, the other variables associated with statistically differences in the post-training knowledge score, determined in the two regression analyses referenced above, are summarized. The variables found to result in a higher post-training knowledge score (when all other variables including modality are accounted for) in at least one of the two regression analyses, are the following: higher education, non-manual job, long JHSC tenure and higher pre-training knowledge score. As well, being from a workplace with less than 20 employees resulted in a lower score. And which HSA delivered the training was associated with a difference too. All differences in final knowledge score were 5% or less. Notably, none of English as a 1st language, age or gender were shown to have an independent effect on the final knowledge score.

Table 4: Other variables associated with differences in post-training knowledge score (based on the two regression analyses)

Variable	Effect of variable, isolated from other variables, on post-training knowledge score (%)	
	From F2F versus distance-1 regression	From e-learning versus distance-2 regression
HSA non-reference (ref: HSA reference)	-4.5***	1.2
Education (ref: secondary/trades or less)	3.6 (college)**	0.9 (college)
Non-manual job (ref: manual)	4.7 (university)**	2.3 (university)
No. of employees (ref: > 250)	2.5*	3.5***
JHSC tenure (ref: < 6 mos.)	-4.5 (<20 employees)*	-3.2 (<20 employees)
	-1.4 (6 mos to 2 yrs)	1.2 (6 mos to 2 yrs)
	0.8 (> 2 years)	3.8 (> 2 yrs)**
Pre-training knowledge score (difference per 1% increase of pre-training score)	0.03	0.2***

ref., reference. Post-training knowledge score is based on the percentage of questions answered correctly. Results are based on regression models reported on in Table 3 and Appendices E and F, which adjusted for the variables listed here, as well as English as a 1st language, age, gender and modality. 'Manual' refers to jobs requiring physical effort. Statistical significance is indicated with the use of boldface and symbols: ***, p < 0.001; **, p < 0.01; *, p < 0.05.

Exploration of statistical interactions between modality and other variables

For each of the statistically significant variables shown in Table 4, additional regression analyses explored whether there was a statistical interaction between it and modality. In other words, analyses were undertaken to see if the main results shown in Table 3 and Figure 4 would be different for different types of learners. In only one case was an interaction found to be statistically significant: learners with non-manual jobs were found to achieve higher post-training knowledge scores in F2F classes than in distance classes -- about 5% higher -- whereas for learners with manual jobs, achievement was the same in both modalities (and similar to learners with non-manual jobs in distance classes). Detailed results of this analysis are found in Appendix G.

Between-modality differences in five other study outcomes – descriptive results

Five other outcome measures were used to compare the learning experience and effects of training across the three training modalities:

- engagement during training
- perceived utility of the learning
- perceived applicability of the learning
- self-confidence in using the learning
- intention to use the learning.

Each outcome was measured on a 6-point scale, e.g., 1 = not at all engaged to 6 = extremely engaged.

As Figures 5 and 6 show, across modalities, there were favourable ratings on all these measures. In response to the question about engagement during training, average ratings ranged between 'engaging' and 'very engaging'. Average ratings on the remaining measures, across modalities, were close to or at the 'very' level of the response scale: 'very useful,' 'very applicable,' 'very confident,' and 'very likely to use.' Figure 5 also shows that all of the secondary study outcomes were more favourable for learners in F2F learning than for those in distance learning. Figure 6 shows that all measures were less favourable for learners in e-learning than for those in distance learning. In both figures, the differences for engagement, perceived utility and self-confidence were statistically significant.

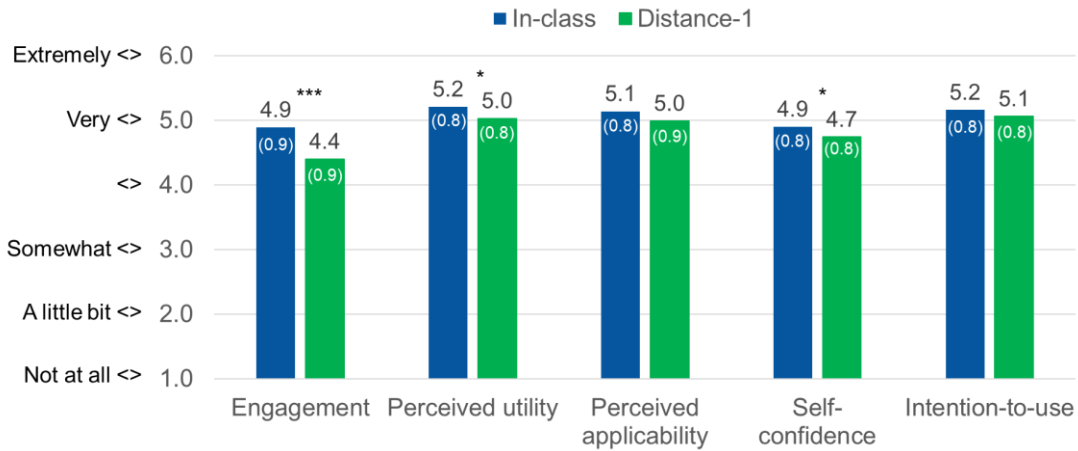


Figure 5: Secondary study outcomes: F2F vs. distance-1

<> represents a word or phrase, which differs according to the concept assessed. For the five scales, respectively, the word or phrase is <engaging>, <useful>, <applicable>, <confident>, <likely to use>. Full questions are in the Methods in Brief section. *, p < 0.05, ***, p < 0.001.

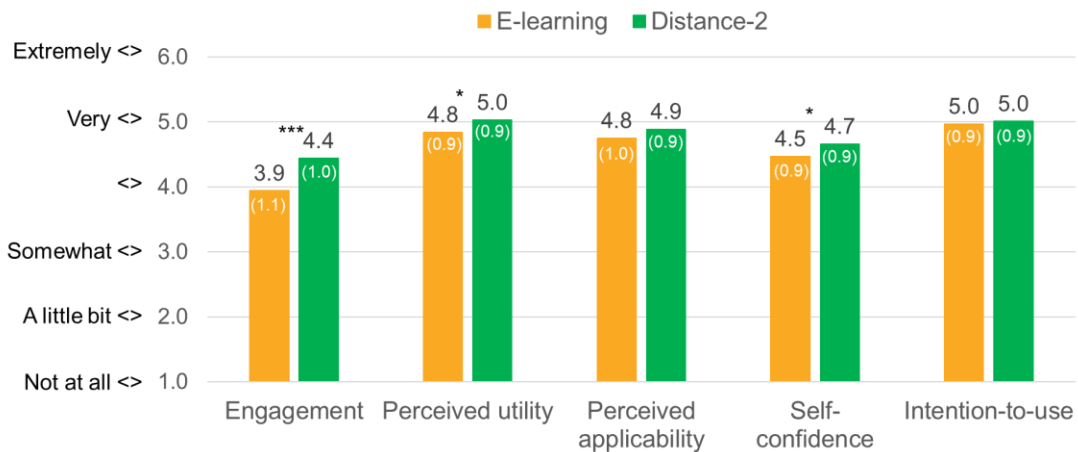


Figure 6: Secondary study outcomes: e-learning vs. distance-2

<> represents a word or phrase, which differs according to the concept assessed. For the five scales, respectively, the word or phrase is <engaging>, <useful>, <applicable>, <confident>, <likely to use>. Full questions are in Methods in Brief section. *, p < 0.05, ***, p < 0.001.

Between-modality differences in five other study outcomes – multiple regression results

A series of regression analyses were carried out with the five secondary outcome measures to estimate the differences in outcome scores related to modality alone (Table 5). Consistent with the descriptive results above, *for all five measures, F2F learning led to higher scores than distance learning, and e-learning led to lower scores than distance learning*, after accounting for other factors affecting the measure. As indicated in the table, *differences were statistically significant for three of the outcomes*:

- engagement
- perceived utility
- self-confidence

The largest modality effects were seen with the engagement scale. There was a 0.59 difference in engagement score estimated in the F2F versus distance analysis and a difference in score of -0.52 e-learning versus distance analysis (Table 5). These values are equivalent, respectively, to 12% and -10% of the five-unit span of the response scale. An illustration of the differences in the engagement score associated with modality type is shown in Figure 7a. The illustration also makes apparent how an estimate of 1.11 (equivalent to 22% of the response scale) can be derived as the estimated difference in engagement scores that would be associated with a F2F vs. e-learning comparison, with adjustment for other factors. Relative to the entire response scale, the range of absolute⁴ effects found with the engagement scale was therefore 10-22%.

For perceived utility, scale score differences of 0.26 and -0.18 were derived from the F2F-to-distance and the e-learning-to-distance analyses, respectively (Table 5, Figure 7b). An imputed value of 0.44 can be derived for a hypothetical F2F-to-e-learning comparison. Relative to the entire response scale, these three differences associated with modality have a range of absolute effects of 4-9%.

⁴ Absolute value is the magnitude of a value without regard to its sign. For example, the absolute value of -10 is 10.

Similarly, for self-confidence, scale score differences of 0.19 and -0.20 were derived from the F2F-to-distance and the e-learning-to-distance analyses, respectively (Table 5, Figure 7c). An imputed value of 0.39 can be derived for a hypothetical F2F-to-e-learning analysis. Relative to the entire response scale, these differences associated with modality correspond to a range of absolute effects of 4-8%.

Table 5: Summary of results for modality alone in regression analyses with secondary outcomes

Outcome	Estimated difference in outcome score (1-to-6 scale), associated with difference in modalities	
	F2F versus distance-1 (see Appendix H)	e-learning versus distance-2 (see Appendix I)
Engagement	0.59***	-0.52***
Perceived utility	0.26**	-0.18*
Perceived applicability	0.16	-0.13
Self-confidence	0.19*	-0.20*
Intention-to-use	0.15	-0.05

Values in the table are the regression coefficients for training modality from 10 separate regression models adjusted for age, gender, education, English as a first language, JHSC tenure and manual/non-manual job (see Appendices H and I for the models). Statistical significance is indicated with the use of boldface and symbols: ***, p < 0.001; **, p < 0.01; *, p < 0.05.

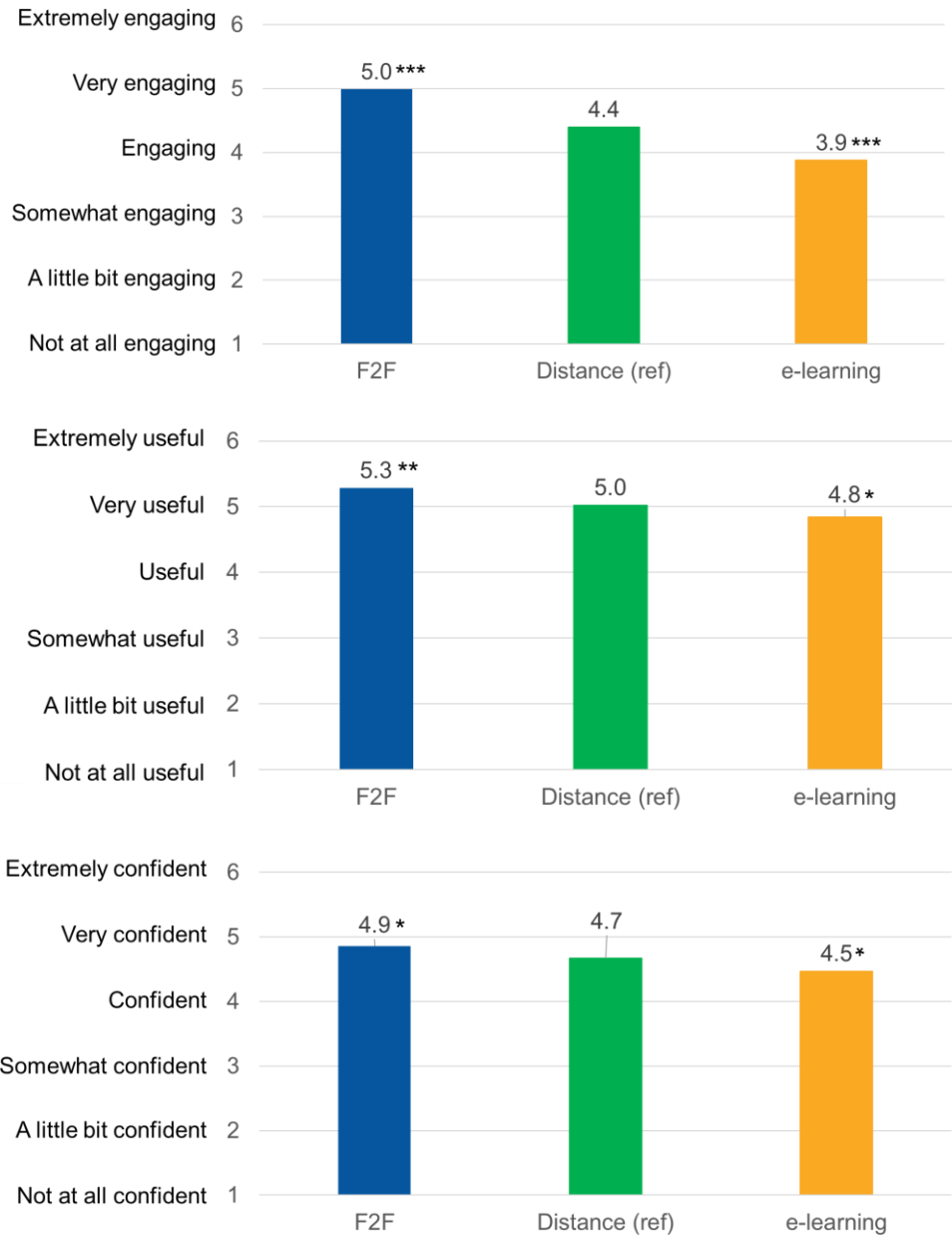


Figure 7a-c: Illustration of how engagement, perceived utility, and self-confidence measures differ as a result of only modality

Using the average score for distance learners as the reference, the effect of only modality, isolated from the effects of other variables, on the scale scores is shown. Modality effects are from the data in Table 5. The statistical significance of the effects is shown: *, $p < 0.05$, **, $p < 0.01$, ***, $p < 0.001$. Abbreviation: ref, reference.

Learner suggestions for improving training content

Learners were asked for suggestions for improving the content of JHSC Certification Part 1 training. Of 899 participants, 347 individuals provided a response (see Table 6 and Appendix J). Though the question sought areas for improvement, 56-68% of respondents, depending on modality, provided a positive comment (e.g., 'content was great and relatable'), while 31-44% either suggested an improvement or identified an area needing improvement.

The most frequently identified content area for improvement related to the Occupational Health and Safety Act (12-19%). A major concern in this area was difficulties learning to navigate the physical 'green/orange book' or the Internet version of the Act. E-learners (14% of them) in addition remarked they would prefer less memorization of which number/clause content is found and more attention to the content itself.

The other most frequently mentioned areas of improvement were found among e-learners (11% of e-learners for each of the following):

- Better explanation of PEMEP (people, environment, materials, environment and process)
- Content seemed repetitive

More detailed results can be found in Appendix J, including illustrative quotes.

Table 6. Number and % of respondents providing suggestions about content improvements, by theme

Category Theme Sub-theme	F2F (n = 118)		Distance (n = 100)		E-learning (n = 129)	
	n	% of F2F	n	% of distance	n	% of e-learning
Suggestions/Areas for Improvement	36	31.0	32	32.0	57	44.2
OHSA Act	15	12.7	15	15.0	25	19.4
<i>Less emphasis on memorization</i>	1	0.9	0	0.0	18	14.0
<i>More on navigation of OHSA</i>	11	9.3	9	9.0	9	7.0
Hazards, controls, inspections	4	3.4	3	3.0	17	13.2
<i>PEMEP better explained</i>	1	0.9	0	0.0	14	10.9
Suggestions for additional content	6	5.1	8	8.0	5	3.9
<i>Industry-specific training</i>	4	3.4	7	7.0	4	3.1
General	4	5.9	3	3.0	15	11.6
<i>Content repetitive</i>	3	2.6	0	0.0	13	11.0
Positive Comments	80	67.8	65	65.0	72	55.8
Other – Not Related to Course Content	6	5.1	12	12.0	6	4.7
Satisfied with training	3	2.5	7	7.0	5	3.9
Delivery-related other than Table 7	2	1.7	5	5.0	0	0.0

Learners were prompted for their suggestions of how to improve the content of the training. Of 899 individuals, 347 provided a response. Responses were coded and themes developed. A single respondent's response could be represented more than once in the table if it was coded to more than one theme). Themes/sub-themes representing 5% of respondents in at least one modality is included here. A more detailed presentation is found in Appendix J. Abbreviations: OHSA, Occupational Health and Safety Act; PEMEP, people, equipment, materials, environment and process.

Learner suggestions for improving training delivery

Learners were also asked for their suggestions for improving the delivery of Certification Part 1 training (see Table 7 and Appendix K). Of 899 participants, 512 individuals provided a response. As above, responses were more often positive in nature, e.g., ‘very well conducted’ (60-71% of all respondents, depending on modality), than they were improvement-oriented (29-42% of all respondents).

The most frequently occurring suggestion across modalities (11-18% of respondents) was for the training to be more engaging, with suggestions to make the training more interactive, add more videos, have more engagement with other students, use case studies, use scenarios, use more visual presentations and improve slides. On the other hand, about 7-14% of learners had something positive to say related to engagement.

Of all e-learner respondents, about 28% had some e-learning-specific improvements to suggest, often about the narration or narrator voice. Of all distance learners, 16% identified some distance-learning-specific issues, often related to the technical issues with the online platform.

Regarding the positive comments, simple general comments like “training was great, no suggestions” was one of the most frequent types across modalities (23-31%). Trainers in both F2F (28%) and distance (20%) were often the focus of positive commentary. Among the e-learning-specific positive comments, its convenience was most commonly noted (14% of e-learners) followed by it being easy to navigate (5%). More detailed results can be found in Appendix K, including illustrative quotes.

Table 7. Number and % of respondents providing suggestions delivery improvements, by theme

Category Theme Sub-theme	F2F (n = 153)		Distance (n = 183)		e-learning (n = 176)	
	n	% of F2F	n	% of distance	n	% of e-learning
Suggestions/Areas for Improvement	44	28.8	74	40.4	73	41.5
More engaging	28	18.3	20	10.9	24	13.6
E-learning-specific	-	-	-	-	49	27.8
<i>Narration and narrator voice</i>	-	-	-	-	15	8.5
Pace/length/volume of material	9	5.9	15	8.2	8	4.5
Distance-specific	-	-	30	16.4	-	-
<i>Technical</i>	-	-	18	9.8	-	-
Positive Comments about Delivery	109	71.2	114	62.3	105	59.7
General	48	31.4	46	25.1	40	22.7
Trainer	42	27.5	36	19.7	-	-
E-learning-specific	-	-	-	-	58	33.0
<i>Convenience of self-paced learning</i>	-	-	-	-	24	13.7
<i>Easy to navigate/follow</i>	-	-	-	-	9	5.1
Engaging	21	13.7	16	8.7	13	7.4
Distance-specific	-	-	22	12.0	-	-
Other – Not related to Delivery	13	8.5	29	15.8	20	11.4
F2F preference	5	3.3	14	7.7	9	5.1

Learners were prompted for their suggestions of how to improve the delivery of the training. Of 899 individuals, 512 provided a response. Responses were coded and themes developed. A single respondent's response could be represented more than once in the table if it was coded to more than one theme. Themes/sub-themes representing 5% of respondents in at least one modality is included here. A more detailed presentation is found in Appendix k. “-” indicates “not applicable”.

Discussion

Principal findings and their interpretation

The study examined how the effectiveness of JHSC Certification Part 1 training differed by modality and other factors, by measuring post-training knowledge achievement and five other study outcomes. Suggestions for improvement of the training were elicited and synthesized too.

Post-training knowledge achievement

Modality was associated with a difference in post-training knowledge score (% of knowledge questions answered correctly): *in comparison with those receiving distance learning, those receiving F2F training scored a statistically significant 2.5% higher* on a post-training knowledge measure, after accounting for other factors. However, *those receiving e-learning scored almost the same as those receiving distance learning* (a statistically non-significant 0.4% higher), after accounting for other factors. It follows that the expected difference in score between e-learning and F2F learning, if it had been possible to compare them directly, would have been about 2.1%.

Interpretation of the magnitude of differences related to knowledge

We discuss three approaches to considering the magnitude of these differences in knowledge score: i) the size of the difference relative to the full range of the possible scores, ii) the 'effect size,' a standardized and unitless metric, which has common classification criteria for small, medium or large,⁵ iii) practical significance, which is based on practitioners' expert opinion. For this study, we established 10% as the

⁵ Effect size is a unitless metric expressing the magnitude of a variable on a measure of interest (in this case, the effect of modality on an outcome), in relation to a measure of variation in the outcome measure in the sample. The effect size metric used in this study was standardized mean difference (SMD), derived from the regression coefficient. Cohen (1988) proposed criteria for classifying values of SMD, which have since been widely adopted and used here: small, 0.2; medium, 0.5; large, 0.8. See Appendix A for more detail.

criterion for practical significance through discussions with expert training practitioners.⁶

With the first approach, already introduced in the Results section, we consider the estimated F2F-to-distance modality effect of a 2.5% difference in knowledge scores in relation to the entire theoretical range of scores of 0% to 100%. Intuitively, most people consider 2.5% to be a small difference in this context. Accordingly, when post-training knowledge score is plotted on a 0% to 100% scale, as in Figure 4, the differences between modalities appear small.

With the second approach, as described above, the observed 2.5% difference in knowledge score is transformed into an effect size of 0.23, which is considered small, from a research perspective, using Cohen's (1988) criteria.

With the third and final approach, the difference of 2.5% is considered 'not practically significant' because it is much lower than the criterion of 10% for practical significance established with training experts involved in this study.

Secondary study outcomes

Statistically significant between-modality differences were seen for three of the five measured secondary outcomes: engagement during training, perceived utility of the learning, and self-confidence to use the learning. *Across these measures, scores obtained from F2F learners were more favourable than scores from distance learners, which were in turn were more favourable than scores from e-learners, after accounting for other factors.*

The between-modality effects on these secondary outcomes showed larger magnitudes than found with knowledge, when expressed relative to the theoretical ranges of the measures. Respectively, the range of (absolute) modality effects observed with engagement, perceived utility, and self-confidence were 10-22%, 4-9% and 4-8% of their respective response scales.

⁶ Practical significance in this study was determined by consulting with two representatives with expertise in training programs from each of the three collaborating training provider organizations, with separate meetings held for each organization. Prior to viewing the study results, representatives were asked what between-modality difference in post-training knowledge score would be meaningful to them. Values from 5% to 20% were suggested by the representatives, with the most common suggestion being 10%.

Considering the between-modality effects on the secondary outcomes as effect sizes, yields the following range of values and corresponding size classification using Cohen's (1988) criteria: engagement, 0.5-1.2, medium-large; perceived utility, 0.2-0.5, small-medium; self-confidence, 0.2-0.5, small-medium. From a research point of view, medium and large effects are often considered substantial.

Two secondary outcome measures, perceived applicability and intention to use learning, were *not* statistically significant. When expressed as a % of the theoretical scale, the range of their effects were smaller, 3-6% and 1-4%, respectively.

E-learning: engagement vs. convenience trade-off?

We noted earlier that the reported engagement during training, the order of levels of engagement from highest to lowest by modality was F2F > distance > e-learning. In contrast, the findings for modality preference prior to training, shown in Table 2, were F2F > e-learning > distance, with the first two being quite a bit stronger than the other. What might account for e-learners having a relatively strong preference for e-learning, even though they rate engagement by it lower? We suggest part of the answer is found in the responses to the survey item seeking suggestions about training delivery: 14% of e-learners provided a positive response remarking on its convenience or flexibility.

Considering the results in relation to the conceptual model

In order to help the reader synthesize and interpret the above results with the various outcomes, they are applied to the conceptual model introduced earlier (Figure 8). We note that as one moves from left to right in the model, the size of observed effects, when each is considered as a % of its respective theoretical range, tends to get smaller. (This is also true if one considers effect sizes instead.) This is an expected pattern. Researchers describe this pattern as 'attenuation': i.e., the large apparent effect of modality on engagement appears to be attenuated as it is propagated through the causal chain, because of the influence of other factors.

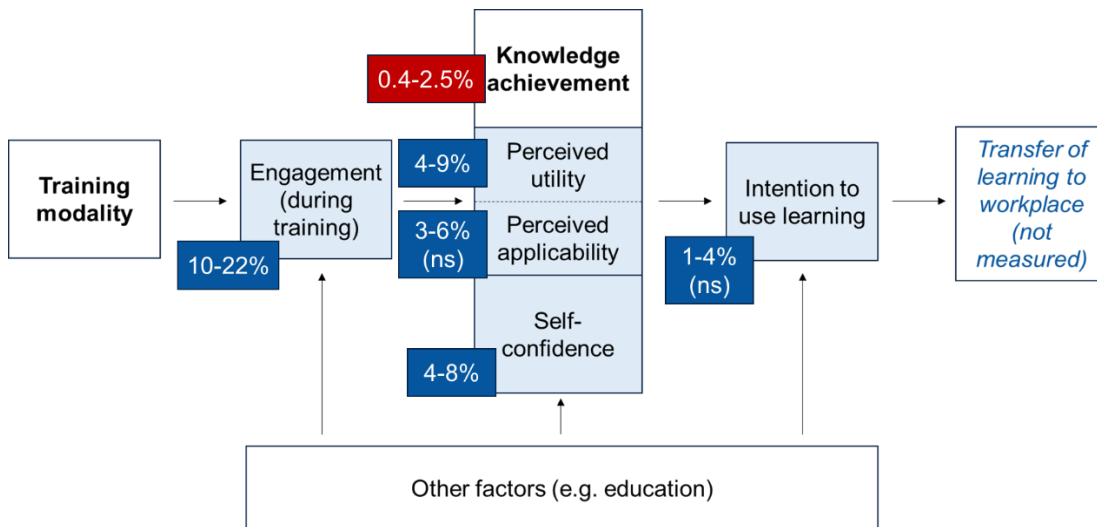


Figure 8: Conceptual model of study outcomes with observed modality effects as % of theoretical range

Abbreviation: ns, not significant. Quantitative results from regression analysis for the various outcomes are applied to the study’s conceptual model in order to give an overview.

The model also raises the question of whether the large modality differences seen ‘upstream’ in the model might be of little concern, since the outcome closest to actual transfer, intention to use training, showed non-significant and small effects. We approach this interpretation with caution. Given the context of the Certification Part 1 training, there may have been additional attenuation of any modality effects upon intention to use training and thus restriction in the variation of the measure. That is, 75% of people taking the training have agreed to be JHSC members or health and safety representatives (Table 1) and are thus likely to intend use the training. Indeed, the average response of all respondents on the intention-to-use measures was ‘very likely’ (5 on the 6 point scale).

Caution about English as a first language finding

The study’s finding, that a difference in post-training knowledge was not associated with whether English was one’s first language, should be generalized with utmost caution to other training contexts, especially training for frontline workers. We suspect that a person chosen to be a JHSC certified member by an employer or peers would typically have good function in English.

Methodological strengths and limitations of the study

The study had several methodological strengths. The same course, with standardized learning objectives, was delivered in all modalities. Learners were recruited from F2F and distance learning classes with various instructors, reducing the likelihood that the effect of modality was actually the effect of (an) individual instructor(s). In addition, learners were diverse in their characteristics. The study design was successful in using more than just 'reaction' measures (e.g. satisfaction with training) and subjective measures of knowledge achievement. That is, knowledge achievement was measured objectively, rather than subjectively, and was complemented by the self-confidence measure (also known as self-efficacy). Self-confidence has been shown in meta-analyses to be just as important as knowledge in predicting actual transfer of learning (Blume et al., 2010; Colquitt et al., 2000; Sitzmann et al., 2008). Use of the multiple regression modeling technique helped ensure comparisons between modalities were valid, since it reduced the impact of characteristics, such as learner education, manual versus non-manual job, and which HSA delivered training, all of which differed across learners in the different modalities. Such statistical control has often been missing in training research comparing modalities.

The study had some limitations too, which should be kept in mind when interpreting the results. The first limitation is that the study involved learners with only three training providers, for reasons of feasibility. The generalizability of these findings to other providers of JHSC Certification Part 1 training is not known. That said, this course should have relatively high consistency because of the standards for curriculum and providers, which is enforced by the MLITSD.

A second limitation is the scope of the outcome measures. It would have been ideal to measure skills for which the training was intended to prepare the learner, such as finding information from the Occupational Health and Safety Act, using a hazard management tool, or conducting an investigation. As well, knowledge achievement was assessed with pre-existing knowledge questions (verbatim or modified) from the MLITSD's standardized questions provided for routine use by providers in end-of-course evaluation. These questions appear to assess cognitive processes found at the lower levels of Bloom's taxonomy (Anderson and Krathwohl, 2001), i.e. remembering and understanding. The design would have been even stronger if we had also assessed higher level cognitive processes such as 'apply', 'analyze' and

'evaluate.' We note too that outcomes were measured shortly after the training. We therefore do not know directly whether there would have been modality differences in knowledge retention or the transfer of knowledge to the workplace (i.e. learners' actual JHSC practices in the workplace). (The study context did not readily lend itself to a typical follow up of learning transfer of 1-3 months, because some learners take Part 2 of JHSC Certification training immediately after Part 1, while others start weeks later (up to one year is allowed for anyone seeking certification)).

A third limitation is the intention-to-use outcome measure. Although intention to use is used as a proxy for actual use of learning in many research contexts, it may not have been sensitive to modalities in the context of the present study, as explained above.

A fourth limitation arises from the nature of the different modalities. Whereas F2F and distance trainings were completed over three successive days, e-learning was variable in length and could last up to 30 days, depending on the learner's preference. That difference in duration could prompt concern about the comparability and thus validity of the study's post-training knowledge assessment, since there was more opportunity for some knowledge (learned at the beginning of the course) to decay in the case of e-learning. This concern is partially mitigated by there being within the course, after completing all modules, a final comprehensive test, which would have prompted review of the course material, reducing concerns about differing decay effects.

Fifth, for learners using the e-learning modality, researchers had little control over when they completed the post-training survey. In contrast, F2F and distance learners received an emailed survey link on the morning following training and the link expired at the end of the third day following training. After data collection was complete, e-learning records were retrieved to identify which learners had complied with the request to complete their post-training questionnaire within three days of course completion. A sensitivity analysis excluded all non-compliant e-learners and found little effect on the results.

Sixth, the prior exposure of individuals to the study's 24 post-training knowledge questions (which were selected from standardized test versions 2 and 3 developed by MLITSD for routine assessment) was somewhat different depending on the particular HSA and modality. Some learners had never been previously exposed to

any of the questions (because version 1 was used in their course's final assessment); and some would have been exposed to 33% of them on average (because their course assessment used random selection from all questions in versions 1 to 3).⁷ This could give an advantage in the study's post-knowledge test to those with the 33% prior exposure. This differential exposure was not an issue for the F2F-to-distance comparison because all were never exposed to the question. For the e-learning-to-distance comparison, differential exposure could possibly have given e-learning an advantage: all in e-learning had the 33% prior exposure, whereas only some in distance learning also had 33% prior exposure (those in one HSA), while others in did not (those in the other HSA). Any such effects must have been small, since an HSA-modality interaction was not observed in the regression modeling involving distance and e-learning.

Results in relation to other research

This study adds to the existing research literature, which shows there is little difference in knowledge achievement between F2F and distance learning in an occupational context (Chipps et al., 2012; Gegenfurtner et al., 2019; He et al., 2020; Robson et al., 2022). It also contributes findings about the difference in knowledge achievement between distance learning and e-learning, a comparison that has seldom been studied. In addition, the study contributes knowledge about modality differences in relation to other training outcomes: perceived utility or applicability, self-confidence in using learning, and intention to use learning.

This study extends the research literature too because it is based on a diverse sample of learners, who are varied in their education, jobs and workplaces. In contrast, the existing bodies of knowledge are based on studies of medical

⁷ Each of the three versions of the MLITSD standardized knowledge tests had 31 questions, one of which was the same in each version, for a pool of 91 unique questions. For some learners, their routine course assessment consisted of the single item common to all versions, plus 30 questions selected at random from the remaining 90 items. Of those 30 selected at random, on average, 10 would have been from version 1 and 20 from version 2 or 3. In other words, through the routine final course assessment, learners were exposed to about a third of the items (20/60) from versions 2 and 3. It follows that when 24 of the 60 questions in versions 2 and 3 were selected to be the study's post-training test, learners would have been previously exposed to a third of them through the course assessment.

professionals and students of those professions (Robson et al., 2022) or university-based students (Robson et al., 2021).

Future research

Future research could address some of the limitations identified above, especially by including longer-term follow up, to measure knowledge retention and use of JHSC practices in the workplace. Additional measures could be included immediately post-training too. Measures of skill would be ideal. Also informative would be more specific measures of self-confidence related to separate skills, for example, self-confidence in looking up information in the OHS or in carrying out a hazard assessment, inspection, or investigation.

Practical implications

This study provides evidence that F2F, distance and e-learning are equivalent in their ability to ensure JHSC-related knowledge achievement of learners following JHSC Certification Part 1 training. The evidence therefore suggests that all three modalities equally equip learners with the fundamental knowledge needed to be a certified JHSC member. This finding of modality equivalency in knowledge achievement is likely generalizable to other short-term OHS trainings, and other occupationally-related trainings too, in which the aim is to impart new knowledge.

In contrast, the finding of modality equivalency should **not** be generalized to outcomes not measured in this study, including skill acquisition or transfer of learning to the workplace, especially given the differences seen in post-training confidence to use the learning. All modalities achieved on average, high levels of self-confidence in the learner, which research has shown is just as important as knowledge with regards to the transfer of knowledge to the workplace. Nevertheless, statistically significant differences in self-confidence in using the learning were measured. Self-confidence was greatest with F2F learning, followed by distance learning, followed by e-learning. The extent to which these differences would lead to differences in OHS practice in the workplace is unknown.

We consider now the specific context of Ontario JHSC certification training, in which most Part 1 learners will subsequently take Part 2 certification training, currently offered in F2F and distance modalities only. It is not yet known whether the differences in self-confidence seen in Part 1 are later mitigated in Part 2 or further

magnified, depending on the modality used in Part 2. Further magnification of differences in self-confidence would be of concern, because of the known relationship between self-confidence and actual transfer of learning to the workplace. In the context of OHS systems in Ontario workplaces, we do not yet have a good understanding of the extent to which modality in certification training, Parts 1 and 2 combined, impacts the ability of certified members to fully participate. Given the large number of workers who undergo JHSC certification training each year, even small differences, once aggregated across all Ontario workplaces, could be meaningful.

References

- Alvarez K, Salas E, Garofano CM. An integrated model of training evaluation and effectiveness. *Human Resource Development Review* 2004; 3(4): 385-416.
- Anderson LW, Krathwohl DR (eds.). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition)*. New York: Longman, 2001.
- Blume BD, Ford JK, Baldwin TT, Huang JL. Transfer of training: a meta-analytic review. *Journal of Management* 2010; 36(4):1065-1105.
- Boeren E, Íñiguez-Berrozpe T. Unpacking PIAAC's cognitive skills measurement through engagement with Bloom's taxonomy. *Studies in Educational Evaluation* 2022;73:101151.
- Braun V, Clarke, V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2006;3(2);77–101.
- Burke LA, Hutchins HM. Training transfer: An integrative literature review. *Human Resource Development Review* 2007;6(3):263-296.
- Burke MJ, Holman D, Birdi K. A walk on the safe side: the implications of learning theory for developing effective safety and health training. In: Hodgkinson GP, Ford JK (eds.) *International Review of Industrial and Organizational Psychology*, v 21. London: John Wiley & Sons, 2006, pp 1-44.
- Burke MJ, Sarpy SA, Smith-Crowe K, Chan-Serafin S, Salvador RO, Islam G. Relative effectiveness of worker safety and health training methods. *American Journal of Public Health*. 2006;96:315-24.
- Burke MJ, Salvador, RO, Smith-Crowe K, Chan-Serafin S, Smith A, Sonesh S. The dread factor: How hazards and safety training influence learning and performance. *Journal of Applied Psychology* 2011;96(1):46-70.
- Chipps, J., Brysiewicz, P., Mars, M. 2012. A systematic review of the effectiveness of videoconference-based tele-education for medical and nursing education. *Worldviews on Evidence-Based Nursing* 9, 78-87. doi:10.1111/j.1741-6787.2012.00241.x
- Cohen J. *Statistical power analysis for the behavioral sciences (2nd ed.)*. New Jersey: Lawrence Erlbaum Associates, 1988.

Colquitt JA, LePine JA, Noe RA. Toward an integrative theory of training motivation: a meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology*, 2000;85:678-707.

Fox J. *Applied regression analysis, linear models, and related models*. Los Angeles: Sage Publications, 1997.

Gegenfurtner, A., Ebner, C. 2019. Webinars in higher education and professional training: a meta-analysis and systematic review of randomized controlled trials. *Educational Research Review* 28, 100293. doi:10.1016/j.edurev.2019.100293

Green SB. How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research* 1991; 26(3):499-510.

He, L., Yang, N., Xu, L., Ping, F., Li, W., Sun, Q., Li, Y., Zhu, H., Zhang, H. 2020. Synchronous distance education vs traditional education for health science students: a systematic review and meta-analysis. *Medical Education* 55, 293-308. doi:10.1111/medu.14364

Kraiger K, Ford JK, Salas E. Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of Applied Psychology* 1993;78(2):311-328.

Li G. Robust regression. In: Hoaglin DC, Mosteller F, and Tukey JW (eds.). *Exploring Data Tables, Trends, and Shapes*. Hoboken, NJ: Wiley, 1985.

Ministry of Labour, Immigration, Training and Skills Development (MLITSD) [Internet]. Ontario: King's Printer of Ontario. c2012-2023 [updated 2022 Dec 01; cited 2023a Aug 18]. Program standard for joint health and safety committee training. Available from: <https://www.ontario.ca/page/program-standard-joint-health-and-safety-committee-training>.

Ministry of Labour, Immigration, Training and Skills Development (MLITSD) [Internet]. Ontario: King's Printer of Ontario. c2012-2023 [updated 2023 Feb 28; cited 2023b Aug 18]. Health and safety associations. Available from: <https://www.ontario.ca/page/ontarios-occupational-health-and-safety-system#section-3>.

Ministry of Labour, Immigration, Training and Skills Development (MLITSD) [Internet]. Ontario: King's Printer of Ontario. c2012-2023 [updated 2023 Jul 04; cited 2023c Sep 25]. Joint health and safety committees (in Guide for health and safety committees and representatives). Available from: <https://www.ontario.ca/page/guide-health-and-safety-committees-and-representatives#section-3>

Robson LS, Irvin E, Padkapayeva K, Begum M, Zukowski M. Effectiveness of synchronous online learning in an occupational context: two rapid reviews. Toronto: Institute for Work & Health, 2021 Aug. Available from: <https://www.iwh.on.ca/scientific-reports/effectiveness-of-synchronous-online-learning-in-occupational-context-two-rapid-reviews>.

Robson L, Irvin E, Padkapayeva K, Begum M, Zukowski M. A rapid review of systematic reviews on the effectiveness of synchronous online learning in an occupational context. *American Journal of Industrial Medicine* 2022;65(7):613-617.

Sitzmann T, Brown KG, Casper WJ, Ely K, Zimmerman RD. A review and meta-analysis of the nomological network of trainee reactions. *Journal of Applied Psychology* 2008; 93(2):280-295.

Appendices

Appendix A: Methods in detail

This section describes the study methods in detail. A briefer version can be found in the main body of the report. Methods were approved by the Health Sciences Research Ethics Board of the University of Toronto.

The study centred on a pre-post survey of learners undergoing JHSC Certification Part 1 training with one of the three Ontario training providers. Learners were delivered training in one of three modalities: F2F, distance and e-learning. The study design was observational rather than experimental in nature, since participants were not allocated to different training modalities randomly, but instead chose their own modality (in some cases, others in their organization would have chosen for them). As per the program standard (MLITSD 2023a), F2F and distance learning involved three successive days of instruction, 6.5 hours per day, for a total of 19.5 hours; self-paced e-learning was designed to last 13 hours in total, though learning could be spread over to as much as a month.

Selection of training providers

The three providers involved in the study were selected because they were delivering Part 1 training in at least two of the three modalities in moderate to high volumes. All three were Ontario sector-based Health and Safety Associations (HSAs) (MLITSD 2023b): Infrastructure Health & Safety Association (IHSA), Public Services Health & Safety Association (PSHSA), and Workplace Safety & Prevention Services (WSPS). These organizations have a provincial mandate to support enterprises in particular sectors through training, education and consulting. They receive core funding from the provincial government and generate revenue through the sale of products and services.

Detailed description of training delivery in the three modalities

A member of the research team carried out observations of F2F and distance learning classes (two classes with different instructors for each HSA-modality combination; first of the 3-day course). They also trialled the two different e-learning courses included in the study, by taking the role of learner. These observations were used to generate the following descriptions and validate that the training conformed to the JHSC Certification program standard (MLITSD 2023a).

Instructor-led F2F and distance learning. F2F was delivered in a classroom setting and distance using a secure two-way audio/video interactive platform (Adobe Connect, GoToMeeting, or Zoom). The learner materials included a participant manual (F2F, hard copy; distance, either

hard copy or electronic version, the latter as a fillable PDF). As well, for all F2F and some distance learners, a hard copy version of the Occupational Health and Safety Act (OHSA) was provided ('green book' or 'orange book'), while other distance learners were instructed on the Internet version only. Activities included group work, discussion groups and presentations. A variety of teaching aids were used in both modalities, e.g., PowerPoint presentation slides, videos, flip charts and (virtual) whiteboards. Distance learning also involved the chat box communication and polls. The instructor would often share stories or give practical examples relevant to the learners' workplaces. The instructor guided activities that allowed opportunities for participation, feedback, and interaction, such as the use of the workbook exercises, problem-solving (e.g., looking up legislation in the OHSA Act), and discussions of the content in small groups (as breakout rooms in distance learning) or in full group discussions. Participation was encouraged by instructors by asking questions and learners also had opportunities to ask questions of the instructor. The instructors provided opportunities for participants to share their own knowledge and workplace experiences. Practice test questions were presented on PowerPoint slides.

Self-paced e-learning. The self-paced e-learning training program was delivered in eight modules (nine modules including the final test). Training activities included web-based and computer-based applications and processes, e.g., interactive slides and videos, knowledge check questions. The modules consisted of interactive slides, with flow charts and diagrams, requiring clicks on the tabs, images, buttons, or text in each slide, to proceed in the module. Learners listened to a narrator read the text as they clicked interactively on the slides. Interactive slides facilitated active participation, e.g., the learner was asked to click on terms in the slide, which would provide the definition of the terms. Navigation of a website version of OHSA was guided using interactive slides.

Recruitment of learners

Learners were recruited between January and September 2022. For each HSA in the study, learners were recruited from all available modalities in which participant numbers were projected to be sufficient for analysis. This led to learners being recruited from one HSA across three modalities, and from the other two HSAs across two modalities. Depending on the HSA and modality involved, recruitment was either at the point of registration or at the start of training. Potential participants were told that they would receive \$60 in appreciation of their participation if both surveys were completed. Eligible pre-training survey data (defined as answering at least 11 of 12 knowledge questions) were collected from 1289 learners, representing a participation rate of 38%. Eligible post-training data (defined as answering the first five post-training survey questions, i.e., the secondary training outcome measures) were collected from 899 of these learners too (representing 70% of the initial sample). The distribution of the 899 learners over the three types of delivery were: F2F, 250; distance, 298; and e-learning, 351. This represents a participation rate of 26% overall with rates ranging

across HSAs for each modality as follows: 14-45%, F2F; 11-44%, distance; and 25-32%, e-learning.

Survey procedure

Surveys were conducted using the Qualtrics online survey platform. Learners accessed the pre-training survey using an Internet link provided in a registration form, in an e-mail invitation, or during the start of a course. As part of registration or the pre-training survey process, F2F and distance learners provided researchers with the date of their course. On the morning following completion of their course, learners were sent an email with a link to the post-training survey and given until the end of the third day following training for questionnaire completion (after which the survey link expired). For e-learners, the initial invitation to participate in the study was embedded into the very beginning of their course. Those interested used a link to access the pre-training survey questionnaire. On the day following completion of that pre-training questionnaire, learners were sent an email with a link to the post-training questionnaire, along with an instruction to retain the email and complete the questionnaire during one of the three days following completion of all e-learning modules.

Survey measurement

Knowledge. JHSC-related knowledge was the primary outcome for the study. Surveys measured knowledge both before and after training with multiple-choice and true-false questions. Twelve questions were asked before training and 24 questions were asked after. Questions were all based on those in the standardized post-training tests developed by the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) for providers to use in their routine assessment of learning achievement. Questions were adopted in the study by either using verbatim or by making minor modifications. An example question is, “Which of the following is/are examples of physical hazards?” and possible responses were the following: noise, chemicals, both noise and chemicals, none of the above. The selection of questions and their modification were intended to increase their level of difficulty and thus avoid ceiling effects in the measure. The questions used post-training were different from those used pre-training. As such, they are valid for between-group comparisons of pre-training knowledge or of post-training knowledge, as done in this study, but not for within-group pre-post estimates of knowledge gain. In analyses, answers to knowledge questions were expressed as a percent correct score out of 100, with missing responses counted as incorrect.

Secondary study outcomes. Five secondary training outcomes (engagement, perceived utility, perceived applicability, self-confidence to use learning, and intention to use learning) were measured after training with the following questions:

- How engaging was the training?
- How useful is what you learned in the training?
- How applicable to your workplace is what you learned in the training?

- How confident do you feel using what you learned at the training?
- How likely are you to use what you learned in the training?

Responses to these questions were measured on a 6-point Likert-type scale, e.g., 1 = not at all engaged to 6 = extremely engaged. In analyses, answers to secondary training outcome questions were treated as continuous variables.

Other study variables. Also included in the questionnaire were questions about the individual learner (age, gender, education, English as a first language, race/ethnicity, first letter of home postal code), their job (work role, manual/non-manual job (i.e. requiring physical effort), union membership), and their workplace (number of employees, industry sector). There were questions about the JHSC context too (their tenure, whether employer/worker representative, reason for taking training, planning to take Certification Part 2 training.)

Suggestions for improvement. An item was included in the survey to elicit suggestions for two types of course improvement: “Please share any suggestions you might have about ways in which training could be improved.” Two free text boxes accompanied the prompt, one labeled “Suggestions about the content of the training” and the other “Suggestions about the way the training was delivered.”

The pre- and post- questionnaires can be viewed in Appendix B. Further details about survey variables can be found in Appendix C.

Sample size

A sample size of 900 learners in total (300 per HSA; 400-500 per comparison) was planned, based on Green (1991), $\alpha = 0.05$, and the variance of course test assessments in archival data. Calculations estimated that with 80% power, effect sizes between small and medium would be detected.

Statistical analysis

Analyses were conducted separately on the following modality comparisons, each involving learners from two HSAs:

- Comparison 1: Face-to-face (F2F) and distance-1 (HSA pair 1)
- Comparison 2: E-Learning and distance-2 (HSA pair 2)

One HSA was represented in both comparisons (because they had learners in all three modalities in the study), whereas the other two HSAs were represented in only one comparison each (because they had learners in only two modalities in the study). There were thus two HSAs involved in each comparison, with a different pair involved in each. The distance learning groups used in the two comparisons differ accordingly (described in the report as distance-1 and distance-2, respectively). This approach to analysis kept HSAs balanced across each pair of modalities being compared, in order to minimize any confounding of the relationship between modality and outcome by learner variables. A lack of balance would be a threat to internal

validity, because of the very different workforce characteristics across HSAs, which specialize in different industrial sectors.

Observations were included in the final analytical data set ($n = 899$) if the respondent answered at least 11 of 12 knowledge questions in the T1 survey and the first five questions in the T2 survey (corresponding to the measurement of secondary study outcomes). To be included in the regression with knowledge score as the outcome, they needed to have answered at least 11 of 12 knowledge questions in the T1 survey and at least 22 of 24 knowledge items in the T2 survey ($n = 887$).

Statistical analyses were carried out using SAS 9.4 software, unless otherwise indicated. Descriptive statistics (means, standard deviations, frequencies, correlations) were computed. The statistical significance of differences in survey measures (knowledge or secondary outcomes) between groups at either pre-test and at post-test were determined with independent t-tests, using an online calculator: <https://www.statskingdom.com/140MeanT2eq.html>.

Multivariable linear regression modeling was used with each of the comparisons to estimate the difference associated with training modality for each of knowledge and the secondary study outcomes, while adjusting for other factors that might affect those measures (education, English as a first language, manual/non-manual job, JHSC tenure, age, gender, workplace size, pre-training knowledge, HSA)

Regressions with post-training knowledge as dependent variable. For each of the two main comparisons (F2F vs. distance-1; e-learning vs. distance-2), a baseline model was constructed that regressed the post-training knowledge score on modality, as well as HSA and pre-training knowledge score. A second model was then constructed, which added a modality*HSA interaction term to the baseline model. For both main comparisons, the coefficient of the interaction term was found to be small and non-significant and so the variable was not included in subsequent models.

A third model was then constructed for each comparison, adding a set of 'Tier 1' categorical variables to the baseline model. Tier 1 variables had been identified prior to analysis as those most likely to affect the primary outcome. These consisted of age, gender, education, English not first language, JHSC tenure and manual/non-manual job. All Tier 1 variables were retained in the model, whether statistically significant or not. For any Tier 1 variable found to be statistically significant, a model was explored that included terms needed to model an interaction between that variable and modality. Only one of these interaction models yielded a statistically significant interaction term (F2F vs. distance-1; modality*manual/non-manual). It is included in the findings (Appendix G).

A fourth model for each comparison added a pair of Tier 2 variables -- occupational group and workplace size -- for each comparison. Workplace size was found to be statistically significant for the F2F vs. distance comparison and was retained in both sets of regressions. A post-hoc

rationale supported inclusion of this variable in the final model with the realization that training would likely be less relevant to learners from smaller organizations, because they have less formal means of management; and would be especially less relevant to learners from the smallest employers (< 20 employees), many of which had no JHSC. Occupational group was not found to be significant in the fourth models for either modality comparison. The variable was therefore not included in the final models, since it had a high correlation with other variables already included in the model (age, gender, education, JHSC tenure and manual/non-manual job).

A fifth model for each comparison added a set of Tier 3 variables for exploratory purposes: reason for taking training, whether worker/employer representative, white/non-white, preference for F2F learning, preference for distance learning, preference for e-learning, union/non-union, postal code (first letter). None of the variables were retained in the final model for one or more of the following reasons: i) aiming for model parsimony; ii) collinearity of some Tier 3 variables with Tier 1 and 2 variables, iii) there was less prior rationale for their inclusion, iv) variable measurement was exploratory, v) their inclusion had little impact on the estimate of the modality coefficient. All effects represented a difference of 7% or less in final knowledge score.

The final model therefore included the Tier 1 variables (age, gender, education, English as a first language, JHSC tenure and manual/non-manual job) and workplace size as predictors.

Sensitivity analyses. Two additional models were developed for each of the two modality comparisons, to better account for outliers in the data. In the first, outliers and influential points were removed. In the second, a robust regression model was used (Fox 1987, Li 1985). For all four models, there was very little change in the regression coefficient of the modality variable, so the final models continued to be adopted.

Regressions with secondary training outcome as dependent variable. Less exploration was undertaken with the regressions involving the secondary training outcomes. Specifications analogous to the 'third' and 'final' models described above were carried out. The regression coefficients for the modality variable were similar in both models, so only the latter is included here.

Effect size. Regression coefficients were transformed to standardized mean differences (SMDs), also known as Cohen's *d*s, using the method recommended by the Campbell Collaboration, available at

<https://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD21.php>.

Conventional criteria (Cohen 1988) were used to classify SMD values: 0.2, small; 0.5, medium; 0.8, large.

Qualitative analysis

Two open-ended prompts about suggestions for improving the training were asked in the survey, one about the way the training was delivered and the other about the content of the training. Responses were coded and themes were identified (Braun & Clarke, 2006). Each

response could receive more than one code. For each question, three major categories of themes were found: Positive Comments, Suggestions/Areas for Improvement, Other. The approach was mostly inductive, though the creation of themes related to suggestions/areas for improvement related to content were organized by the content areas found in the JHSC Certification program standard (MLITSD 2023a).

Appendix B: Pre- and post-training survey questionnaires

Pre-training survey questionnaire

Instructions

Please answer all questions so the survey data will be complete. Please select the best answer available. Please answer honestly so the research will be accurate. No one outside of the research team will see your individual answers.

JHSC-related knowledge

Please complete the following questions related to JHSCs and workplace health and safety. If you do not know the answer, make your best guess, but do not look up answers elsewhere.

Example question:

1. Which of the following is/are examples of physical hazards?
 - Noise, chemicals, both noise and chemicals, none of the above

< CENSORED: The survey included eleven other knowledge questions, which were adopted verbatim or with minor modification from version 1 of the three final MLITSD standardized tests. They are censored here to preserve JHSC Certification testing integrity.>

Attitude toward course

In the next questions we would like to know how you feel about taking the course.

2. I am very motivated to learn the material in the course
 - Strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree
3. I will try to learn as much as I can from the course
 - Strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree

Preference for training methods

The next questions ask you about how much you like learning with different training methods.

4. How much do you usually like learning in person with an instructor (in-class learning)?
 - Responses: Not at all, A little bit, Somewhat, Quite a bit, A lot, I have no experience with this⁸
5. How much do you usually like learning online with a live instructor (distance/virtual classroom learning)?
 - Responses: Not at all, A little bit, Somewhat, Quite a bit, A lot, I have no experience with this
6. How much do you usually like learning online with self-paced modules and no instructor (e-learning)?
 - Responses: Not at all, A little bit, Somewhat, Quite a bit, A lot, I have no experience with this

⁸ The final response option of 'I have not experience with this' was included in only versions #1, #2, but not in versions #3-5, due to oversight.

Post-training survey questionnaire

Instructions

Please answer all questions so the survey data will be complete. Select the best answer available and answer honestly so the research will be accurate. No one outside of the research team will see your individual answers.

Training experience

The first set of questions are concerned with your experience in JHSC Certification 1 training.

1. How engaging was the training?
 - Responses: not at all engaging, a little bit engaging, somewhat engaging, engaging, very engaging, extremely engaging
2. How useful is what you learned at the training?
 - Responses: not at all useful, a little bit useful, somewhat useful, useful, very useful, extremely useful
3. How applicable to your workplace is what you learned at the training?
 - Responses: not at all applicable, a little bit applicable, somewhat applicable, applicable, very applicable, extremely applicable
4. How confident do you feel using what you learned at the training?
 - Responses: not at all confident, a little bit confident, somewhat confident, confident, very confident, extremely confident
5. How likely are you to use what you learned in the training?
 - Responses: not at all likely, a little bit likely, somewhat likely, likely, very likely, extremely likely
6. *[for only those answering not at all likely or a little bit likely in the previous question]* Why are you not at all likely or only a little bit likely to use what you learned in the training?
 - [open text box]

JHSC-related knowledge

The next questions will ask you about what you learned in the training. **Please do not refer to your course materials!** Use only your memory to answer the questions as best you can. Your answers today are for research purposes and will have no effect on achieving certification.

Example question:

1. How often must an employer review their occupational health and safety policy?
 - At least every three years, At least annually, At least every two years, When an order is written

< CENSORED: The survey included 23 other knowledge questions adopted from versions 2 and 3 of the three final MLITSD standardized tests. They are censored here to preserve JHSC Certification testing integrity.>

Reason for taking training

31. What was your main reason for taking JHSC Certification 1 training?

- My JHSC needed a new certified member
- At my workplace, all JHSC members take Certification 1 training
- I am a health and safety representative (no JHSC at my workplace)
- I am keeping my JHSC training up to date in case an employer needs it
- I am completing requirements for the National Construction Safety Officer program
- Other (please specify) [text box]

Intention to take Certification 2 training

32. Are you planning to take JHSC Certification 2 training?

- Yes
- No
- I don't know yet

Additional feedback

33. Please share any suggestions you might have about ways in which the training could be improved.

- a) Suggestions about the content of the training [open text box]
- b) Suggestions about the way the training was delivered [open text box]

Questions about you

We will now ask you some questions about yourself. Your answers help us describe the group of people who were surveyed.

34. For how long have you served on a JHSC with your current employer or a previous employer?

- Responses: not at all, just starting, less than 6 months, 6 months to 2 years, more than 2 years but less than five years, five or more years

35. Who do you represent on a JHSC?

- Employer
- Worker
- Not applicable

36. How many people work at your workplace?

- Responses: less than 20, 20 to 49, 50 to 250, more than 250

37. Which best describes the industry in which you work? (click on box to see drop-down list)

- Agriculture, forestry, fishing and hunting
- Utilities
- Construction
- Manufacturing
- Wholesale and retail trade
- Transportation and warehousing
- Information and cultural industries; arts, entertainment and recreation
- Finance, insurance, real estate, rental and leasing
- Administrative and support (inc. temp. agencies, landscaping), waste management, remediation

- Education
- Health care and social assistance
- Accommodation and food services
- Other services (besides public administration/public safety services)
- Public safety services (e.g., fire-fighting, policing)
- Other public administration/government
- Other (please specify)

38. Which best describes your role at your work?

- Front-line worker
- Supervisor
- Middle Manager
- Technical specialist/professional
- Senior manager/Executive
- Other (please specify) _____

39. Which best describes your job?

- Manual (usually requiring physical effort), e.g., plumber, machine operator
- Non-manual (not usually requiring physical effort), e.g., salesperson, teacher

40. Do you belong to a union?

- Yes
- No

41. Which category best describes your highest educational achievement?

- No certificate, diploma or degree
- Secondary (high) school diploma or equivalency certificate
- Apprenticeship or trades certificate or diploma
- College, CEGEP or other non-university certificate or diploma
- University certificate, diploma or degree

42. In which age category are you?

- Responses: Less than 25 years, 25-34, 35-44, 45-54, 55+

43. What is the first letter of your home postal code?

- a. Responses: K, L, M, N, P, other

44. Which best describes your gender?

- Responses: Male, Female, Other

45. Which of the following best describes your race/ethnicity? (you may select more than one). We ask this so we can describe the diversity of people taking the survey.

- Black
- Indigenous
- South Asian (e.g. Pakistani)
- Chinese
- Other East Asian or Southeast Asian (e.g., Korean, Filipino)
- Arab or West Asian (e.g. Iranian)
- Latin American

- White
- Other (please specify)

46. Is English your first language?

- Responses: yes, no

Administrative questions

47. May we contact you again in one year about another survey, to learn about your experience on a JHSC, if applicable?

48. Would you like to receive notice when a report on the study is made available online?

49. Is there anything else you think we should know about JHSC Certification Part One training or your experience with this survey? [open text box]

Appendix C: Details of survey variables

Table C.1 Descriptive statistics for the training outcome variables

Outcome measure	n	Mean	s.d.	Median	Minimum	Maximum
Knowledge-pre-training	887	63.19	14.39	66.67	16.67	100
Knowledge-post-training	887	75.45	11.42	75.00	25.00	100
Engagement	899	4.36	1.06	4	1	6
Perceived utility	899	5.00	0.86	5	1	6
Perceived applicability	899	4.93	0.92	5	1	6
Self-confidence	899	4.66	0.89	5	2	6
Intention-to-use	898	5.04	0.88	5	1	6

n, number of participants in the analytical sample; s.d., standard deviation

Table C.2 Correlation coefficients for the training outcome variables

	1	2	3	4	5	6
1. Knowledge-pre-training						
2. Knowledge-post-training	0.12 0.0003 887					
3. Engagement	0.02 0.4779 887	-0.05 0.0704 887				
4. Perceived utility	-0.01 0.6764 887	0.03 0.3486 887	0.50 <.0001 887			
5. Perceived applicability	-0.01 0.8052 887	0.04 0.1795 887	0.38 <.0001 887	0.55 <.0001 887		
6. Self-confidence	0.01 0.8222 887	-0.01 0.7384 887	0.38 <.0001 887	0.45 <.0001 887	0.42 <.0001 887	
7. Intention-to-use	0.03 0.2072 886	0.08 0.0054 886	0.32 <.0001 886	0.51 <.0001 886	0.49 <.0001 886	0.50 <.0001 886

Kendall tau b correlation coefficients, except for pre- and post-training correlation, which is a Pearson correlation coefficient. Each cell shows the correlation, coefficient, p-value, and number of learners in the analysis (n). Statistically significant p-values are in boldface.

Table C.3 Correlation coefficients for the regression model covariates

	1	2	3	4	5	6	7
1. JHSC tenure							
2. Manual job	0.09						
3. Education	-0.04	0.38					
4. Age	0.18	0.05	-0.10				
5. Gender	0.05	0.33	0.28	0.09			
6. English as 1st language	0.04	0.05	0.16	0.02	-0.03		
7. Workplace size	0.07	0.18	0.18	-0.04	0.18	0.07	
8. HSA	0.06	0.15	0.18	0.13	0.33	0.05	0.17

Coefficients between ordinal covariates (such as age) are Spearman correlation coefficients. Coefficients between nominal covariates (such as manual/non-manual job) are Cramer's V coefficients. Statistically significant correlations are in boldface.

Appendix D: Detailed description of sample characteristics by modality and comparison

Table D.1 Detailed description of the sample characteristics in the F2F and distance-1 comparison

	F2F		Distance-1		p-value
	N	%	N	%	
Age					0.95
NR	2	0.8	2	1.02	
25-34	115	46	94	47.72	
35-44	71	28.4	56	28.43	
45-54	46	18.4	32	16.24	
55+	16	6.4	13	6.6	
Gender					<.0001
NR	2	0.8	2	1.02	
Male	187	74.8	99	50.25	
Female	61	24.4	94	47.72	
Other	.	.	2	1.02	
Race/Ethnicity					0.09
NR	2	0.8	1	0.51	
Not White	58	23.2	60	30.46	
White	190	76	136	69.04	
Education					<.0001
NR	2	0.8	1	0.51	
Secondary or Less/Apprenticeship/ Trades/Diploma	119	47.6	45	22.84	
College/CEGEP/Other Non-University	72	28.8	72	36.55	
University	57	22.8	79	40.1	
English as 1st Language					0.67
NR	2	0.8	1	0.51	
Yes	205	82	165	83.76	
No	43	17.2	31	15.74	
Postal Code (home, 1st letter)					0.03
NR	2	0.8	1	0.51	
K	38	15.2	25	12.69	
L	92	36.8	93	47.21	
M	25	10	30	15.23	
N	63	25.2	35	17.77	
P	29	11.6	12	6.09	
Other	1	0.4	1	0.51	
Manual/Non-Manual Job					<.0001
NR	2	0.8	1	0.51	
Manual	141	56.4	62	31.47	
Non-Manual	107	42.8	134	68.02	

Work Role					0.21
NR	2	0.8	1	0.51	
Technical Specialist/Professional	24	9.6	29	14.72	
Senior Manager/Executive	37	14.8	34	17.26	
Supervisor	43	17.2	37	18.78	
Front-Line Worker	93	37.2	55	27.92	
Other	51	20.4	41	20.81	
No. of Employees in Workplace					0.003
NR	2	0.8	1	0.51	
Less than 20	58	23.2	20	10.15	
20 to 49	69	27.6	65	32.99	
50 to 250	96	38.4	82	41.62	
More than 250	25	10	29	14.72	
Industry Sector					<0.0001
NR	5	2	2	1.02	
Other Goods-Producing*	13	5.2	11	5.58	
Construction	149	59.6	58	29.44	
Manufacturing	33	13.2	29	14.72	
Wholesale & Retail Trade	10	4	26	13.2	
Transportation & Warehousing	18	7.2	18	9.14	
Education	1	0.4	2	1.02	
Health Care & Social Assistance	2	0.8	7	3.55	
Public Administration/Government	7	2.8	11	5.58	
Other (Please specify)	2	0.8	3	1.52	
Other Services	10	4	30	15.23	
Union Membership					0.002
NR	2	0.8	1	0.51	
Yes	80	32	37	18.78	
No	168	67.2	159	80.71	
JHSC Tenure					0.95
NR	2	0.8	1	0.51	
Less Than 6 Months	165	66	133	67.51	
6 Mths To 2 Yrs	44	17.6	33	16.75	
More Than 2 Years	39	15.6	30	15.23	
Employer/Worker Rep on JHSC					0.38
NR	2	0.8	1	0.51	
Employer	78	31.2	67	34.01	
Worker	153	61.2	110	55.84	
Not Applicable	17	6.8	19	9.64	
Main Reason for Taking Training					0.03
NR	2	0.8	1	0.51	
Keeping JHSC training up to date in case an employer needs it	22	8.8	13	6.6	
Completing requirements for National Construction Safety Officer Program	27	10.8	10	5.08	
Other	30	12	20	10.15	
JHSC needed new certified member	105	42	100	50.76	
All JHSC members take Certification Pt 1 training at workplace	37	14.8	41	20.81	

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Health & safety representative (no JHSC at workplace)	27	10.8	12	6.09
Planning to take JHSC Cert Pt 2				0.92
NR	2	0.8	1	0.51
Yes	234	93.6	185	93.91
No	2	0.8	1	0.51
Don't know yet	12	4.8	10	5.08

* Other Goods-Producing is Utilities, Agriculture, Forestry, Fishing, Hunting

Table D.2 Detailed description of the sample characteristics in the e-learning and distance-2 comparison

	E-learning		Distance-2		p-value
	N	%	N	%	
Age					0.62
NR	9	2.56	1	0.48	
25-34	124	35.33	84	40.58	
35-44	111	31.62	60	28.99	
45-54	75	21.37	40	19.32	
55+	32	9.12	22	10.63	
Gender					0.03
NR	8	2.28	2	0.97	
Male	138	39.32	77	37.2	
Female	205	58.4	124	59.9	
Other	.	.	4	1.93	
Race/Ethnicity					0.32
NR	8	2.28	1	0.48	
Not White	85	24.22	59	28.5	
White	258	73.5	147	71.01	
Education					0.13
NR	8	2.28	1	0.48	
Secondary or Less/Apprenticeship/ Trades/Diploma	67	19.09	42	20.29	
College/CEGEP/Other Non-University	109	31.05	81	39.13	
University	167	47.58	83	40.1	
English at 1st Language					0.31
NR	8	2.28	1	0.48	
Yes	287	81.77	179	86.47	
No	56	15.95	27	13.04	
Postal Code (home, 1st letter)					0.65
NR	9	2.56	1	0.48	
K	50	14.25	30	14.49	
L	123	35.04	75	36.23	
M	64	18.23	28	13.53	
N	69	19.66	46	22.22	
P	32	9.12	25	12.08	
Other	4	1.14	2	0.97	
Manual/Non-Manual Job					0.14
NR	8	2.28	1	0.48	
Manual	121	34.47	60	28.99	
Non-Manual	222	63.25	146	70.53	
Work Role					0.05
NR	8	2.28	1	0.48	
Senior Manager/Executive	90	25.64	34	16.43	
Technical Specialist/Professional	42	11.97	23	11.11	
Supervisor	45	12.82	40	19.32	
Front-Line Worker	107	30.48	74	35.75	

Other	59	16.81	35	16.91
Number of Employees in Workplace				0.18
Nr	9	2.56	1	0.48
Less than 20	27	7.69	22	10.63
20 to 49	111	31.62	52	25.12
50 to 250	150	42.74	90	43.48
More than 250	54	15.38	42	20.29
Industry Sector				0.0002
NR	12	3.42	2	0.97
Other Goods-Producing*	11	3.13	2	0.97
Construction	19	5.41	4	1.93
Manufacturing	72	20.51	31	14.98
Wholesale & Retail Trade	20	5.7	27	13.04
Transportation & Warehousing	20	5.7	10	4.83
Education	31	8.83	6	2.9
Health Care & Social Assistance	74	21.08	64	30.92
Public Administration/Government	19	5.41	20	9.66
Other (Please Specify)	7	1.99	4	1.93
Other Services	66	18.8	37	17.87
Union Membership				0.12
NR	8	2.28	1	0.48
Yes	67	19.09	52	25.12
No	276	78.63	154	74.4
JHSC Tenure				0.55
NR	8	2.28	1	0.48
Less Than 6 Months	216	61.54	136	65.7
6 Mths To 2 Yrs	66	18.8	32	15.46
More Than 2 Years	61	17.38	38	18.36
Employer/Worker Rep on JHSC				0.32
NR	8	2.28	1	0.48
Employer	115	32.76	58	28.02
Worker	203	57.83	128	61.84
Not Applicable	25	7.12	20	9.66
Main Reason for Taking Training				0.46
NR	8	2.28	1	0.48
Keeping JHSC training up to date in case an employer needs it	21	5.98	13	6.28
Completing requirements for National Construction Safety Officer Program	2	0.57	.	.
Other	45	12.82	30	14.49
JHSC needed new certified member	181	51.57	118	57
All JHSC members take Certification Pt 1 training at workplace	75	21.37	32	15.46
Health & safety representative (no JHSC at workplace)	19	5.41	13	6.28
Planning to take JHSC Cert Pt 2				0.34
NR	8	2.28	1	0.48
Yes	314	89.46	193	93.24
No	3	0.85	.	.

I Don't Know Yet	26	7.41	13	6.28
<hr/>				
* Other Goods-Producing is Utilities, Agriculture, Forestry, Fishing, Hunting				

Appendix E: Final regression model of post-training knowledge score, F2F and distance-1 comparison

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	2.5	1.1	0.02	0.3	4.7
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-4.5	1.1	<.0001	-6.7	-2.3
Pre-training knowledge score	0.03	0.0	0.37	0.0	0.1
Age (ref: < 35)					
35-44	-1.1	1.2	0.35	-3.5	1.3
45-54	0.8	1.4	0.58	-2.0	3.6
55+	1.4	2.1	0.53	-2.8	5.5
Female (ref: male)	1.0	1.2	0.37	-1.2	3.3
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	3.6	1.3	0.004	1.2	6.1
University	4.7	1.4	0.001	1.9	7.5
English 1st language – No (ref. Yes)	-2.0	1.4	0.15	-4.7	0.7
Non-manual job (ref: manual job)	2.5	1.2	0.04	0.2	4.9
No. of employees (ref: > 250)					
< 20	-4.5	2.0	0.02	-8.4	-0.7
20-49	-2.0	1.7	0.24	-5.5	1.4
50-250	-0.7	1.6	0.68	-3.9	2.6
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	-1.4	1.4	0.32	-4.1	1.3
> 2 years	0.8	1.4	0.56	-2.0	3.7
Intercept	70.3	2.8	<.0001	64.8	75.8

n = 439, R² = 0.17. Abbreviations: ref, reference. Details of the regression modeling process are given in Appendix A.

Appendix F: Final regression model of post-training knowledge score, e-learning and distance-2 comparison

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	0.4	0.9	0.67	-1.4	2.3
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	1.2	0.9	0.18	-0.6	3.1
Pre-training knowledge score	0.2	0.0	<.0001	0.1	0.3
Age (ref: < 35)					
35-44	1.0	1.1	0.35	-1.1	3.2
45-54	-0.03	1.3	0.98	-2.5	2.4
55+	-1.0	1.6	0.55	-4.2	2.2
Female (ref: male)	0.2	1.0	0.83	-1.7	2.2
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.9	1.3	0.52	-1.7	3.4
University	2.3	1.3	0.08	-0.3	5.0
English 1st language – No (ref. Yes)	-1.6	1.3	0.21	-4.1	0.9
Non-manual job (ref: manual job)	3.5	1.0	0.0008	1.5	5.5
No. of employees (ref: > 250)					
< 20	-3.2	1.9	0.08	-6.9	0.4
20-49	-1.2	1.4	0.38	-3.9	1.5
50-250	-0.7	1.3	0.60	-3.2	1.8
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	1.2	1.2	0.34	-1.2	3.6
> 2 years	3.8	1.2	0.002	1.4	6.2
Intercept	62.0	2.6	<.0001	56.8	67.1

n = 544, R² = 0.13. Abbreviations: ref, reference. Details of the regression modeling process are given in Appendix A.

Appendix G: Regression model of post-training knowledge score, with F2F and distance-1 comparison, with addition of modality-(non-)manual interaction

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	-0.4	1.7	0.82	-3.7	2.9
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-5.1	1.1	<.0001	-7.2	-2.9
Pre-training knowledge score	0.0	0.0	0.34	0.0	0.1
Age (ref: < 35)					
35-44	-1.4	1.2	0.25	-3.8	1.0
45-54	0.4	1.4	0.79	-2.4	3.2
55+	1.1	2.1	0.62	-3.1	5.2
Female (ref: male)	1.3	1.2	0.26	-1.0	3.6
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non-	3.3	1.3	0.009	0.8	5.8
university certificate or diploma	4.5	1.4	0.002	1.7	7.2
University					
English 1st language – No (ref. Yes)	-2.0	1.4	0.15	-4.7	0.7
Non-manual job (ref: manual job)	0.3	1.7	0.85	-3.1	3.8
F2F * Non-manual job (ref: distance & Manual)	4.7	2.1	0.03	0.4	8.9
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	-1.7	1.4	0.22	-4.3	1.0
> 2 years	1.0	1.4	0.49	-1.9	3.8
Intercept	70.8	2.7	<.0001	65.5	76.2

Appendix H: Final regression models for secondary study outcomes for the F2F vs. distance-1 comparison

1. Engagement during training

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	0.6	0.1	<.0001	0.4	0.8
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-0.2	0.1	0.0121	-0.4	-0.1
Age (ref: < 35)					
35-44	-0.03	0.1	0.7526	-0.2	0.2
45-54	0.03	0.1	0.7999	-0.2	0.3
55+	0.2	0.2	0.2006	-0.1	0.6
Female (ref: male)	0.1	0.1	0.4468	-0.1	0.3
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non-university certificate or diploma	0.02	0.1	0.8675	-0.2	0.2
University	-0.1	0.1	0.4012	-0.3	0.1
English 1st language – No (ref. Yes)	0.01	0.1	0.9217	-0.2	0.2
Non-manual job (ref: manual job)	0.1	0.1	0.4841	-0.1	0.3
No. of employees in workplace (ref: > 250)					
< 20	0.04	0.2	0.8112	-0.3	0.4
20-49	-0.05	0.2	0.7548	-0.3	0.3
50-250	-0.02	0.1	0.9035	-0.3	0.3
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.02	0.1	0.8835	-0.2	0.3
> 2 years	0.2	0.1	0.1375	-0.1	0.4
Intercept	4.4	0.2	<.0001	4.1	4.8

R-square=0.105

2. Perceived utility of learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	0.3	0.1	0.0018	0.1	0.4
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-0.2	0.1	0.027	-0.4	-0.02
Age (ref: < 35)					
35-44	0.01	0.1	0.948	-0.2	0.2
45-54	0.1	0.1	0.3072	-0.1	0.3
55+	0.2	0.2	0.1907	-0.1	0.5
Female (ref: male)	0.1	0.1	0.433	-0.1	0.2
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.02	0.1	0.8547	-0.2	0.2
University	0.1	0.1	0.4428	-0.1	0.3
English 1st language – No (ref. Yes)	0.01	0.1	0.9214	-0.2	0.2
Non-manual job (ref: manual job)	-0.01	0.1	0.9462	-0.2	0.2
No. of employees in workplace (ref: > 250)					
< 20	0.2	0.1	0.2595	-0.1	0.5
20-49	0.1	0.1	0.4669	-0.2	0.4
50-250	0.1	0.1	0.405	-0.1	0.3
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	-0.04	0.1	0.6661	-0.2	0.2
> 2 years	0.2	0.1	0.1594	-0.1	0.4
Intercept	4.9	0.2	<.0001	4.6	5.2

R-square=0.049

3. Perceived applicability of learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	0.2	0.1	0.0784	-0.02	0.34
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	0.1	0.1	0.5658	-0.1	0.2
Age (ref: < 35)					
35-44	-0.1	0.1	0.4993	-0.3	0.1
45-54	-0.1	0.1	0.5477	-0.3	0.2
55+	0.0	0.2	0.9918	-0.3	0.3
Female (ref: male)	0.1	0.1	0.222	-0.1	0.3
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	-0.02	0.1	0.8539	-0.2	0.2
University	0.04	0.1	0.749	-0.2	0.3
English 1st language – No (ref. Yes)	0.1	0.1	0.2125	-0.1	0.4
Non-manual job (ref: manual job)	-0.03	0.1	0.7636	-0.2	0.2
No. of employees in workplace (ref: > 250)					
< 20	-0.01	0.2	0.9564	-0.3	0.3
20-49	0.001	0.1	0.9943	-0.3	0.3
50-250	-0.1	0.1	0.4516	-0.4	0.2
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	-0.1	0.1	0.3946	-0.3	0.1
> 2 years	0.1	0.1	0.4058	-0.1	0.3
Intercept	5.0	0.2	<.0001	4.6	5.3

R-square=0.025

4. Self-confidence to use learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	0.2	0.1	0.0259	0.02	0.4
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-0.1	0.1	0.4593	-0.2	0.1
Age (ref: < 35)					
35-44	-0.04	0.1	0.6782	-0.2	0.1
45-54	-0.05	0.1	0.6678	-0.3	0.2
55+	0.1	0.2	0.4531	-0.2	0.4
Female (ref: male)	-0.1	0.1	0.396	-0.3	0.1
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.03	0.1	0.7741	-0.2	0.2
University	-0.1	0.1	0.5976	-0.3	0.2
English 1st language – No (ref. Yes)	-0.005	0.1	0.9632	-0.2	0.2
Non-manual job (ref: manual job)	0.1	0.1	0.1232	-0.04	0.3
No. of employees in workplace (ref: > 250)					
< 20	0.2	0.2	0.2481	-0.1	0.5
20-49	0.1	0.1	0.6179	-0.2	0.3
50-250	0.2	0.1	0.1924	-0.1	0.4
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.4988	-0.1	0.3
> 2 years	0.3	0.1	0.011	0.1	0.5
Intercept	4.6	0.2	<.0001	4.2	4.9

R-square=0.047

5. Intention to use learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
F2F (ref: distance)	0.2	0.1	0.0905	-0.02	0.3
HSA non-reference, pair 1 (ref: HSA reference, pair 1)	-0.1	0.1	0.1636	-0.3	0.1
Age (ref: < 35)					
35-44	0.03	0.1	0.7436	-0.2	0.2
45-54	-0.1	0.1	0.4519	-0.3	0.1
55+	0.2	0.2	0.2998	-0.2	0.5
Female (ref: male)	0.003	0.1	0.9785	-0.2	0.2
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.1	0.1	0.1872	-0.1	0.3
University	0.04	0.1	0.7411	-0.2	0.3
English 1st language – No (ref: Yes)	0.0	0.1	0.877	-0.2	0.2
Non-manual job (ref: manual job)	-0.01	0.1	0.9466	-0.2	0.2
No. of employees in workplace (ref: > 250)					
< 20	0.1	0.2	0.6069	-0.2	0.4
20-49	-0.01	0.1	0.9188	-0.3	0.3
50-250	0.05	0.1	0.7239	-0.2	0.3
JHSC tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	-0.1	0.1	0.325	-0.3	0.1
> 2 years	0.05	0.1	0.6953	-0.2	0.3
Intercept	5.0	0.2	<.0001	4.7	5.4

R-square=0.025

Appendix I: Final regression models for engagement and secondary study outcomes for the e-learning vs. distance-2 comparison

1. Engagement during training

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	-0.5	0.1	<.0001	-0.7	-0.3
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	-0.2	0.1	0.0259	-0.4	0.0
Age (ref: < 35)					
35-44	0.1	0.1	0.3636	-0.1	0.3
45-54	0.4	0.1	0.0006	0.2	0.7
55+	0.3	0.2	0.0482	0.0	0.6
Female (ref: male)	-0.1	0.1	0.4908	-0.3	0.1
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.634	-0.2	0.3
> 2 years	0.2	0.1	0.0454	0.0	0.5
Non-manual job (ref: manual job)	0.1	0.1	0.2896	-0.1	0.3
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.1	0.1	0.6343	-0.2	0.3
University	0.1	0.1	0.4705	-0.2	0.3
English 1st language – No (ref. Yes)	0.4	0.1	0.0003	0.2	0.7
No. of employees (ref: > 250)					
< 20	0.0	0.2	0.9397	-0.4	0.3
20-49	0.0	0.1	0.8249	-0.2	0.3
50-250	0.0	0.1	0.7497	-0.2	0.3
Intercept	4.2	0.2	<.0001	3.8	4.5

R-square=0.120

2. Perceived utility of learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	-0.2	0.1	0.0238	-0.3	0.0
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	-0.1	0.1	0.1523	-0.3	0.0
Age (ref: < 35)					
35-44	0.1	0.1	0.336	-0.1	0.3
45-54	0.3	0.1	0.0181	0.04	0.5
55+	0.2	0.1	0.1163	-0.1	0.5
Female (ref: male)	0.03	0.08	0.7094	-0.13	0.20
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.2558	-0.1	0.3
> 2 years	0.1	0.1	0.4628	-0.1	0.3
Non-manual job (ref: manual job)	0.2	0.1	0.0653	-0.01	0.3
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.09	0.11	0.4097	-0.13	0.3
University	-0.05	0.11	0.6628	-0.3	0.2
English 1st language – No (ref. Yes)	0.3	0.1	0.0053	0.1	0.5
No. of employees (ref: > 250)					
< 20	-0.01	0.2	0.9277	-0.3	0.3
20-49	0.1	0.1	0.6257	-0.2	0.3
50-250	0.1	0.1	0.5921	-0.2	0.3
Intercept	4.7	0.2	<.0001	4.4	5.0

R-square=0.056

3. Perceived applicability of learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	-0.1	0.1	0.1287	-0.29	0.04
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	-0.2	0.1	0.0083	-0.4	-0.1
Age (ref: < 35)					
35-44	0.2	0.1	0.0218	0.03	0.4
45-54	0.4	0.1	0.0009	0.2	0.6
55+	0.2	0.1	0.1481	-0.1	0.5
Female (ref: male)	0.1	0.1	0.2175	-0.1	0.3
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.2587	-0.1	0.3
> 2 years	0.1	0.1	0.4009	-0.1	0.3
Non-manual job (ref: manual job)	0.02	0.1	0.8515	-0.2	0.2
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.02	0.1	0.8917	-0.2	0.2
University	-0.1	0.1	0.5796	-0.3	0.2
English 1st language – No (ref. Yes)	0.4	0.1	0.001	0.2	0.6
No. of employees (ref: > 250)					
< 20	-0.2	0.2	0.1779	-0.6	0.1
20-49	-0.2	0.1	0.0632	-0.5	0.01
50-250	-0.1	0.1	0.4065	-0.3	0.1
Intercept	4.8	0.2	<.0001	4.5	5.1

R-square=0.073

4. Self-confidence to use learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	-0.2	0.1	0.0148	-0.4	-0.04
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	-0.2	0.1	0.0127	-0.4	-0.04
Age (ref: < 35)					
35-44	0.04	0.1	0.6575	-0.1	0.2
45-54	0.2	0.1	0.1178	0.0	0.4
55+	0.2	0.1	0.2252	-0.1	0.5
Female (ref: male)	-0.03	0.1	0.7668	-0.2	0.1
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.5704	-0.1	0.3
> 2 years	0.3	0.1	0.0026	0.1	0.5
Non-manual job (ref: manual job)	0.01	0.1	0.9377	-0.2	0.2
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	-0.1	0.1	0.4719	-0.3	0.1
University	-0.1	0.1	0.4138	-0.3	0.1
English 1st language – No (ref. Yes)	0.4	0.1	0.0004	0.2	0.6
No. of employees (ref: > 250)					
< 20	-0.1	0.2	0.4172	-0.4	0.2
20-49	-0.1	0.1	0.6459	-0.3	0.2
50-250	0.03	0.1	0.7586	-0.2	0.3
Intercept	4.7	0.2	<.0001	4.4	5.0

R-square=0.074

5. Intention to use learning

Parameter	Estimate	Standard error	p-value	Lower CI	Upper CI
E-learning (ref: distance)	-0.05	0.1	0.5729	-0.2	0.1
HSA non-reference, pair 2 (ref: HSA reference, pair 2)	-0.2	0.1	0.0406	-0.3	-0.01
Age (ref: < 35)					
35-44	0.1	0.1	0.1661	-0.1	0.3
45-54	0.1	0.1	0.1977	-0.1	0.3
55+	0.1	0.1	0.5132	-0.2	0.4
Female (ref: male)	0.002	0.1	0.9834	-0.2	0.2
JHSC Tenure (ref: < 6 mos.)					
6 mos. to 2 yrs.	0.1	0.1	0.1661	-0.1	0.3
> 2 years	0.1	0.1	0.1977	-0.1	0.3
Non-manual job (ref: manual job)	0.1	0.1	0.5132	-0.2	0.4
Education (ref: ≤ secondary/apprentice/trade)					
College/CEGEP/other non- university certificate or diploma	0.1	0.1	0.1661	-0.1	0.3
University	0.1	0.1	0.1977	-0.1	0.3
English 1st language – No (ref. Yes)	0.1	0.1	0.5132	-0.2	0.4
No. of employees (ref: > 250)					
< 20	-0.2	0.2	0.2217	-0.5	0.1
20-49	0.03	0.1	0.774	-0.2	0.3
50-250	0.1	0.1	0.2262	-0.1	0.3
Intercept	4.8	0.2	<.0001	4.5	5.1

R-square=0.051

Appendix J: Learner suggestions for improving the JHSC Certification Part 1 content

Learners were prompted for their suggestions of how to improve the content of the training. Of 899 individuals, 347 provided a response. Responses were coded and themes were developed, considering in part the organization of the learning outcomes in the program standard for JHSC training (MLITSD 2023a). A single respondent's response could be represented more than once in the table if it was coded to more than one theme). The table is followed by each theme's description and illustrative quotes, in the order in which they appear in the table.

Table J.1. Number and % of respondents providing suggestions about content improvements by theme

Category Theme Sub-theme	F2F (n = 118)		Distance (n = 100)		E-learning (n = 129)		TOTAL (n = 347)	
	No.	% of F2F	No.	% of distance	No.	% of e-learning	No.	% of total
<u>Suggestions/Areas for Improvement in Course Content</u>	36	31.0	32	32.0	57	44.2	125	36.0
OHSA Act	15	12.7	15	15.0	25	19.4	55	15.9
<i>Less emphasis on memorization</i>	1	0.9	0	0.0	18	14.0	19	5.5
<i>More on navigation of OHSA Act/green book</i>	11	9.3	9	9.0	9	7.0	29	8.4
Hazards, controls, inspections	4	3.4	3	3.0	17	13.2	24	6.9
<i>PEMEP better explained</i>	1	0.9	0	0.0	14	10.9	15	4.3
<i>Inspections</i>	1	0.9	1	1.0	1	0.7	3	0.9
Suggestions for additional content	6	5.1	8	8.0	5	3.9	19	5.5
<i>Industry-specific training</i>	4	3.4	7	7.0	4	3.1	15	4.3
General	4	5.9	3	3.0	15	11.6	25	7.2
<i>Content repetitive</i>	3	2.6	0	0.0	13	11.0	16	4.8
<i>Update/correct content</i>	1	0.9	2	2.0	1	0.8	4	1.2
Reporting and investigating serious incidents, work refusals, and complaints	2	1.7	2	2.0	1	0.8	5	1.4
JHSC functions, rights & responsibilities	2	1.7	2	2.0	0	0.0	4	1.2
<u>Positive Comments about Course Content</u>	80	67.8	65	65.0	72	55.8	217	62.5
General	76	64.4	64	64.0	70	54.3	210	60.5
OHSA Act	4	3.4	1	1.0	1	0.8	6	1.7
<u>Other – Not Related to Course Content</u>	6	5.1	12	12.0	6	4.7	24	6.9
Satisfied with training	3	2.5	7	7.0	5	3.9	15	4.3
Delivery-related comments not already represented in Appendix K	2	1.7	5	5.0	0	0.0	7	2.0
<i>Green/orange book – Larger font size</i>	2	1.7	1	1.0	0	0.0	3	0.9
<i>Consistent materials for all</i>	0	0.0	4	4.0	0	0.0	4	1.2

Major Category: “Suggestions/Areas for Improvement”

Theme: “OHSA Act”

- F2F (12.7%)
- Distance (15.0%)
- E-learning (19.4%)

Description: Suggestions related to “8.1.3. Identify occupational health and safety legislation, demonstrate how to access information from it, and explain the basic rights, responsibilities, and training requirements” in the program standard.

Sub-theme: “Less emphasis on memorization”

- F2F (0.9%)
- E-learning (14.0%)

Description: Suggestions for less emphasis on memorization of the content

Quotes (F2F):

- *Less act memorization*

Quotes (E-learning):

- *I am not sure that memorizing what section information is found in is that useful. More important is that you learn to find that information in the act.*
- *I don't think you should [be] tested on identifying the exact sections/subsections on tests. In the real world you would refer to the OHSA and not need to memorize it*
- *Being able to recall a specific section of the act for testing purposes is unnecessary when it can be looked up. More value in more practical applications to identify understanding.*
- *It's not clear what all the references to OHSA sections are for. Is the goal to teach JHSC members to learn how to find information in OHSA and perhaps highlight important questions? Or, is the goal for them to leave training with certain sections/pieces of information memorized? (The second goal is certainly not achieved, if so.) Stating the goal upfront would help.*

Sub-theme: “More on navigation of OHSA Act/green book”

- F2F (9.3%)
- Distance (9.0%)
- E-learning (7.0%)

Description: Suggestions for more practice and explanation on navigating of the OHSA Act/green book

Quotes (F2F):

- *More orange (green) book navigation skills*
- *Providing a handbook/pamphlet to assist with understanding the green book.*
- *Make sure any participants who have never used the regulations book before have a brief period of asking questions relating to it.*

- ...Secondly, the Orange book must be organized with actual page numbers. Looking things up quickly from the index is silly without page numbers. Retain the Section, Sub section, Clause, Sub clause for referencing but include page numbers for index title subjects. This would help immensely.

Quotes (Distance):

- ...I think more training on using the green book would also be good
- Explaining the OH&S Act booklet and how to find sections better.
- For people that were not familiar with the standard and regs, explaining in more detail how to navigate electronically or in handbooks would ease the stress for the exam. I personally had no issue but saw people during activities struggle who will likely still not be sure outside of class, perhaps at the start, walking through it live on screen.
- Prior to having to locate the laws, please show HOW to locate using elaws. Several of the students were very unfamiliar with how to find them.

Quotes (E-learning):

- there should have been training about how to use the green book. average joe's that take part in these trainings are not aware of how to use legal books. it is helpful to simplify it and show the difference between the act and other regulations and how to use the index
- More details on how to read the OSHA green book would be appreciated

Theme: "Hazards, controls & inspections"

- F2F (3.4%)
- Distance (3.0%)
- E-learning (13.2%)

Description: Suggestions related to hazard recognition, assessment and control, including inspections.

Summary: Suggestions included more emphasis on hazard recognition and differentiation between a hazard and a risk. Two sub-themes emerged, 1) more explanation on the PEMEP concept, and 2) inspections checklist processes.

Quotes (F2F):

- More emphasis on hazard recognition

Quotes (Distance):

- There were some discrepancies with the contents in the course and the instructor not agreeing with them. An example is when the participant handbook indicated that a Getting hit by a car is a Hazard. The hazard should be traffic/car and getting hit is Risk.

Quotes (E-learning):

- A little overly specific to workplaces handling hazardous materials but that was to be expected (I work in an office).

- *In the hazard section, the video about the fall where the dead man is talking about not getting to attend his daughter's wedding is triggering and unnecessary. It's a grotesque, flip depiction of a tragedy. It's dated and it needs to go.*

Sub-theme: "PEMEP better explained"

- *F2F (0.9%)*
- *E-learning (10.9%)*

Description: Suggestions for improvement on better explaining the PEMEP (people, equipment, materials, environment, and process) concept.

Summary: Suggestions included providing more information, clarification or scenarios.

Quotes (F2F):

- *I think some of the categories of hazard controls overlap and are redundant and also some of the categories of hazard causes (i.e. environment, materials, process, tools) also overlap. I understand that part of the development of overlapping categories is to allow multiple ways to frame input for greater capture of data but the course didn't get into that and made it seem like answers were either correct or incorrect.*

Quotes (E-learning):

- *I feel like the PEMEP part could have been better explained. I'm still not confident.*
- *Include more PEMEP information/scenarios to understand each component.*
- *I struggled with the portion about PEMEP - seemed to always get these scenarios wrong when looking at a vague picture. Not sure if there is a better way to check understanding on this portion - maybe a more detailed write up about the situation along with a picture?*
- *while doing PEMEP questions i found the photos to be inadequate to answer correctly. i found myself making assumptions in hopes of answering correctly, or i did not make any assumptions and found myself incorrect*
- *The section on PEMEP was very thin--there were brief examples under each component, but not an explanation for why certain things would fall under that component. When I went to do the "check your knowledge" questions, I did not understand why certain components were/n't a contributing factor. The rest of the content was comprehensive and well-delivered.*
- *Also, I found PEMEP examples were subjective and not objective to assess. Saying I was totally wrong when I included an extra factor or missed one isn't helpful to my learning.*

Sub-theme: "Inspections"

- *F2F (0.9%)*
- *Distance (1.0%)*
- *E-learning (0.7%)*

Description: Suggestions for including more content in the training on inspections.

Quotes (F2F/distance/e-learning):

- *Checklist examples for job site inspections.*

- *At some point a basic list of general requirements for every workplace. Something you can look at and check off one by one to bring back to your workplace.*
- *I would have liked more examples of an actual inspection, going through them step-by-step.*

Theme: “Suggestions for additional content”

- F2F (5.1%)
- Distance (8.0%)
- E-learning (3.9%)

Description: Suggestions for additional content for the course.

Summary: Suggestions for additional content ranged from including the Harassment and Violence training in Part 1 of the JHSC Certification training and including first aid training and training on accessibility laws and regulations, to making the training more industry-specific, e.g., broaden the scope of the training from construction and manufacturing to more focus on other industries, including offices.

Quotes (F2F/distance/e-learning):

- *maybe rejig it such that harassment and violence is covered in part 1 just in case trainees do not plan to attend part 2*
- *It would be beneficial to have or receive first aid training as it helps better understand/appreciate how easily workplace accidents may occur and their severity.*
- *we should learn about accessibility la[w]s and regulations*
- *Less on legislation, more on practical.*

Sub-theme: “Industry-specific training”

- F2F (3.4%)
- Distance (7.0%)
- E-learning (3.1%)

Description: Suggestions for content that is more industry-specific.

Summary: Suggestions for making the training more industry-specific, e.g., broaden the scope of the training from construction and manufacturing to more focus on other industries, such as the transportation industry, offices and working from home.

Quotes (F2F):

- *More industry specific training*
- *If several workers are from same company try to make more specific contents related to their specific activities*
- *I would prefer a class with a more broad program. This was very much construction based, I found interesting but didn't have a lot to do with Transportation. Our instructor did try to tie in some, but it was obvious he was passionate about construction.*
- *I am a municipal worker so the construction material was a little different.*

Quotes (Distance):

- *Should be updated to include current COVID conditions as we are now living with a new landscape in business models; reduced real-estate; some places like medical facilities require masks where other commercial sites do not*
- *Try to use other examples not just manufacturing warehouses.*
- *Make it more applicable to each workplace*
- *I would like to see more of the training focused on offices. Perhaps separating the training entirely because machinery is not used within most office settings.*
- *As more companies move to work from home, having more content related to that aspect would be beneficial*

Quotes (E-learning):

- *A little overly specific to workplaces handling hazardous materials but that was to be expected (I work in an office).*
- *...it would be nice to have a construction oriented one and one for office work and one more based on chemicals and training*
- *It was not streamlined to my field so some aspects may not have applied.*
- *I would like to see it include more working groups. I felt that it centered on the construction industry mostly.*

Theme: “General”

- F2F (5.9%)
- Distance (3.0%)
- E-learning (11.6%)

Description: General suggestions for improving the content of the training, with a sub-theme related to currency/correctness of information.

Quotes (F2F):

- *To[o] similar to the supervisor training course*

Quotes (Distance):

- *The workbook could have been more challenging*

Sub-theme: “Content repetitive”

- F2F (2.6%)
- e-learning (11.0%)

Description: Recommendations to make the content of the training less repetitive.

Summary: Recommendations to make the content of the training less repetitive in the F2F and e-learning modalities, such as within the hazard module and across multiple modules, however there was a recognition that the repetition may facilitate learning and content retention.

Quotes (F2F):

- *Some content repeats*
- *I think some of the categories of hazard controls overlap and are redundant and also some of the categories of hazard causes (i.e. environment, materials, process, tools) also overlap. I understand that part of the development of overlapping categories is*

to allow multiple ways to frame input for greater capture of data but the course didn't get into that and made it seem like answers were either correct or incorrect.

- *There's quite a bit of repetitiveness of the content on several modules. I think it meant to emphasize importance but for me it gets confusing. I find the appendices better in comprehending the content instead of many pages of discussion.*

Quotes (e-learning):

- *Try not to repeat information over multiple modules*
- *Some modules are a little repetitive of others*
- *A little bit of over lap in the course modules.*
- *The content was good but a lot of repetition between modules, the program can definitely be shortened*
- *...Also felt like some things were redundant (making the training longer than necessary), but perhaps that was intended to "drive the point home".*
- *There was a decent amount of repetitiveness, but I do believe that's an effective tool to enforce ideas and information. I found some of it very repetitive but at the same time I feel it helped me remember the content*
- *Somewhat repetitive content, could be more concise. Slides were very content heavy--could disperse the content a little more.*
- *It was extremely repetitive and long. Made staying engaged with content difficult...*
- *There was a lot of repetitive content.*

Sub-theme: "Update/correct content"

- *F2F (0.9%)*
- *Distance (2.0%)*
- *E-learning (0.8%)*

Description: Suggestions related to updating and correcting the content.

Quotes (F2F):

- *Have more up to date statistics as some were out of date.*

Quotes (Distance):

- *The slides need to be updated. There were a few errors*
- *There are some errors in the training materials that could be updated*

Quotes (E-learning):

- *Ensure photos contain people wearing proper PPE for their environment.*

Theme: "Reporting and investigating serious incidents, work refusals and complaints"

- *F2F (1.7%)*
- *Distance (2.0%)*
- *E-learning (0.8%)*

Description: Suggestions related to investigation and reporting of fatalities, critical injuries, work refusals, and complaints of dangerous circumstances

Quotes (F2F/distance/e-learning):

- *A few more applied examples for work refusals, critical injuries and occupational illnesses could be useful to solidify those concepts in your head. I also would have liked to do a potential example of what it looks like to contact the MOL.*
- *With a simple and more direct way of doing case studies and investigations.*
- *Be more clear on the work refusal process, maybe present as a flowchart.*
- *Do a complete complaint from start to finish ie complaint is made or raised, look in the green book for what is required, suggestion, etc. just to see the flow of problems and how they are done.*
- *...one of the charts regarding notice requirements for critical injuries/fatalities are outdated. The handbook has the date of 2015 on it so i think it would be beneficial to review training contents with the instructors and updating to a newer version.*

Theme: “JHSC functions, rights & responsibilities”

- F2F (1.7%)
- Distance (2.0%)

Description: Suggestions for the improvement of the content related to JHSC functions, rights and responsibilities.

Quotes (F2F/distance):

- *Focus more on what a meeting looks like, benefits of being a part of the JHSC, more case studies and examples of what JHSC members do in the event of an accident*
- *... provide additional information related to Company offices JHSC material and practices.*
- *A bit more training on the work of the JHSC itself, like its meetings*
- *Need to address WFH and what the role of the JHSC is in that instance.*

Major Category: “Positive Comments”

Theme: “General”

- F2F (64.4%)
- Distance (64.0%)
- E-learning (54.3%)

Description: General positive comments about the content of the JHSC Certification Part 1 training.

Summary: Comments said the content was informative, relevant and comprehensive.

Quotes (F2F):

- *Content of training was very good. Accurate to today's real life scenarios. Visual representations were accurate and information was recent.*
- *I thought the content of the course was very good. I wish I knew some of this training in my previous management career.*
- *The content was provided and areas focused on were most relevant*
- *The content was very informative.*
- *Great content! Great real life examples*
- *Content was great and relatable*

Quotes (Distance):

- *good mix of 'textbook' and 'practical' learning*
- *This course was exceptional. I couldn't think of anything that could be added*
- *Your content of training is the best and up-to-date.*
- *...content was informative and relevant.*
- *Content of training was good. Very valuable and useful information*
- *The content was informative and applicable*
- *Very thorough - helped me tons and will be working on new policies at my workplace*
- *Good for new person with no experience*

Quotes (E-learning)

- *very informative online training*
- *Training was more than enough for my duties.*
- *I thought the content was great but I do not have any other education in this area to compare.*
- *...I thought it was relatable and relevant.*
- *Thought the content was useful and was relevant to the topics*
- *It was comprehensive and informative*

Theme: "OHSA Act"

- F2F (3.4%)
- Distance (1.0%)
- E-learning (0.8%)

Description: Positive comments related to "8.1.3. Identify occupational health and safety legislation, demonstrate how to access information from it, and explain the basic rights, responsibilities, and training requirements" in the program standard.

Quotes (F2F):

- *...the focus on how to use the "green book" was very important and useful.*
- *I really hope other people take this course, learning how to read the book is a whole course itself*
- *Learned to navigate the green book's very helpful!*
- *Great reference manual, work book and information about OSHA regulation*

Quotes (Distance):

- *The content covered was just enough to learn without feeling totally overwhelmed by the depth of everything in the OHSA. No suggestions!*

Quotes (E-learning):

- *everyone should know their rights and awareness.*

Major Category: "Other – Not Related to Course Content"

Theme: "Satisfied with training"

- F2F (2.5%)
- Distance (7.0%)
- E-learning (3.9%)

Description: Responses of satisfaction and adequacy about the content, but not more strongly positive

Quotes (F2F/distance/e-learning):

- *Everything was ok*
- *No content complaints*
- *Satisfied*
- *The content of the training was as needed, can't make many changes to that.*
- *The content was suitable.*
- *I felt the content was adequate*

Theme: “Delivery comments not captured by delivery question”

- F2F (1.7%)
- Distance (5.0%)

Description: Other suggestions pertaining to the delivery of the training that were not captured in response to the separate open-ended survey question about delivery

Sub-theme: “Green/orange book - Larger font size”

- F2F (1.7%)
- Distance (1.0%)

Description: Suggestions that the font size should be larger in the green/orange book containing the OHS Act and regulations, at least during instruction

Quotes (F2F):

- *...And while the small size of the Orange Book is handy for the construction site. The books small size is absolutely useless for studying from. There is absolutely no reason why the material cannot be printed off onto 8.5 x 11 size double sided paper. I require reading glasses now and the font size and small sized book made studying it, a horrible experience.*
- *Make that green book larger with bigger font*
- *It's would be nice to have a larger green book for training, I don't require glasses but staring at the extremely small font for 3 days was tough. Headaches*

Sub-theme: “Consistent materials for all”

- Distance (4.0%)

Description: Suggestions that the instructor and learners should all have the same learning materials, such as books.

Quotes (Distance):

- *Ensure the instructor and course participants have the same books/material*
- *Ensure all training materials and green books are consistent for all participants.*
- *Same books for everyone orange or green.*
- *I suggest making sure that the members taking the course have the matching material to the instructor*

Appendix K: Learner suggestions for improving JHSC Certification Part 1 training delivery

Learners were prompted for their suggestions of how to improve the delivery of training. Of 899 individuals, 512 individuals provided a response. Responses were coded and themes were developed. A single respondent's response could be represented more than once in the table if it was coded to more than one theme. The table below is followed by each theme's description and illustrative quotes, in the order in which they appear in the table.

Table K.1. Number and % of respondents providing suggestions delivery improvements, by theme

Category Theme <i>Sub-theme</i>	F2F (n = 153)		Distance (n = 183)		e-learning (n = 176)		TOTAL (n = 512)	
	No.	% of F2F	No.	% of distance	No.	% of e-learning	No.	% of total
<u>Suggestions/Areas for Improvement in Course Delivery</u>	44	28.8	74	40.4	73	41.5	191	37.3
More engaging	28	18.3	20	10.9	24	13.6	72	14.1
E-learning-specific	-	-	-	-	49	27.8	49	9.6
<i>Narration and narrator voice</i>	-	-	-	-	15	8.5	15	2.9
<i>Knowledge checks and tests</i>	-	-	-	-	7	4.0	7	1.4
<i>Shorter modules/breaks within modules</i>	-	-	-	-	7	4.0	7	1.4
<i>Control of audio/video speed</i>	-	-	-	-	5	2.8	5	1.0
Pace/length/volume of material	9	5.9	15	8.2	8	4.5	32	6.3
Distance-specific	-	-	30	16.4	-	-	30	5.9
<i>Technical</i>	-	-	18	9.8	-	-	18	3.5
<i>Breakout groups</i>	-	-	7	3.8	-	-	7	1.4
<i>Make easier to follow</i>	-	-	6	3.3	-	-	6	1.2
Materials	0	0.0	8	4.4	3	1.7	11	2.1
<u>Positive Comments about Course Delivery</u>	109	71.2	114	62.3	105	59.7	328	64.1
General	48	31.4	46	25.1	40	22.7	134	26.2
Trainer	42	27.5	36	19.7	-	-	78	15.2
E-learning-specific	-	-	-	-	58	33.0	58	11.3
<i>Convenience of self-paced learning</i>	-	-	-	-	24	13.7	24	4.7
<i>Easy to navigate/follow</i>	-	-	-	-	9	5.1	9	1.8
<i>Interactive slides and e-learning videos</i>	-	-	-	-	5	2.8	5	1.0
<i>Problem-based learning and knowledge-checks</i>	-	-	-	-	3	1.7	3	0.6
Engaging	21	13.7	16	8.7	13	7.4	50	9.8
Distance-specific	-	-	22	12.0	-	-	22	4.3
<i>Breakout groups</i>	-	-	4	2.2	-	-	4	0.8
<i>Convenience and accessibility</i>	-	-	4	2.2	-	-	4	0.8
Pace/length/volume of material	2	1.3	2	1.1	4	2.3	8	1.6

Category Theme Sub-theme	F2F (n = 153)		Distance (n = 183)		e-learning (n = 176)		TOTAL (n = 512)	
	No.	% of F2F	No.	% of distance	No.	% of e- learning	No.	% of total
Clear and understandable	2	1.3	2	1.1	4	2.3	8	1.6
F2F-specific	5	3.3	-	-	-	-	5	1.0
<u>Other – Not related to Course Delivery</u>	13	8.5	29	15.8	20	11.4	62	12.1
F2F preference	5	3.3	14	7.7	9	5.1	27	5.3
Online (distance or e-learning) preference	6	3.9	8	4.4	4	2.3	18	3.5
Satisfied with training	1	0.7	7	3.8	6	3.4	14	2.7

“-“ indicates “not applicable”.

Major Category: “Suggestions/Areas for Improvement” - Delivery

Theme: “More engaging”

- F2F (18.3%)
- Distance (10.9%)
- e-learning (14.2%)

Description: Suggestions about making the training delivery more engaging.

Summary: Suggestions include making the training more interactive, adding more videos, engagement with other students and group work, real-life examples, case studies and scenarios, more visual presentations, and improving the slide presentations.

Quotes (F2F):

- *There is a lot of dry content. Maybe come up with a more creative way to deliver the message*
- *Instructor kept class engaged however a lot of the visuals need to be updated. More visuals would be beneficial.*
- *More slideshows less reading out of a book.*
- *A more modulated voice of lecturer would be appreciated.*
- *More slides or videos explaining hazards and how to identify hazards more, in different circumstances.*
- *Video's and Scenario's would allow for better understanding of situations*
- *More specific Ontario workplace examples of how this committee can perform their duties.*
- *The training could implement more real life examples through the use of videos, images, etc.*
- *More interactive to keep full attention*
- *More engagement with other students*
- *More group activities would be more engaging to everyone*

Quotes (Distance):

- *Dry like law class. Maybe something more lively including videos.*
- *Enforce participation amongst all learners. Try to tailor examples to be applicable to learner's workplaces/job contexts.*
- *to make it a little more engaging. Online training is harder to be interactive...*
- *Many participants were hesitant/shy to speak up. Many were muted and not on video while using [virtual platform]. Of course, there were some who were eager to contribute. The presenter was excellent and tried very hard to get everyone involved. I just wish there was a way for people to be more engaged.*
- *May be some group activities can be included if there is a possibility*
- *Maybe more pics to have a more visual aspect of certain subjects*
- *Maybe allow for different activities, some of the worksheets were so ambiguous that the discussions ended up getting of topic. I understand that it was meant to be engaging but maybe try and re create one's that clearly have answers to them and don't leave much room for interpretation especially when it comes to safety*
- *60-75% of attendees did not actively participate. Going into breakout rooms was painful and often only 2 people speaking or with cameras on out of 7. Not even sure the others were there. Felt unfair to always carry the conversation and reporting out. Perhaps ensuring equal participation, asking attendees to go on camera, etc., would help.*
- *More real life examples*

- *I wish we had more time to focus on using case studies, and that case studies had some guiding questions on what to look out for (if it was application based and not knowledge recall based).*

Quotes (e-learning):

- *The information is dense and dry, although important. Finding new creative, engaging ways to deliver content would help the trainees stay engaged. Adding in little games of jeopardy or wheel of fortune would help deliver some info in a new more interesting way. Certain areas were so dry that it was hard to soak in information. Even as little as having different voices read different modules (male voice for mod 1, female voice for mod 2, etc.) would be less monotonous and would reset the brain*
- *...Monotonous during reading each Act. Interactive "game" to help familiarize with acts.*
- *Since there is so much material, it might be worthwhile trying some music, animations, or more fun stuff to make it a little more interesting. Especially, the legal parts referring to the Act. I found it really difficult to stay engaged during that part. However, I really did appreciate the interviews and videos which gave excellent context beyond theory, Thanks for your work. It's important and I appreciate it!*
- *The use of multiple media types would be useful - video, audio, etc. I felt like I was mostly reading a lot and it was hard to stay interested at times.*
- *Showing more acted out scenes of possible scenarios showing procedures, etc..*
- *Listening to someone "read" the slides is very monotonous!...watching a video where someone is "training" and speaking would be more interactive and easier to listen to*
- *more interaction for the user. When people just sit and click periodically their attention gets drawn elsewhere. Interactive learning and hands on is always best.*

Theme: "E-learning-specific"

- e-learning (28.4%)

Description: Suggestions about delivery specific to e-learning.

Summary: Suggestions included improving interactivity with the material, technical suggestions such as the ability to increase the speed of the narrator, recommending when to take breaks, shorter modules, and making the voice of the narrator less monotonous.

Quotes (e-learning):

- *It would be neat to have a more interactive process like a video game to trial health and safety incidents.*
- *...part of the screen needs to be smaller. i couldn't increase it to more than 50% of my screen.*
- *Be able to print the modules before hand so we can have it at the time of the training*
- *Online chat option for question*
- *Just found it hard to access the course itself once registered. Had to call for assistance.*

Sub-theme: "Narration and narrator voice"

- e-learning (8.5%)

Description: Suggestions about delivery specific to e-learning including suggestions regarding the narration and narrator voice.

Summary: Suggestions including ensuring that the narrator had a less monotone voice, switching the narrator's voice between modules, playing less music behind the vocal audio, and have the narrator not read out all of the numbers and policy names.

Quotes:

- *Certain areas were so dry that it was hard to soak in information. Even as little as having different voices read different modules (male voice for mod 1, female voice for mod 2, etc.) would be less monotonous and would reset the brain*
- *The audio track was distracting. I learn better by reading, so I turned the audio off by turning the volume down.*
- *Different voices for each module.*
- *Having the narration match the text on the slides would be helpful. Sometimes the narration had more to say than what was shown on screen*
- *Less monotone voice*
- *Listening to someone "read" the slides is very monotonous!...watching a video where someone is "training" and speaking would be more interactive and easier to listen to*
- *Change up the reading voice. Very mono-toned*
- *Change the voiceover from Module to Module so that the same narrator is not being used for the entire course.*
- *when music is played behind vocal audio, it can sometimes be difficult to concentrate on the vocal...*
- *Maybe change the fact that the presenter reads out all the numbers and policy names.*

Sub-theme: "Knowledge checks and tests"

- *e-learning (4.0%)*

Description: Suggestions about delivery specific to e-learning including suggestions regarding the knowledge-check questions and tests.

Summary: Suggestions included adding more knowledge-check questions, fixing errors and a suggestion that correct answers in the final test should not be displayed in red font.

Quotes:

- *I enjoy the knowledge checks, and more of those types of activities would be beneficial*
- *More knowledge questions should be added.*
- *Include more knowledge based questions.*
- *Testing should be on the information ourself not the specific section numbers of the act*
- *More interactive content, more smaller quizzes*
- *Was delivered well except for a few knowledge questions, Module7 check 12 no right answer and Module8 check 3 no right answer to choose from, tried all answers because I thought my first answer should of been right.*
- *It was delivered in a good way. During final test, correct answers should not be red.*

Sub-theme: "Shorter modules/breaks within modules"

- *e-learning (4.0%)*

Description: Suggestions about delivery specific to e-learning including shorter modules and breaks within modules.

Summary: Suggestions included breaking up the modules into more, shorter modules, and recommending dedicated breaks within the modules.

Quotes:

- *E-learning made it flexible, but some of the modules were very long and perhaps could be broken into more modules.*
- *Have dedicated breaks within the modules.*
- *Training should suggest where you should break / half way points as hard to manage where should start / stop to make sure everything is completed within the 2 day timeframe*
- *time specified was wrong. it was possible to complete 120 min module in 30 minutes. also if someones going through the training for more than 1 hour or 2hrs, the training video could automatically recommend a break the slides/ video part of the screen needs to be smaller...*
- *shorter modules*
- *Module 3 was a killer -- 3 1/2 hours! ...*
- *I am a retired teacher (25 years), so I am a little old school when it comes to this sort of thing. I "glazed over" several times while undertaking the course work, maybe have the same material in smaller chunks so it gives the appearance of making headway.*

Sub-theme: "Control of audio/video speed"

- *e-learning (2.8%)*

Description: Suggestions related to allowing the learner/user to have control over the audio and video speed, e.g., increasing the speed of the audio and videos.

Summary: Suggestions included allowing the learner to increase the speed of the audio and video to 1.25 or 1.5x speed or have the option to turn off the voice-over completely. There was also a suggestion to not allow the learner to fast forward or skip through items.

Quotes:

- *Sections were tedious, like Module 5, especially since the voice was slow. Suggest to allow x1.25, x1.5 speed for audio like the option is for the videos.*
- *Ability to speed up voice-over a bit, and/or turn it off completely. Found at times it was too slow and/or distracted me from absorbing. On the whole, it was good to have but would be better to have options.*
- *Way too slow. If there was an option to speed up the speaking it would be fantastic. That way those who read faster aren't slowed down*
- *I would suggest not being allowed to fast forward or skip through things.*

Theme: "Pace/length/volume"

- F2F (5.9%)
- Distance (8.2%)
- e-learning (4.5%)

Description: Suggestions about the pace, length and volume of the training.

Summary: In F2F and distance, there was mixed opinion about the pace/length/volume of the training. Some found it too slow and/or thought the length of delivery time could therefore be shortened; others were overwhelmed by the amount of information and suggested spreading the material across 4 days. E-learning had a more consistent theme of the course being 'long'.

Quotes (F2F):

- *Maybe make it a 4 day course. More time can be spent on topics rather than skipping*
- *Perhaps it should be a 4 day course not 3 (for pet 1)*
- *Don't overwhelm with the amount of information*
- *Make it 2 day course*
- *Course could be condensed to two days, left early all three days*

Quotes (Distance):

- *This being my first time doing this training, the first two days are really information overload for a full 8 hours. It be better and more enjoyable, less stressful if it was spread out over 4 days vs 3 days. And just let people naturally absorb what they've learnt on each day...*
- *Too packed for one day*
- *... some areas were sped through leaving me feeling lost at times.*
- *I'm not sure if there is a way to rectify this, but by 2:30/3:00 most of the participants (including myself) were tired and finding it difficult to participate. The breakout rooms helped break this up a bit*
- *I felt like the delivery was good, 8 hours was a little long though.*
- *Need more staggered breaks*
- *...The training material could have easily been covered in 1/3 of the time.*
- *Need to not go through material so slowly*
- *it was very straight forward and slow to progress at times.*
- *The end was rushed. Instructor mentioned they wanted to "beat the record"*

Quotes (e-learning):

- *...that was a long time to be sitting in front of computer*
- *I like the online format, however I found it extremely long.*
- *Improve length, and succinctness of content.*
- *Could shorten a bit*
- *Very lengthy*
- *Was delivered good, a little long tho*

Theme: "Distance-specific"

- Distance (16.4%)

Description: Suggestions about delivery, specific to distance modality.

Summary: Suggestions included suggestions on the technical aspects of the training as well as the use of breakout groups.

Sub-theme: “Technical”

- Distance (9.8%)

Description: Suggestions about technical aspects of delivery, specific to distance modality.

Summary: Suggestions about the use of different virtual platforms, providing technical support, hearing the instructor and considering learners familiarity with online training platforms.

Quotes:

- *...maybe try to provide support to help minimize technical difficulties*
- *Keep in mind that some people have never experienced an online training before and that poses technical difficulties*
- *...Need work on the initial log on. Granted it was as new set up so there are start up issues. It took awhile to enter into the system*
- *The app used for training wasn't the greatest, zoom or teams would've been better.*
- *Virtual training was delivered on an unfamiliar platform. Individuals may be more familiar with Zoom or Microsoft Teams.*
- *...We experienced a lot of technical issues (sound problems, some videos not playing). Perhaps using a another platform, such as Microsoft Teams, may make things easier as I never had issues with Teams in the past.*
- *Was all right, but had some Technical issues with webCams always having to being on and some issues with hearing the instructor with their mics*
- *The only trouble I found with the virtual delivery was internet connection troubles on my end. And the information in the last day felt rushed because we had fallen behind*
- *With zoom I think there's a way to turn off the mics of people for them as the host. That would be good for the people who would sometimes accidentally leave theirs on.*

Sub-theme: “Breakout groups”

- Distance (3.8%)

Description: Suggestions about breakout groups in the distance modality.

Summary: Some respondents found the breakout groups to be ineffective or difficult to participate in, while other respondents suggested them to increase participation.

Quotes:

- *Break away groups were ineffective. Many trainees would not engage. Start/finish sooner.*

- *60-75% of attendees did not actively participate. Going into breakout rooms was painful and often only 2 people speaking or with cameras on out of 7. Not even sure the others were there. Felt unfair to always carry the conversation and reporting out. Perhaps ensuring equal participation, asking attendees to go on camera, etc., would help.*
- *It was challenging to learn when in small groups due to the range of job roles in group and the very short timed work periods. Groups were under pressure to find info for exercises and scramble to complete task. This left no time to absorb process or info effectively.*
- *It was kinda overwhelming to me honestly because of putting into a group with different people especially I wasn't really sure what I was doing and as a not native speaker. I loved the way we take it as a whole group. Prefer to go along with the people who can answers so I don't really have to stress or be nervous about when they will ask me to answers and stuffs, but it wad pretty fun at least to learn*
- *In order to increase participation, a breakout room to do exercises and share answers may work (not sure whether this is possible in the [virtual platform] platform;*
- *Online we should do breakout rooms*

Sub-theme: “Make easier to follow”

- *Distance (3.3%)*

Description: Suggestions about making the training easier to follow in the distance modality.

Summary: Some respondents found the training to be difficult to follow, fragmented and jumpy. Suggestions included adding the workbook pages to the PowerPoint slides, provide a resource on how to navigate the online platform for reading the Act, and having the instructor be specific about the book that they are referring to.

Quotes:

- *Add workbook pages to the powerpoint slides - many times, it was hard to follow or sections jumped pages. ...Folks also perhaps needed a resource and walk through of how to navigate the online platform for reading the act*
- *Have teacher be very specific about what book they are referring to when looking up information during virtual training.*
- *Very fragmented and jumpy, hard to follow at times. Instructor should have corresponding materials to match student's materials*
- *Better explain how to use the manual. It really wasn't user friendly when trying to find sections*
- *I like the online training personally, had a little trouble finding the right page in workbook at times but did find them.*

Theme: “Materials”

- *Distance (4.4%)*
- *e-learning (1.7%)*

Description: Suggestions about the materials used in the training.

Summary: Suggestions included ensuring that the instructor had the same materials as the students, providing a hard copy of the OHSA Act and workbook, and providing access to the materials prior to the start of the training. Respondents from the e-learning training recommended providing access to follow-up resources after taking the final test for future reference.

Quotes (Distance):

- *Instructor should have corresponding materials to match student's materials*
- *A hard copy of the OHSA Act would be nice. The online version was very hard to navigate and search for acts etc.*
- *It would be helpful if the information was able to be accessed for printing the day before the training started*
- *I like to have paper copies of things, so I would have liked the option to purchase a physical copy of the Workbook as I find scrolling through a 300+ page document very time consuming. I am also less likely to reference the electronic version in the future, they way I would with a physical copy.*

Quotes (e-learning):

- *Would be nice to get follow up resources for future reference.*
- *The Resources section is not available after you take the final test. I was planning to go back and access several resources.*

Major Category: “Positive Comments” - Delivery

Theme: “General”

- F2F (31.4%)
- Distance (25.1%)
- e-learning (22.7%)

Description: General positive comments about the delivery of the training.

Summary: General positive comments included that the training was well-conducted and informative.

Quotes (F2F):

- *Very well conducted, enjoyed every minute*
- *Training was perfect*
- *Training was delivered in simple English where one can totally understand there was so much information given I found it to be good*

Quotes (Distance):

- *It was on [virtual platform] but very informative and clear*
- *Training was great, no suggestions.*

Quotes (e-learning):

- *It was very informative*

- *The reader was informative and not monotone which made it easier to listen too*
- *It was well done*

Theme: “Trainer”

- F2F (27.5%)
- Distance (19.7%)

Description: Positive comments about the trainer.

Summary: Positive comments were about the trainers’ use of their knowledge, relevant stories, examples and real-life scenarios to deliver the content in an engaging and clear manner.

Quotes (F2F):

- *[Name] did a finomimal job applying the content with experience.*
- *[Name] is an incredible instructor. He manages to find time to tell relatable stories to keep you involved, yet mixes in enough of the manual searching and reporting that at the end of it you don't feel like a zombie and you are very confident in finding what you may need to find, AND what to do with what you've found. Great instructor, great course!*
- *[Name] was very interactive. Always a positive cheerful attitude. Always trends to bring up real life scanarios to our jobs.*
- *Instructor [Name] was extremely engaging and knowledgeable. Made the 3 days go by fast and he shared many relevant stories and examples to help us understand.*
- *The trainer was very knowledgeable and gave relatable personal experience to enhance the material being trained. There was active participation and the trainer stayed on topic*

Quotes (Distance):

- *The instructors were engaging and provided valuable insight.*
- *The training was given really well by [Name]. He answered all questions and would always circle back or cover them 2 times which helped us remember. I felt very confident when writing the test*
- *I really liked the instructor. He was passionate and clear!*
- *The presenters were truly fantastic! Have to give a quick call out to [Name] because he was so easy and compelling to listen to.*
- *Very knowledgeable instructors who were able to navigate the material seamlessly and were able to answer any questions that arose*

Theme: “E-learning-specific”

- e-learning (33.0%)

Description: Positive comments about the e-learning modality.

Summary: Positive comments were about the ability to learn at one’s own pace, the use of the videos and interactive slides, the use of problem-based learning and knowledge checks, and the ease of navigation of the website.

Sub-theme: “Convenience of self-paced learning”

- *e-learning (13.7%)*

Description: Positive comments on the convenience of self-paced learning in the e-learning modality.

Summary: Positive comments included enjoying the convenience and flexibility of self-paced learning which facilitated keeping with other work duties and understanding of the concepts.

Quotes:

- *I enjoyed the ability to control the pace of the content. There were aspects I had knowledge from previous experience so I was able to speed through those quiet. Then there were other areas where I was able to slow down or go back and review again if I felt I did not grasp the content.*
- *This was great I love the e course. It makes scheduling it in to a busy life easy.*
- *...pacing and accessibility were good.*
- *I liked the module approach and the ability to learn at your own pace or when time allows*
- *Really liked the online format. Being able to stop/start when I had time was very useful.*
- *I enjoyed the form of delivery that allowed me to move at my own pace and do it in sections over days if necessary.*
- *It was nice to be able to go at my own pace online as opposed to trying to cram all the info in in 2 days.*
- *I enjoyed the online training and being able to do it at my own pace as I was pulled away from my desk a few times to cover for other employees.*
- *Liked that it was delivered in an online format that provided me with flexibility for completing*
- *Online training is great...flexible and easy to use.*
- *I like the modules as I can keep up with my work and get the modules done when I have time.*
- *I enjoyed being able to go at my own pace without having to rush my understanding of concepts, etc.*

Sub-theme: "Easy to navigate/follow"

- *e-learning (5.1%)*

Description: Positive comments about how the e-learning training was easy to navigate, use and follow.

Summary: Positive comments included that the training was easy to navigate and follow and that the website was easy to use.

Quotes:

- *Online training is great...flexible and easy to use.*
- *Website was simple and easy to use.*
- *It was very easy to navigate and understand.*
- *It was well organized and easy to follow*
- *The delivery was excellent and easy to follow*
- *It was very easy to navigate each section and find all the information necessary.*

- *No feedback as the online training as easy to do*
- *It was well made and understood.*

Sub-theme: "Interactive slides and e-learning videos"

- *e-learning (2.8%)*

Description: Positive comments on the use of interactive slides e-learning videos in the e-learning modality.

Summary: Positive comments that the interactive slides and e-learning videos facilitated engagement.

Quotes:

- *Excellent online course presentation. The use of interaction on the slides kept me engaged.*
- *I liked that the videos summarized the most important parts of the module.*
- *I thought the ratio of videos to content was good*
- *Having to click buttons and press tabs kept the course more engaging. Maybe more of that.*
- *I like the videos. I would recommended more videos but overall it was very interactive.*

Sub-theme: "Problem-based learning and knowledge-checks"

- *e-learning (1.7%)*

Description: Positive comments on the knowledge-check questions, problem-based learning and tests specific to the e-learning modality.

Summary: Positive comments included the respondents enjoyed the problem-based learning and knowledge-check questions.

Quotes:

- *I loved the e-learning and with the questions scattered throughout it. Not too many videos and not too much text it was a good balance.*
- *I enjoyed the problem based learning, anywhere this can be incorporated can help.*
- *Enjoyed the knowledge tests, found them very useful. Could include more interactive sections like that.*

Theme: "Engaging"

- *F2F (13.7%)*
- *Distance (8.7%)*
- *e-learning (7.4%)*

Description: Positive comments about engaging delivery

Summary: Comments about the training being interactive, thought-provoking and practical and made use of stories, scenarios and examples in the F2F modality. The virtual training additionally made use of

interactive poll questions and breakout sessions for engagement; and the e-learning used videos, knowledge check questions and interactive slides.

Quotes (F2F):

- *In person, very interactive and enjoyed the review questions and case study's to reflect and practice what was learned*
- *I enjoyed the way training was delivered in was very entertaining and I like how there was a lot of stories and examples being told, kept me entertained.*
- *...the training was delivered perfectly, as it was engaging and practical and it was delivered in a way that can catch the participants attention and further help them remember for real life situations*
- *I liked the case studies and working with the person at my table. Used slides and pictures, some videos might be good too. But overall was really informative and engaging.*
- *The training delivered was awesome. Everything was explained with examples hence no suggestions from me. Couldn't have been better.*
- *Good use of class engagement with different type of scenarios.*

Quotes (Distance):

- *...The interactive polling questions during the course via Adobe Connect was really a nice touch and very engaging. Also people weren't self conscious since it was anonymous.*
- *The training was very good thru online . Alot if information was explained thru videos and book references.*
- *I liked that the training was virtual but still interactive.*
- *I was very impressed with the quality of the training considering that it was online and over the course of 3-days. It was very engaging and the breakout sessions enabled the interactions we would get in person. Some independent activities (not in groups) would be beneficial.*
- *...Training delivery through discussions, examples and videos were effective.*
- *It was interactive I liked the way it was delivered*

Quotes (e-learning):

- *...I liked that there was a variety of media used because this would accommodate for different learning styles. I liked the mix of text, videos, pictures, and the engagement of having knowledge check questions throughout the course.*
- *I liked the videos and that there was some interaction with the slides*
- *Having to click buttons and press tabs kept the course more engaging. Maybe more of that.*
- *Delivery was great! entertaining, I likes the audio script and I believe it suits all learning styles.*
- *I thought the ratio of videos to content was good*

Theme: "Distance-specific"

- Distance (12.0%)

Description: Positive comments specific to the delivery of distance learning.

Summary: Comments such as the effectiveness of distance learning and interactivity in a virtual format.

Quotes (Distance):

- *Distance learning is just as effective as classroom training.*
- *The training was very good thru online. A lot of information was explained thru videos and book references.*
- *I liked that the training was virtual but still interactive.*
- *I was very impressed with the quality of the training considering that it was online and over the course of 3-days. It was very engaging and the breakout sessions enabled the interactions we would get in person...*
- *I loved that it was online and with instructors, no travelling or extra expenses. This should be an option always :)*
- *Overall was a good experience, breaks were adequate and more important pieces of the content were emphasized*
- *The interactive polling questions during the course via Adobe Connect was really a nice touch and very engaging. Also people weren't self conscious since it was anonymous.*

Sub-theme: "Breakout groups"

- *Distance (2.2%)*

Description: Positive comments on the use of breakout groups.

Summary: Breakout groups enhanced interactivity.

Quotes:

- *...the breakout rooms were a nice way to shake up the day and engage further*
- *...I also like the breakout sessions where we get to work in a smaller group.*
- *...the breakout sessions enabled the interactions we would get in person*

Sub-theme: "Convenience and Accessibility"

- *Distance (2.2%)*

Description: Positive comments about the convenience and accessibility of distance training.

Summary: The distance training was convenient and accessible.

Quotes:

- *Online is very convenient*
- *Virtual learning was accessible during Covid limitations*
- *The online delivery was very convenient and easy to follow.*
- *Training was delivered effectively. I think that virtual is best way - taking into consideration that our current economic environment is inflationary on fuel. I prefer this method of learning as most of business is conducted this way and my drive time would be over an hour out. In addition I suffered a recent death (Thursday September 15 afternoon) and chose to continue with the learning on Friday and my head space was not where it needed to be - driving would have very bad for me and being in front of people crying would not have ideal. I at least had the comfort of being alone and being not seen while I was crying. Over all this was a great*

experience and if you/can or are willing to put the course to put the entire course to virtual this would be ideal.

Theme: “Pace/length/volume of material”

- F2F (1.3%)
- Distance (1.1%)
- e-learning (2.3%)

Description: Positive comments on the pace, length and volume of the training.

Quotes (F2F):

- *Delivered in a well timed manner*
- *... It was delivered extremely thorough. .*

Quotes (Distance):

- *I think the training was delivered well - rotated instructors, respected time, made reference to the green book and actively used the materials and exercises*
- *the ladies were great, knew their jobs and ran it efficiently*

Quotes (e-learning):

- *Efficient*
- *I did the training online and felt it was broke down very well.*
- *To the point, fast and efficient.*
- *No suggestions - pacing and accessibility were good.*

Theme: “Clear and Understandable”

- F2F (1.3%)
- Distance (1.1%)
- e-learning (2.3%)

Description: Positive comments on how the training was clear and understandable.

Quotes (F2F):

- *It was delivered well and clear.*
- *Delivery was clear and understandable*

Quotes (Distance):

- *It was on zoom but very informative and clear*
- *None - Training was delivered well and clearly*

Quotes (e-learning):

- *Good delivery method - easy to use and understand*

- the training was delivered in very clear way
- training was presented well and understandable
- The language used was simple and easy to understand. I found that helpful.

Theme: “F2F-specific”

- F2F (4.6%)

Description: Positive comments specific to the F2F delivery.

Summary: Comments about interactivity and being tangible.

Quotes (F2F):

- *The training was done well for the Covid 19 protocols.*
- *In person, very interactive and enjoyed the review questions and case study's to reflect and practice what was learned*
- *In class delivery of lecture is good and tangible compared to on line*
- *I like that it was in person and we were able to work in groups*
- *In person training is still the most engaging and thought provoking way to learn in my opinion*

Major Category: “Other” – Not Related to Delivery

Theme: “F2F preference”

- F2F (3.3%)
- Distance (7.7%)
- e-learning (5.1%)

Description: Comments of preference for the F2F modality.

Summary: Across the three modalities, there were respondents who preferred the F2F modality over distance or e-learning, for reasons such as there less distractions, less technical issues, less sitting in front of a computer and more engagement, and interactivity, as well as networking.

Quotes (F2F):

- *Prefer in class training...*
- *In person training is still the most engaging and thought provoking way to learn in my opinion*
- *Course taken IN PERSON. Less distractions than if done virtually.*
- *In person is a must. Keep it going.*

Quotes (Distance):

- *Online is tough. Tech issues are never fun. In class would have been preferred*
- *In person training is much better than on line as technical difficulties and lack of computer skills obstructs the learning process*
- *I am not big on sitting in front of a computer all day , I learn best in a classroom without so many distractions.*
- *Not online*

Quotes (e-learning):

- *i always learn and retain more information in actual class sessions as opposed to online learning*
- *in class would be better for information retention, that was a long time to be sitting in front of computer*
- *Would prefer an in person class with a workbook*
- *In class learning would have been more interactive and good for networking*

Theme: “Online (distance or e-learning) preference”

- F2F (3.9%)
- Distance (4.4%)
- e-learning (2.3%)

Description: Comments of preference for online training, either distance or e-learning.

Quotes (F2F):

- *Prefer the training online than in person*
- *Online training would be a sufficient alternative*

Quotes (Distance):

- *Training was delivered effectively. I think that virtual is best way - taking into consideration that our current economic environment is inflationary on fuel. I prefer this method of learning as most of business is conducted this way and my drive time would be over an hour out. In addition I suffered a recent death (Thursday [date] afternoon) and chose to continue with the learning on Friday and my head space was not where it needed to be - driving would have very bad for me and being in front of people crying would not have ideal. I at least had the comfort of being alone and being not seen while I was crying. Over all this was a great experience and if you/can or are willing to put the course to put the entire course to virtual this would be ideal.*
- *More virtual sessions for other courses*
- *Self-directed learning would be far more effective instead of live; could also be better as a combination self-learning with only 1 or 1/2 a day live.*

Quotes (e-learning):

- *I prefer online*
- *Online training is great...flexible and easy to use.*

Theme: “Satisfied with training”

- F2F (0.7%)
- Distance (3.8%)
- e-learning (3.4%)

Description: Comments of satisfaction about the delivery (not a strong positive comment).

Quotes (F2F/distance/e-learning):

- *I was satisfied with how the training was delivered.*