



Fatigue Related to On-Line Training

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INTRODUCTION

The use of Zoom, and other on-line technologies, exploded with the onset of the Covid-19 pandemic. At the end of 2019 there were approximately 10 million Zoom users. By April 2020, the number had climbed to 300 million.¹ After attending virtual meetings and listening to and/or participating in on-line programs, one often feels exhausted or fatigued.² Prior to the pandemic there was little peer reviewed literature on “Zoom fatigue”. In fact, the term was not even in frequent use. Most of the existing literature and research relates to telework and higher education. The role and impact of Zoom on worker training programs is virtually non-existent. This paper surveys workers in on-line health and safety training. It focuses on the behavior and attitudes of small group Zoom training for Covid and other infectious disease training run by the training consortium of the International Chemical Workers Union Council’s Center for Worker Health and Safety Education out of Cincinnati. The research question is: What are the fatigue impacts of on-line training and how might negative impacts be reduced? This paper explores the level of fatigue felt by trainees experiencing prolonged screen times. After a review of what literature does exist, this study uses primary data from surveys of participants to better understand their reactions to a new form of training – training on-line. Specifically, the courses involved were the *NIOSH PG Application*, *CAMEO Chemicals Application*, *Spanish Introduction to Covid* Focus Group, and a *Spanish Introduction to Covid*.

¹ Morris, B. “Why Does Zoom Exhaust You? Science Has an Answer.” *Wall Street Journal*, on-line ed., 2020 in Bonanomi, A, Facchin, F, Barelo, S, Villani, D. “Prevalence and health correlates of Online Fatigue: A cross-sectional study on the Italian academic community during the COVID-19 pandemic.” *Plosone*, October 14, 2021, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0255181>.

² Epstein, H B. “Virtual Meeting Fatigue,” *Journal of Hospital Librarianship*, Vol. 20 No. 4, pp. 356-360, <https://www.tandfonline.com/doi/abs/10.1080/15323269.2020.1819758?journalCode=whos20>.

Zoom fatigue can be defined as “somatic and cognitive exhaustion that is caused by the intensive and/or inappropriate use of videoconferencing tools, frequently accompanied by related symptoms such as tiredness, worry, anxiety, burnout, discomfort, and stress, as well as other bodily symptoms such as headaches.”³

Members of the International Chemical Workers Union Council (ICWUC) Consortium include: the International Association of Machinists and Aero Space Workers (IAMAW), the United Food and Commercial Workers (UFCW), the Coalition of Black Trade Unionists (CBTU), the American Federation of Teachers (AFT), the American Federation of Government Employees (AFGE), the University of Cincinnati (UC), Department of Environmental Health, the Labor Council for Latin American Advancement (LCLAA), the National Council for Occupational Safety and Health (NCOSH), the American Federation of State, County, and Municipal Employees (AFSCME), the Association of Environmental and Occupational Clinics (AOEC), and National Nurses United (NNU).

LITERATURE ON ON-LINE FATIGUE

One researcher, studying zoom fatigue, found three root causes of Zoom fatigue: asynchronicity of communication, lack of body language, and lack of eye contact. She also found that: “Because the brain has a natural tendency to compensate for missing information by increased computations, lack of information that a person’s brain perceives in the course of social interaction—ironically—may cause increased cognitive effort.”⁴

Why the stress and fatigue from video meetings? Humans are “wired” for immediate feedback in an interaction. According to Riedl: “If a delay is perceived during videoconferencing (even if this perception occurs subconsciously in the range of milliseconds), the human brain works harder and thereby attempts to overcome the issue of asynchronicity, which is accompanied by increased cognitive effort to restore synchrony. Moreover, this effect is likely accompanied by enhanced frustration and stress.”⁵ Lack of emotion recognition via body language can be yet another potential root cause of Zoom fatigue. One needs both face and body feedback for accurate reading of body language. Reduced eye contact in Zoom activities can add to greater fatigue. Riedl goes on to say: “if there is a lack of eye contact, shared attention is more difficult to establish than with eye contact, and this, in turn, leads to coordination difficulty that comes along with increased cognitive effort.” Yet another cause of fatigue is increased self-awareness from seeing oneself reflected on the screen, like a constant mirror-view of oneself.⁶ In addition, many people multi-task while on a Zoom call – sending out emails or texts, for example. This multitasking also can contribute to stress and fatigue.

³ Riedl, R. On the stress potential of videoconferencing: definition and root causes of Zoom fatigue. *Electron Markets* 32, 153–177 (2022). <https://doi.org/10.1007/s12525-021-00501-3>.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

Other research⁷ has found that being on a video call requires more focus than face-to-face interactions. One's brain needs to work harder to process and understand non-verbal cues such as facial expressions, body language, and tone or pitch of the voice. This gets even more difficult as the number of people in the meeting increases. Over time, such on-line interactions may make one feel mentally drained or exhausted.

Fatigue can also result from the need for multi-tasking.⁸ Interacting with multiple people on the same video call, one's mind rapidly shifts focus from one person to another, each of whom may have a different background. One's brain's central vision gets challenged if it has to process all the people at the same time and may not be able to focus on the speaker. This may cause one to constantly pay partial attention to each person, and thus lead to multitasking. This process can hamper productivity and can also cause fatigue.

Zoom calls, according to Bothra,⁹ can also cause dissonance and distress. The human mind understands the importance of having other people around and to some degree enjoys interpersonal interactions. When one's mind sees and hears other people, but realizes they are not physically present there, it can cause a sense of dissonance or disconnection. This disconnect, for some people, can be jarring to deal with and difficult to adapt to – and can eventually lead to high levels of stress.

Zoom calls can also pressure participants to behave a certain way.¹⁰ It is easier to look around and maintain eye contact with others in a face-to-face setting. But during a Zoom call it can become difficult to display natural body language. Looking off to a side, trying to read the time, or even taking notes can be interpreted as a participant not paying attention. This in turn can put a lot of pressure on individuals to behave differently – by sitting straight or perhaps focusing solely on the person who is talking. Dealing with this pressure can be tiring and draining.

The findings of a study in Italy:¹¹

The biopsychosocial mechanisms associated with the mental and physical toll (e.g., headaches and vision problems) of videoconferencing technology overuse remain unclear. Besides technical malfunctions, it has been suggested that minimal delays occurring in this type of communication, along with lack of mutual gaze, decreased nonverbal cues, and one's

⁷ Bothra, Sweta. Inner Hour Mental Health Platform, "How to Avoid Zoom Fatigue While Working from Home," https://thriveglobal.com/stories/how-to-avoid-zoom-fatigue-while-working-from-home/?utm_source=Newsletter_General&utm_medium=Thrive.

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Morris, B. "Why Does Zoom Exhaust You? Science Has an Answer." *Wall Street Journal*, on-line ed., 2020 in Wiederhold BK. Connecting through Technology during the Coronavirus Disease 2019 Pandemic: Avoiding "zoom Fatigue." Vol. 23, *Cyberpsychology, Behavior, and Social Networking*. 2020.

overexposure to one's own image, cause extra work to the brain to restore synchrony, as well as psychological fatigue.

The Italian researchers discuss the extra stress created by meeting on-line instead of in person. They found that in-person meetings encourage both verbal and non-verbal communication. Videoconferencing requires greater effort in processing non-verbal cues. A mental health professional found that video calls require more focus than in-person interactions because one's brain needs to work harder to process non-verbal cues.¹²

STUDY METHODOLOGY

Beyond the literature review, trainees in five on-line classes, delivered during 2020 and 2021, ranging from two hours to four hours, were surveyed to determine their on-line behaviors and levels of fatigue from doing their training by Zoom. The survey was developed by the consultant in partnership with two professionals at the Center of Health and Safety Education. In all there were 31 participants. The survey was administered on-line at the end of each class. All class participants responded to the survey.

Findings

One hypothesis, initially, had been that Zoom work would be more stressful for those who do not use a computer in their regular daily work. Unfortunately, this could not be tested because over 95 percent of participants worked at a desk during most of their regular job – and not on their feet or driving. (See Table 1.)

Table 1: During most of my regular job, I am

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:31)
On my feet inside	1	0	0	0	0	3.2%
On my feet outside	0	0	0	0	0	0.0%
At a desk	8	7	3	6	6	96.8%
Driving	0	0	0	0	0	0.0%
# Participants	9	7	3	6	6	100.0%

The ICWUC training program is mindful of the need for breaks and the 31 trainees, by and large thought there were enough breaks, though many would have preferred more breakout groups to further discussion and interaction. (See Table 2.)

¹² Bothra.

Table 2: When taking this on-line course

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:32)
There were enough breaks	7	5	2	6	5	78.1%
There were too few breaks	2	1	0	0	0	9.4%
More break-out discussion groups would help	0	1	2	0	1	12.5%
# Participants	9	7	4	6	6	100%

While 75 percent of trainees did something “different” during breaks, a full 25% either continued sitting at their computer or spent the time with their phone or caught up with missed work or messages. (See Table 3.) The literature suggests that talking to someone nearby, getting up and walking around or getting a snack, helps individuals have a more “useful” break and changes body position and line of vision. Directing trainees toward specific “true” and more relaxing break activities would be a recommendation for the future.

Table 3: During breaks in this class

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:36)
I continued sitting at my computer or with my phone	3	1	0	0	1	13.9%
I got up & walked around	3	4	1	3	5	44.4%
I caught up on missed work or messages	2	0	2	0	0	11.1%
I talked to someone who was nearby	0	1	0	3	1	13.9%
I got a snack	1	1	2	0	2	16.7%
# Participants	9	7	5	6	9	100.0%

While half the trainees reported feeling fine during class, a full 50 percent reported that they got sleepy and had trouble paying attention, that their eyes hurt, found themselves feeling restless or irritable, or had achy joints from sitting so long. (See Table 4.)

Table 4: During the course itself

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:33)
I got sleepy & had trouble paying attention	1	2	2	0	1	18.2%
My eyes hurt	0	0	1	0	0	3.0%
I found myself feeling restless & irritable	3	1	0	0	0	12.1%
My joints were achy from sitting so long	2	2	0	0	1	15.2
I felt fine	3	2	1	6	5	51.5%
# Participants	9	7	4	6	7	100.0%

Again, half the participants felt they had paid full attention during the course, but another half admitted to not paying full attention. Ten percent simply said they lost focus, while a few were also playing a game on their phone. Nearly 30 percent said they were responding to emails and/or texts while attending class and nearly 15 percent said they were doing other work or personal tasks. (See Table 5.) Zoom training, especially from home, easily allows for such distractions.

Table 5: During this course

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:32)
I paid full attention	3	1	1	5	5	46.9%
I lost focus and did not pay full attention	0	1	1	1	0	9.4%
I was also playing a game on my phone	0	1	0	0	0	3.1%
I was also responding to emails and/or texts	4	3	1	0	1	28.1%
I was also doing additional work-related or personal tasks	2	1	1	0	0	12.5%
# Participants	9	7	4	6	6	100.0%

Very few participants actually felt bored during class, but half said that while they were engaged, they still got tired sitting and listening. Nearly 20 percent admitted to feeling Zoom

fatigue and nearly 30 percent needed more opportunities to participate and discuss the material. (See Table 6.)

Table 6: During this course

	2 Hr. NIOSH PG App.	2 Hr. CAMEO Chemicals	4 Hr. Spanish Intro to Covid Focus Group	3 Hr. Spanish Intro to Covid	2 Hr. NIOSH PG App.	% of total for all 31 participants (including multiple answers per question:34)
I suffered from “on-line fatigue”	0	2	2	0	2	17.6%
I was engaged, but I still got tired sitting & listening	8	3	2	2	2	50.0%
I was often bored, and I got tired of sitting & listening	0	1	0	0	0	2.9%
I needed more opportunities to participate & discuss the material	1	1	0	4	4	29.4%
# Participants	9	7	4	6	8	99.9%

DISCUSSION

ICWUC on-line training that was part of this study was for relatively short duration – two to four hours. Most of the literature associates zoom fatigue with more lengthy sessions and more continuous use of videoconferencing.

Union trainees usually thrive best with a reliance on small group discussions for much of each program. Finding ways to effectively integrate such breakouts into Zoom training requires new and creative curriculum development. ICWUC has done much of this innovation, but there is more to be done.

RECOMMENDATIONS

Trainees should be directed during breaks to get up, look out a window, get a snack, splash some water on their face, or do some stretches.

Trainers should build in a substantial number of small group break outs to build greater interaction and discussion. Icebreakers at the beginning of on-line training can be especially important in helping to make a connection among participants.

Trainees should consider using a phone instead of a laptop for the freedom to walk around and/or move one's body while on the call. It can also reduce physical strain on one's body.¹³

Trainers should urge participants to take a break from the internet after the on-line training.

CONCLUSIONS

Zoom fatigue can result in emotional, visual, motivational, and social fatigue.¹⁴ Overall, participants seemed well-adapted and comfortable with being on-line. Still, nearly 20 percent of participants claimed Zoom fatigue and all 31 participants commented on some type of discomfort from the format. As on-line training becomes one additional option for occupational safety and health training, the ICWUC Center for Health and Safety Education is pledged to continual improvement in its teaching techniques. As trainees become more and more familiar with on-line training, they too can adapt their behaviors to minimize the stress related to Zoom fatigue.

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¹³ Bothra.

¹⁴ Blandin HM, Sarres CP, Espinoza OM , Pineda EG, and Landa-Blanco M. "The effects of telework satisfaction and Zoom fatigue on mental health: a pilot study" National Autonomous University of Honduras, <https://mail2.tds.net/service/home/~/?auth=co&loc=en&id=21008&part=2>.