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Do Boredom, Escapism, Apathy, and Information Overload lead to Zoom Fatigue?

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Abstract: Unprecedented challenges in higher education due to COVID-19 emphasized the vital role of videoconferencing technologies to sustain education in emergencies. The colossal challenge of balancing learning and the psychological impact of the pandemic has caused exhaustion in the use of videoconferencing platforms in what researchers termed as Zoom Fatigue. In this study, we draw from the literature the behavioral constructs of boredom, escapism, apathy, and information overload and empirically test whether these factors can lead to Zoom Fatigue. Using a structural model and a validated scale, we analyzed 215 responses from university students using PLS-SEM. We confirm that boredom, escapism, and information overload lead to Zoom Fatigue. On the contrary, apathy among students is not a significant determinant. We discuss the results and implications of our study and conclude by recommending possible avenues for future investigations.

Keywords: Zoom fatigue, videoconferencing exhaustion, COVID-19, boredom, escapism, apathy, information overload

1. Introduction

Alongside socio-economic enfeeblements and public health threats, the pandemic has halted all facets of society, including the education sector. While institutions of higher learning are pivotal in developing the country's human capital, many of them are caught unprepared and uncertain about the challenges implicated by the pandemic (Sahu, 2020). Education digitalization, the change demanded by the current global health crisis to migrate from traditional classroom to the "new normal" or "now normal" learning environment, becomes a moonshot to many institutions of learning because of deficiencies in technological infrastructure, inadequate funding, lack of support, among other essential resources (AlHeneidi et al., 2021; Toney et al., 2021).

Notably, the transition from traditional to online learning led to the adoption of combined teaching and learning modalities, both synchronous and asynchronous (Aram, 2020; Lakhal et al., 2021). Synchronous classes require real-time interaction between the teacher and students for lectures and presentations, discussions, virtual video and audio conferencing, and demonstrations using a cloud-based video communications application. Conducting synchronous classes through these communication applications provides teachers and students the opportunities to become more engaged in teaching and learning (Fauville et al., 2021; Laha, 2020).

In this crisis, videoconferencing tools afforded universities and the faculty to deliver classes seamlessly. However, similar to other technologies, using these platforms may negatively impact students in what researchers termed Zoom Fatigue, or general exhaustion from learning via videoconferencing platforms (Peper et al., 2021; Ramachadran, 2021; Toney et al., 2021). In this paper, we positioned boredom, escapism, apathy, and information overload as determinants of Zoom Fatigue in a structural model. We analyzed the results using Partial Least Squares Structural Equation Model or SmartPLS 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 videoconferencing tools use, 2) Expanding the applicability of the Zoom Fatigue scale, and 3) Providing a perspective from a developing economy through insights into education technologies adoption during COVID-19. The following sections discuss related studies, theoretical foundations of our hypotheses, methods, and statistical results. We conclude by stating our limitations and possible opportunities for future research.

2. Videoconferencing and COVID-19

The stay-at-home orders during the COVID-19 pandemic had forced significant changes in how individuals work and learn(Aram, 2020; Hacker et al., 2020). Video conferencing has now become an essential tool for education, healthcare, and business. Thus, a drastic usage increase was observed (Geraldine Fauville et al., 2021). In the case of Zoom, video communications had reported 300 million daily meeting participants worldwide in April 2020, just four months after reporting 10 million meeting participants in December 2019 (Mlitz, 2021). Other video conferencing platforms like Google Meet and Microsoft Teams have also been experiencing significant increases in daily meeting participants (Peters, 2020; Thorp-Lancaster, 2020).

However, the increase in videoconferencing engagement is a challenge to many individuals. For instance, several individuals are complaining of Zoom fatigue or the feeling of mental and physical exhaustion. This feeling emerged as an overall negative experience caused by prolonged computer-mediated communication (CMC) platforms (Peper et al., 2021; Toney et al., 2021). Zoom Fatigue is an emerging technology-related concern that needs attention given that videoconferencing usage will continue even after the pandemic.

3. Hypotheses Development and Structural Model

Videoconferencing tools that enable online learning delivery are crucial to the effective design and implementation of a seamless, technology-enabled higher education. While its success has been highlighted in recent literature, research must ascertain the diverse factors that impede its sustained usage. We positioned four independent variables as factors that contribute to extreme mental and physical tiredness in the use of videoconferencing technologies. In the context of this study, we refer to this term as the unexpected negative effect in the use of available videoconferencing tools such as Zoom and Google Meet to achieve cognitive desires. The proliferation of webinars and sudden transition to online classes have led to issues among higher education students such as being overwhelmed, disengagement, and stress in what the scholarship refers to as Zoom Fatigue.

Synchronous classes through videoconferencing tools are opportunities for responsive knowledge exchanges between instructors and students. In literature, several authors have identified various factors that are detrimental to the effective delivery of this learning modality. Boredom is a state of mind when individuals perceive situations that lack meaning, interest, and engagement, therefore negatively affecting their general well-being (Struk et al., 2017). Like boredom, discomforts, and difficulties in life can negatively affect how students perceive a learning activity. Given that there is wider access to technology devices among students, activities online such as social media and games unrelated to their courses allow them to temporarily disconnect from unfavorable circumstances of their lives in what researchers termed escapism (Klosi, 2021; Taneja et al., 2015). During COVID-19 Pandemic, boredom and escapism were significantly felt by students in higher education and therefore increased their anxiety and mental fatigue affecting the way they learn, especially during synchronous classes (Banati et al., 2020; Onyema, 2020; Toney et al., 2021; Wilcha, 2020). In this study, we propose that both the factors of boredom (H1) and escapism (H2) are positively related to Zoom Fatigue, as summarized in Table 1 and shown in Figure 1.

Engagement during synchronous classes via videoconference platforms remains a challenge among higher learning stakeholders. Therefore, course materials that the faculty present during live synchronous sessions should pique their interest in the learning process. In the education context, apathy manifests lethargy when a topic's purpose, objectives, and relevance are not established (De Lay & Swan, 2014; Lang, 1977). Weak pedagogical factors in online learning covering instructional delivery and course content contribute to student apathy (Dable et al., 2012; Taneja et al., 2015). On the other hand, information overload occurs when overwhelming knowledge content is presented in a limited time, such as synchronous classes (Chase et al., 2018; Al Heneidi et al., 2021). Extraneous course activities that require careful processing may exceed the learning limits of students, primarily when instructional strategies are poorly implemented (Sweller et al., 2011). During COVID-19, videoconferencing tools supported faculty members in instructional delivery. However, recent

literature has called for a better understanding of this modality, as revealed by students' apathy and concerns on information overload (Aram, 2020; Fauville et al., 2021; Al Heneidi et al., 2021; Williams & Corwith, 2021). In this study, we further propose that both the factors of apathy (H3) and information overload (H4) are positively related to Zoom Fatigue, as summarized in Table 1 and shown in Figure 1.

Table 1. *Study Hypotheses*

Hypothesis	Statement
H1	Boredom is positively related to Zoom Fatigue
H2	Escapism is positively related to Zoom Fatigue
H3	Apathy is positively related to Zoom Fatigue
H4	Information Overload is positively related to Zoom Fatigue

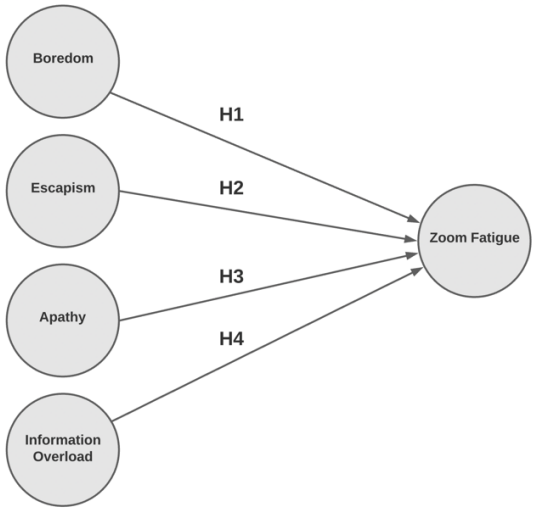

Figure 1. Theoretical Framework.

4. Method

4.1 Scale Development and Recruitment

Our theoretical model was operationalized as a structural model consisting of Boredom, Apathy, Escapism, and Information Overload as independent variables predicting Zoom Fatigue to test our proposed hypotheses. The Short Boredom Proneness scale consisting of 8 questions was adopted from the study of Struk et al (2017). We also used questions for Apathy and Escapism using the study of Taneja et al (2015), consisting of 3 questions each, while we used another 3 questions for Information Overload from Lee et al (2016). Using the Zoom Fatigue scale consisting of 15 questions was incorporated in our model as our dependent construct. We also included questions on sociodemographic characteristics of our participants such as gender, age range, program, typical frequency of synchronous sessions, and the videoconferencing platform used. Some terms were changed to align with the objectives of the study. All questions were deployed using Google Forms. We invited 43 students to answer the survey as a pilot test to check the validity and reliability of our scale.

4.2 Check for Scale Reliability and Convergent Validity

To ensure that the scale demonstrates sufficiency and accuracy in measuring the variables in our structural model, we used the Partial Least Squares algorithm functions of SmartPLS consistent with prior information systems or IS education research that tested theoretical models statistically (Catedrilla et al., 2019; Trapero et al., 2019). As shown in Table 2, Cronbach's alpha's lowest value is 0.837, Composite Reliability is 0.899, and the Average Variance Extracted is 0.750. These values are above the minimum acceptable threshold of 0.70 for both Cronbach's Alpha and Composite Reliability and

0.50 for Average Variance Extracted, exhibiting satisfactory internal consistency and indicator reliability (Hair et al., 2017; Sarstedt et al., 2020).

Table 2. *Scale Reliability and Validity*

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Boredom	0.919	0.934	0.640
Escapism	0.905	0.940	0.840
Apathy	0.877	0.924	0.801
Information Overload	0.837	0.899	0.750

4.3 Assessment of Discriminant Validity

To ensure that each construct measures only the concept it is supposed to represent in the model, and there is an absence of high intercorrelation with other constructs, we extracted the values from the Fornell-Larcker test. As shown in Table 3, the topmost values per column are the highest establishing discriminant validity. Critique of this test has been highlighted in recent literature necessitating quantitative studies to use the Heterotrait-Monotrait Test or HTMT as a complementary criterion for discriminant validity(Ab Hamid et al., 2017; Benitez et al., 2020). Extracting the values from the HTMT report of SmartPLS, no value is above 0.85, further establishing the absence of intercorrelation among our variables and strengthening the discriminant validity of our scale, as shown in Table 4. Both tests support the discriminant validity of our scale.

Table 3. *Fornell-Larcker Test*

Construct	Apathy	Boredom	Escapism	Information Overload	Zoom Fatigue
Apathy	**0.895**				
Boredom	0.650	**0.801**			
Escapism	0.449	0.473	**0.916**		
Information Overload	0.587	0.609	0.478	**0.866**	
Zoom Fatigue	0.535	0.646	0.460	0.659	**0.800**

Table 4. *HTMT Test*

Construct	Apathy	Boredom	Escapism	Information Overload	Zoom Fatigue
Apathy					
Boredom	0.705				
Escapism	0.506	0.511			
Information Overload	0.643	0.663	0.525		
Zoom Fatigue	0.569	0.666	0.476	0.697	0.800

4.4 Recruitment, Participants, and Structural Test

After the pilot test, we approached several students from several universities to answer our online survey based in the Philippines. Currently, face-to-face classes are still suspended in these universities since the start of the pandemic. These universities implemented flexible learning where students attend synchronous sessions with the assigned faculty, and flexible arrangements are available for asynchronous learning. A brief explanation of the study, a statement of informed consent, and data privacy were also included.

Two hundred fifteen students participated in the study; 50.2% were male, while 40.8 % were female. Most of the respondents, or 59.1%, are between 20 to 21 years of age. We asked our participants how frequent their synchronous classes are conducted via videoconferencing platforms, majority or 52.1%, said that they attend at least 3 to 4 sessions in a typical day, this is followed by 21.9% with 1 to 2 sessions frequency, and 17.7% have 5 to 6 sessions a day. The top two most widely used

videoconferencing platforms are Zoom and Google Meet, as stated by 50.2% and 46.5% of our respondents, respectively. A bulk or 67.9% of the participants are enrolled in technology-related programs, followed by 18.1% students from healthcare programs. The rest are enrolled in various programs related to science, hospitality, business, and others. Most of the participants, or 76.3%, are already in their 3rd-year or 4th-year levels.

The 215 responses were analyzed using SmartPLS using its bootstrapping feature. This statistical treatment is appropriate for studies that test structural models with several hypotheses and small sample sizes. It is a nonparametric statistical procedure that assesses the significance of a path in a structural model. It has been widely used in quantitative studies that investigated the use of technology in education.

5. Results

The bootstrapping results of SmartPLS determined the t-values of the four paths from our independent constructs to the dependent construct in our structural model. The same statistical analysis likewise revealed the p-values to determine the level of significance of the relationships. The minimum value for a relationship to establish significance is 1.96. As shown in Table 5, 3 relationships are positive and significant; therefore, we accept Boredom (H1), Escapism (H2), and Information Overload (H4) as determinants of Zoom Fatigue. On the other hand, the relationship between Apathy (H3) and Zoom Fatigue is not supported at a significant level.

Table 5. *Structural Model Test*

HYPOTHESIS	SD	t-values	p-values	DECISION
H1 - Boredom is positively related to Zoom Fatigue	0.099	3.675	0.000	Accept
H2 - Escapism is positively related to Zoom Fatigue	0.064	2.917	0.004	Accept
H3 - Apathy is positively related to Zoom Fatigue	0.104	0.180	0.857	Reject
H4 - Information Overload is positively related to Zoom Fatigue	0.120	4.455	0.000	Accept

We interpret our supported hypotheses from the perspectives of two crucial stakeholders: the faculty and the students. Findings from prior studies emphasized the importance of engagement within the classroom to promote interest, interaction, and enjoyment among learners (AlHeneidi et al., 2021; Taneja et al., 2015). Activities that lack this engagement contributes to apathy, information overload, and boredom (De Lay & Swan, 2014). While the utility of an online learning environment has been highlighted in the past, issues such as lack of social engagement, social presence, and technology challenges remain (Rapanta et al., 2020; Valverde-Berrocoso et al., 2020). From the viewpoint of faculty, this need adds further challenge as going beyond the physical environment and transitioning to online environments such as those supported by videoconferencing tools requires additional skills to ensure that instruction is optimal. During the COVID-19 pandemic, universities were unprepared to fully transition online, resulting in insurmountable pressure on faculty members to learn videoconferencing tools, learning management system platforms, and quickly digitalize course materials. The lack of training among faculty members was also evident as students had to be oriented on new policies, assessments, and delivery methods (Pokhrel & Chhetri, 2021).

On the other hand, students are also besieged by stress, social isolation, and restrictions on mobility. Universities are physical spaces where social interactions can occur. An online environment exhibits inadequacy in providing such interactions, contributing to boredom during synchronous classes. The stress from COVID-19 has also resulted in students diverting their attention to activities outside learning to escape the realities of the current pandemic (Banati et al., 2020). Observations from research have also attributed connectivity as a contributor to escapism, information overload, and boredom in the use of technology for learning, as students might open social media platforms and online

games during synchronous classes as a coping mechanism to stress (AlHeneidi et al., 2021; Laha, 2020; Melodia et al., 2020). Most of our participants reported having to attend synchronous sessions through videoconferencing at least three times a day; studies have shown that uptake of webinars and online classes was observed during COVID-19 and have resulted in people being overwhelmed by the amount of information delivered in these platforms contributing to their cognitive overload (Hacker et al., 2020; Ismail et al., 2021).

While this research has found that boredom, escapism, and information overload contribute to Zoom fatigue, the structural model reveals that students' apathy is not. A possible explanation for this result is that the survey was conducted more than a year after the university closures, where teachers and students have gained traction in learning various technological features that will enrich the classroom experience, such as breakout rooms and gamified learning activities (Brasili & Allen, 2019; Toney et al., 2021). Given the negative impact of COVID-19, shifting to the online environment has become mandatory rather than an option. Prior research in videoconferencing platforms identified the moderating role of voluntariness or its absence in the way learners perceive the value of online learning modality (Khechine & Lakhal, 2018). Lastly, we observed that 67.9% of our participants are enrolled in a technology program who are most likely adept to technologies such as videoconferencing platforms. Studies argue that a high level of computer-self efficacy and prior experience leads to a broader acceptance and adoption of university resources and technologies (Lakhal et al., 2021; Mcilroy et al., 2007).

6. Conclusion

In summary, this quantitative study revealed that boredom, escapism, and information overload are factors that lead to Zoom Fatigue. On the other hand, we found that apathy is an insignificant factor that causes videoconferencing exhaustion. These findings should be interpreted within the scope of our limitations which future related inquiries can address. First, our small sample size limits generalizability; therefore, future research can include larger sample sizes or test our structural model in a different culture to reveal differences. Second, we did not account for group differences; testing the moderating effects to the relationships of our structural model by variables such as age, gender and discipline may further illuminate current knowledge on Zoom Fatigue. Lastly, a qualitative inquiry to explain our results may further strengthen the claims of our study and therefore garner rich insights into these contributing factors to Zoom Fatigue and influence future policies and strategies in education.

Videoconferencing platforms became an indispensable tool to sustain online learning despite the challenges brought about by COVID-19. As society slowly becomes accustomed to learning, it is crucial to craft sound policies, plan strategies, and develop manuals to regulate how education can maximize these technologies. These tools are just one of the available support mechanisms for learners and teachers to transition to the new normal. They will complement other available technologies, support mechanisms, and traditional learning strategies to ensure that there are no lost opportunities during and beyond COVID-19.

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