Kashihara, A. et al. (Eds.) (2024). Proceedings of the 32nd International Conference on Computers in Education. Asia-Pacific Society for Computers in Education

Zooming In on Educator Well-Being: Exploring Behavior Attributes, Zoom Fatigue, and Burnout Dynamics

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Abstract: The widespread use of video conferencing tools like Zoom has led to discussions on "Zoom fatigue" (ZF), a condition of exhaustion and burnout (BO) from prolonged platform use. While ZF is often viewed as a result, this study examines it as a potential cause of BO. Surveying 303 educators, we explore predictors of Zoom fatigue (ZF) and burnout (BO), focusing on workload, boredom proneness, and TechnoStress. Analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) showed that WL, BP, and TS contribute to ZF. However, IO and NT showed no significant impact, likely due to educators' professional nature. While ZF was linked to BO, TS had no direct connection, suggesting certain aspects of TS may not lead to BO. This opens new avenues for exploring the relationship between TS and BO.

Keywords: Videoconferencing, Zoom Fatigue, Burnout, Workload, Boredom Proneness, Information Overload, Neuroticism, TechnoStress

1. Introduction

In the era of remote work and online education, platforms like Zoom and Google Meet have become essential for virtual meetings and classes (Bhardwaj & Chaudhary, 2023). However, this widespread use has led to the challenge of Zoom fatigue (ZF), characterized by exhaustion, burnout (BO), and decreased engagement (Nesher Shoshan & Wehrt, 2022). Researchers are increasingly studying the impact of videoconferencing on fatigue to optimize virtual interactions (Luebstorf et al., 2023). ZF is driven by factors such as continuous video conferencing, blurred boundaries, and limited non-verbal cues. This study explores how ZF contributes to BO in educators, aiming to identify factors that exacerbate this relationship and provide insights for improving virtual teaching environments (Massner, 2021).

In this paper, we positioned workload, boredom proneness, information overload, TechnoStress (TS), and neuroticism as determinants of ZF in a structural model. In addition, we also investigate the potential effect of ZF and TS on mental BO. By establishing a deeper understanding of Zoom fatigue (ZF) in educators and their well-being, we may uncover strategies to enhance their ability to create more interactive and engaging virtual learning environments. This can lead to increased motivation for students resulting in better outcomes, and a more sustainable approach to remote teaching. We analyzed the results using the Partial Least Squares Structural Equation Model through SmartPLS 4 to confirm or reject our proposed hypotheses. Results of this study will add to the scant literature on several fronts: 1) understanding the behavioral factors that influence video conferencing tools use, 2) expanding the applicability of the ZF scale, and 3) initiating an exploration of ZF as a factor affecting another construct, in this case, BO. The results of this paper will expose potential intervention points for managing ZF and BO among educators.

2. Literature Review

The emergence of video conferencing platforms like Zoom has revolutionized remote communication, enabling virtual meetings, conferences, and classrooms. However, alongside its convenience, a phenomenon known as *Zoom fatigue* (ZF) has garnered attention, defined as a feeling of exhaustion from participating in video conference calls (Fauville et al., 2021). Various studies identified the advantages and disadvantages of these videoconferencing tools (VCT) and the conduct of online learning. VCTs empower educators to engage in real-time communication and collaboration with students, regardless of physical distance. They facilitate virtual classes, interactive discussions, and timely feedback, enriching the learning experience. VCTs offer flexibility in terms of time and location, where educators can schedule online classes at convenient times for both them and their students, accommodating diverse schedules and allowing for greater accessibility to their learning process (Ram Lakhan & Kuldeep Singh Verma, 2023). VCTs, while advantageous, pose challenges such as poor connectivity and increased fatigue during online classes (Camilleri & Camilleri, 2022). Results showed that the biggest challenges of using digital media and mobile technologies in remote learning are the difficulty in looking at screens for long periods, physical problems, the distractions caused by other digital non-educational content due to easy access, and the educators' pressure to keep lectures as lively as possible to capture their students' attention.

Studies show that Zoom fatigue negatively impacts educator well-being and performance, with factors like meeting frequency contributing to fatigue (Carțiș, 2023). In addition, ZF can result in negative attitudes toward video meetings and impact overall communication experiences (Fauville et al., 2021). On the other hand, a mixed methods approach was used through a cross-sectional survey of 108 respondents composed of university students and faculty, and the researchers aimed to compare the outlooks of the two groups towards using Zoom for nursing education in Alberta, Canada (Vandenberg & Magnuson, 2021). This shows evidence of the relative infancy of the concept of ZF, with most research focusing on students and the remote working population. Research highlights also a correlation between burnout (BO) and fatigue, suggesting that ZF may contribute to BO, particularly in educators (Erjavec & Leskovic, 2023). Understanding the factors leading to ZF and its impact on mental BO post-pandemic is crucial for educational institutions. This knowledge can inform policies and classroom management strategies related to video conferencing. Policymakers can develop interventions to mitigate ZF effects. Higher education administrators and instructors benefit from understanding effective online interaction and the role of video conferencing and ZF in this context (Massner, 2021).

3. Hypothesis Development and Structural Model

Video conferencing platforms like Zoom have transformed education by enabling remote connections between teachers and students. However, prolonged use has led to Zoom fatigue (ZF), characterized by cognitive overload and mental fatigue, particularly when combined with academic demands (Fauville et al., 2021). Studies such as Fan & Smith (2017) show that workload contributes to fatigue, supporting the hypothesis that workload (H1) is positively associated with ZF.

Virtual settings also increase the risk of boredom, which reduces engagement and motivation (Toney et al., 2021). Those prone to boredom are more likely to experience information overload (IO) and fatigue Whelan et al. (2020). Online learning may also lack social interaction, leading to isolation and disconnection (Liu et al. 2020; Tam et al., 2021). This supports the hypothesis that boredom proneness (H2) and IO (H3) are positively associated with ZF, and boredom proneness (H4) is positively linked to IO. ZF is further influenced by neuroticism (NT), with neurotic individuals experiencing more stress and fatigue during online learning (Queiroz et al., 2023). We hypothesize NT (H5) is positively associated with ZF. ZF also intensifies academic stress, leading to burnout (BO), with TechnoStress (TS) contributing to this through factors like techno-complexity and techno-insecurity (Bailenson,

2021). This supports the hypothesis that TS is positively associated with ZF (H6) and BO (H7). Carțiș (2023) found that fatigue dimensions, including visual and motivational fatigue, were affected by ZF, while Erjavec & Leskovic (2023) confirmed a strong correlation between BO and fatigue among healthcare professionals. White Taneasha (2021) notes that Zoom fatigue (ZF) shares symptoms with burnout (BO) and contributes to overall BO. Leone et al. (2007) examined the overlaps between BO and fatigue, showing they can occur separately or simultaneously, with potentially worse outcomes when combined. Fatigue was linked to health factors, while BO was tied to work-related factors. This study hypothesizes that ZF (H8) is positively associated with mental BO. All hypotheses are illustrated Figure 1.

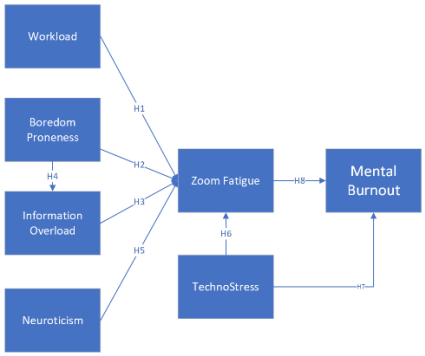

Figure 1. Theoretical Framework of the Study

4. Methodology

A structural model was developed with workload (WL), boredom proneness (BP), information overload (IO), neuroticism (NT), and TechnoStress (TS) as independent variables influencing Zoom Fatigue (ZF). ZF, along with TS, also serves as an independent variable for mental burnout (BO) (Figure 1). All questions were adapted from prior studies and structured on a 5-point Likert scale consisting of 5 questions on BP and three on IO were adapted from Whelan et al. (2020), 4 on TS from Estrada-Muñoz et al. (2020), 3 on NT from Ramírez-Correa's (2017), and 16 WL questions from Fan & Smith (2017). ZF was measured using 14 questions adapted from Fauville et al. (2021), while BO was measured using 4 questions from the Maslach Burnout inventory (Zhu et al. 2022). This survey also included sociodemographic questions. A pilot survey of 46 teachers was conducted for validity and reliability testing.

SmartPLS 4 was used for path analysis, generating results such as Cronbach's alpha, composite reliability, and average variance extracted (AVE) (Setiyowati et al., 2020). The lowest values for Cronbach's alpha, composite reliability, and AVE were 0.735, 0.729, and 0.555, respectively, exceeding the acceptable thresholds (0.70 for Cronbach's alpha and composite reliability, 0.50 for AVE), indicating satisfactory internal consistency and reliability. Discriminant validity was also confirmed, ensuring that each construct was distinct and played a unique role in the model. The online survey was conducted with 303 teachers and professors from various schools and universities in the Philippines using convenience sampling and snowballing. It included explanations of the study, informed consent, and data privacy. Most of the respondents taught in public schools (69%), had post-graduate degrees (51%), and over ten years of academic experience (33%). The gender distribution was nearly equal, with 51% male and 46% female, and 7 identifying as intersex. Age distribution ranged mostly between 18 and 49, with 33 participants aged 60 or older. SmartPLS 4 was used for data analysis, with bootstrapping applied for resampling (Scharkow, 2017).

5. Results

Bootstrapping estimates for PLS-SEM model parameters tested the eight hypotheses (Table 1) at a 0.05 significance level. Five hypotheses showed a significant positive relationship

between variables. Workload (H1), boredom proneness (H2), and TechnoStress (H6) were significantly associated with Zoom fatigue (ZF). However, information overload (H3) and neuroticism (H5) were not significantly related to ZF. Boredom proneness (H4) was positively linked to information overload, and while ZF (H8) was connected to burnout (BO), TechnoStress (H7) was not significantly associated with BO. These findings provide insights into the factors influencing ZF and BO. Results showed that three factors had a significant positive association with Zoom fatigue (ZF). Firstly, higher workload (WL) was linked to increased ZF, consistent with studies on the relationship between workload and fatigue in online video conferencing (Sudiono et al., 2023; Weiher et al., 2023). Overworked teachers experience greater ZF due to screen strain. Secondly, strategies for reducing boredom and fatigue, such as social media engagement, partly support the link between boredom proneness and ZF (Whelan et al., 2020). This suggests potential interventions like offering more rest time for teachers. Lastly, TechnoStress (TS) was confirmed to be positively associated with ZF, as prolonged videoconferencing can lead to ZF through reduced verbal communication, tech glitches, and physical strain.

Table 1. *Structural Model Test*

HYPOTHESIS	SD	t-value	p	DECISION
H1: WL is positively associated with ZF	0.071	3.595	0.000	Accept
H2: BP is positively associated with ZF	0.089	3.644	0.000	Accept
H3: IO is positively associated with ZF	0.078	1.180	0.238	Do Not Accept
H4: BP is positively associated with IO	0.045	15.146	0.000	Accept
H5: NT is positively associated with ZF	0.072	0.123	0.902	Do Not Accept
H6: TS is positively associated with ZF	0.084	3.640	0.000	Accept
H7: TS is positively associated with BO	0.098	1.432	0.152	Do Not Accept
H8: ZF is positively associated with BO	0.091	6.669	0.000	Accept

However, information overload (IO) and neuroticism (NT) were not significantly associated with Zoom fatigue (ZF). Recent studies on IO primarily focus on students, who are the main receivers of information (Masrek & Baharuddin, 2023). Teachers, who control the flow of information in classes, are less likely to experience IO, leading to its insignificant relationship with ZF. The limited interaction in online settings further reduces the potential for information overload (Maimaiti et al., 2023). Boredom proneness (BP), however, still contributes to both IO and ZF for educators. Also, NT was found to have no significant link to ZF. Sander & de la Fuente (2022) explain that NT is negatively correlated with academic confidence, and given that most respondents hold post-graduate degrees, their confidence in their knowledge may reduce stress. Additionally, Sterlus & Bernacka (2023) suggest that low NT correlates with high emotional intelligence and seniority among teachers, which could explain its limited impact. The results of this study indicate that TechnoStress (TS) does not directly cause burnout (BO), but ZF significantly contributes to BO. ZF may also be a manifestation of TS, implying that TS only leads to BO through specific manifestations like ZF. Thus, BO in educators is driven more by ZF than by broader tech-related stressors.

6. Conclusion

This study identified workload, boredom proneness, and TechnoStress as key contributors to Zoom fatigue, highlighting the need for targeted interventions. Strategies like workload rationalization, flexible scheduling, and fostering supportive, active classroom environments can help reduce Zoom fatigue and burnout. While Zoom fatigue was linked to burnout, the relationship between TechnoStress and burnout is more complex and requires further study. Educational institutions should consider employee welfare programs that address physical and mental health, including training to manage TechnoStress and promote work-life balance. Implementing interactive teaching methods, such as group discussions and breakout rooms, can also enhance engagement and reduce burnout, benefiting both educators and students.

Future research could explore how Zoom fatigue differs across various use cases, such as teaching, attending lectures, and holding meetings, to provide more targeted insights into its specific causes. Also, examining the impact of session duration and user motivation on fatigue levels would offer a deeper understanding of how to design more effective and engaging virtual environments for Filipino educators. Longitudinal studies and cross-cultural comparisons could further enhance our understanding of how Zoom fatigue evolves over time and across different educational contexts, offering valuable insights for institutional interventions.

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