Research Article

Received: 8 March 2022 / Accepted: 20 June 2022 / Published: 5 July 2022

Scientific Production on Zoom Fatigue: Understanding a New Phenomenon

Josué Edison Turpo Chaparro[1]

Oscar Mamani-Benito[1]

Renzo Felipe Carranza Esteban[2]

Miguel A. Saavedra-López[3]

Xiomara M. Calle-Ramírez[4]

Karel Llopiz-Guerra[5]

Ronald M. Hernández[6]*

[1]Universidad Peruana Unión, Lima, Perú
[2]Universidad San Ignacio de Loyola, Lima, Perú
[3]Universidad Continental, Cusco, Perú
Universidad Nacional de Tumbes, Tumbes, Perú
[4]Universidad Nacional de Tumbes, Tumbes, Perú
[5]Universidad Central "Marta Abreu" de Las Villas, Santa Clara, Cuba
[6]Universidad Católica Santo Toribio de Mogrovejo, Chiclayo, Perú
**Corresponding Author*

DOI: https://doi.org/10.36941/ajis-2022-0101

Abstract

The objective of this research was to characterize the production of Latin American scientific literature on Zoom fatigue. A retrospective and descriptive study was conducted in which 41 manuscripts published in journals indexed in the Scopus database between January 2020 and December 2021 were analyzed. The variables studied were document frequency, scientific production by country, number of authors, institutional affiliation and scientific production by descriptor. It was found that 58.54% of the identified manuscripts are research articles. The country with the highest scientific production is the United States (46.34%); institutions in the Philippines and the United States stand out since they have the highest scientific production, and Journal of Loss and Trauma is the journal with the highest number of publications. Regarding affiliation, the authors belong to entities in the Philippines. It is necessary to continue researching on zoom fatigue, considering that it is currently widely used worldwide in organizations, but the effect or positive or negative impacts on the human being are not measured.

Keywords: *Scientific production, Zoom Fatigue, scientific publication*

1. Introduction

As a consequence of the social isolation measures imposed by the COVID-19 Pandemic (Palacios Cruz et al., 2021), millions of people have had to replace physical communication with virtual interaction (Marinucci et al., 2022). Thus, the adoption of videoconferencing increased significantly, making the use of virtual media such as Zoom, Meet, Microsoft Teams, Cisco Webex, among others, the best alternative to continue the work dynamics in different sectors (Mamani-Benito et al., 2021).

One of the virtual tools that has stood out in this environment is Zoom, which is technically a video chat software developed by the company Zoom Video Communications and was created by Eric Yuan in 2011. (Mahr et al., 2021). According to the perception of users, this platform stands out from others such as Skype or Meet for its simplicity and speed in organizing meetings, so its use is not only limited to the business context, but has also been preferred in most higher education centers (BBC News Mundo, 2020).

Because of its usefulness, there is no doubt that videoconferencing has become a fundamental tool for education, healthcare and business, confirming that its use can bring benefits such as travel cost savings and environmental preservation (Al-Habaibeh et al., 2021). In addition, it has been opportunely introduced in an important sector of society, such as education, where it has been temporarily replacing traditional education (Carpenter et al., 2022). However, inappropriate and prolonged use has been the cause of the appearance of psychological disorders such as stress, anxiety and depression (Tibbetts et al., 2021) and fatigue Zoom (Anderson & Looi, 2020).

On these facts, the World Health Organization (WHO) already warned of the emergence of phenomena such as pandemic fatigue (World Health Organization, 2020), caused by feelings of anguish, hopelessness, decreased motivation, among other factors, in the face of the inability to solve the health emergency. In the case of "Zoom fatigue", it is understood to be a depletion of physiological and cognitive resources (Riedl, 2021) due to an increased need for videoconferencing throughout the day in people working remotely (Nadler, 2020). And according to some inquiries, the topic has been so popular that the term "Zoom fatigue," as of December 7, 2020, had garnered more than 700,000 hits on Google (Williams, 2021).

Given the need to study Zoom fatigue, researchers designed measurement instruments to assess the magnitude of the problem, for example, there are psychometric reports in Italy (Bonanomi et al., 2021) and the United States (G. Fauville et al., 2021). Later studies, such as the one conducted in Israel and Germany, reported that participants stated that the use of videoconferencing generated tension and emotional burden, so they preferred face-to-face communication (Nesher Shoshan & Wehrt, 2021). In other research conducted in the United States, workers aged 20 to 59 years showed that the use of this platform was associated with high levels of emotional fatigue (G. Fauville et al., 2021). Along the same line, another study, in which 1408 daily observations were conducted of 103 employees, revealed that fatigue increased as they were asked to turn on the camera (Shockley et al., 2021), which is in line with other research, where U.S. employees reported through a multilevel modeling of 279 videoconference meetings, that turning off the microphone was related to lower level of fatigue (Bennett et al., 2021). Finally, an analysis by gender found that women experience higher levels of it than men (Geraldine Fauville et al., 2021).

In other analyses, researchers have tried to explain the causes of Zoom fatigue, so far reporting evidence from theoretical models such as computer-mediated communication that theorize that the dynamics of interaction and the cognitive effort to interact produce emotional exhaustion (Nadler, 2020). In addition, another explanation states that in face-to-face interaction, nonverbal language flows naturally, as we rarely consciously pay attention to our own gestures or other nonverbal signals. In Zoom, however, nonverbal language is complex, so users must make a greater effort to send and receive signals that enhance the interaction (Bailenson, 2021).

In view of the above, important advances have been made in Zoom fatigue research. This helps to understand the psychological effects that it generates in different populations and age groups (G. Fauville et al., 2021), which are precisely of interest to government agencies responsible for health,

welfare and economic activity; who also have the challenge of improving their ability to monitor, evaluate and respond to the impacts caused by COVID-19 (Peters et al., 2022).

Therefore, in view of the gradual growth of scientific knowledge on Zoom fatigue, it is pertinent to evaluate the scientific activity on this topic in order to systematize the knowledge generated so far, and to make it useful for decision making in groups such as occupational health professionals, who have the responsibility to identify the causes and possible occupational risks, since it is important to keep in mind that care must be taken with the introduction of new technologies or the increased use of established technology, especially when change occurs rapidly.

Therefore, the objective is to analyze the scientific production on fatigue Zoom.

2. Methods

Retrospective and descriptive study, which considered as a unit of analysis the publications on Fatigue zoom, in journals indexed in Scopus, during the January 2020 to December 2021 period and whose authors are affiliated to university and non-university institutions worldwide. Scopus includes more than 40,804 journals in science, technology, social sciences, arts, humanities and medicine, so it was decided to use this database due to the large number of journals it contains, and its rigorous journal selection process, which allows the collection of the most relevant studies on the subject. In addition, Scopus has advantages such as ease of navigation, it includes 100% of what is indexed in the MEDLINE, EMBASE and COMPEDEX databases, and others, facilitating access to cited documents, being open to the Internet, availability of web pages and patents.

The search included all published and indexed articles, using the fields Article Title, Abstracts, Keywords, using the term "zoom fatigue". With the extracted documents, a database was organized in Microsoft Excel that included the following data: name of the signing authors, title of the publication, type of publication, affiliation institutions of the signing authors, journal of publication and country of publication. Finally, with the support of the VOSviewer software, a network was created with the main thematic themes associated with the key words of the publications.

3. Results

A total of 41 documents published and indexed in Scopus were found. A total of 05 types of publishable documents were included in the analysis. A total of 58.54 % of the documents are research articles (Table 1). In addition, during the last year the publications on zoom fatigue have been increasing notably, being the year 2021 the year that shows the highest scientific production on this subject, showing that the production increased by 41.46 %.

Table 1: Document type of publications on Fatigue zoom

Document type	2020		2021		Total	
	n	%	n	%	n	%
Article	6	14.63	18	43.90	24	58.54
Conference paper	0	0.00	6	14.63	6	14.63
Note	4	9.76	1	2.44	5	12.20
Editorial	2	4.88	0	0.00	2	4.88
Letter	0	0.00	2	4.88	2	4.88
Review	0	0.00	2	4.88	2	4.88

Table 2 shows the countries with a production on Fatigue zoom. The United States is the country that contributes with the highest scientific production, representing 46.34% of the world production, followed by the Philippines and Germany, countries that exceed 5.00% of the production.

Table 2: Countries with scientific production on zoom fatigue

Country	n	%
United States	19	46.34
Philippines	4	9.76
Germany	3	7.32
Russia	2	4.88
Saudi Arabia	2	4.88
Other countries	11	26.83

In terms of productivity by institution, 58 international institutions have participated in the production on zoom fatigue; the list of the top 06 is presented, including institutions from the Philippines and the United States, and only one institution is ranked in the QS World University Rankings 2021.

Table 3: Institutions participating in research on zoom fatigue

Institution	Country	QS World University Rankings 2021	Documents
West Visayas State University	Philippines	-	3
Polytechnic State University of Bicol	Philippines	-	2
University of Pangasinan-PHINMA	Philippines	-	2
California State University Long Beach	United States	-	2
University of California, San Diego	United States	54	2
Majmaah University	Saudi Arabia	-	1

Table 4 shows the list of the 10 most productive journals, among which the Journal Of Loss And Trauma (United States) stands out with two publications, followed by 36 journals with at least one publication on the subject. Within the thematic areas of these 10 journals, 40% are in the category of Medicine and Social Sciences. Scientific production is concentrated in journals from the United States and the United Kingdom, which shows that researchers from this region prefer to produce and publicize their research in their own environment. In addition, 70% of the journals mentioned are located in quartile 01 and 02, which demonstrates not only the high visibility of the contributions but also their potential quality.

Table 4: Most productive journals on zoom fatigue

Journal	Documents	Country	Quartile	SJR 2020	Categories
Journal Of Loss And Trauma	2	United States	Q2	0.44	Medicine; Nursing; Psychology and Social Sciences
Acta Informatica Pragensia	1	Czech Republic	Q4	0.11	Business, Management and Accounting; Social Sciences
Alternative And Complementary Therapies	1	United States	Q4	0.13	Medicine
American Journal Of Cultural Sociology	1	Switzerland	Q1	0.87	Social Sciences
Annals Of Surgery	1	United States	Q1	4.15	Medicine
Applied Psychology	1	United Kingdom	Q1	1.5	Arts and Humanities; Psychology
Asian Journal For Public Opinion Research	1	South Korea	Q4	0.12	Social sciences
Child And Adolescent Mental Health	1	United States	Q1	0.91	Medicine
Communications Of The Association For Information Systems	1	United States	Q2	0.58	Computing
Computer Communication Review	1	United States	Q2	0.54	Computing

Table 5 shows the authors who have contributed the largest number of studies on zoom fatigue. Of the 102 authors, researchers such as Ryan Michael F. Oducado and Geneveve M. Parreño-Lachica stand out with 3 published documents each. Within the list of the top 8 authors, 100% are subscribed to an institutional affiliation in the Philippines.

Table 5: Authors with the highest production of documents on zoom fatigue

Author	Institution	Country	H-Index	Documents
Oducado, Ryan Michael F.	West Visayas State University	Philippines	5	3
Parreño-Lachica, Geneveve M.	West Visayas State University	Philippines	1	3
Dequilla, Ma Asuncion Christine V.	West Visayas State University	Philippines	1	2
Fajardo, Maria Teresa R.	University of Pangasinan-PHINMA	Philippines	1	2
Maniago, Jestoni D.	University of the Philippines Manila,	Philippines	2	2
Montaño, Hilda C.	West Visayas State University,	Philippines	1	2
Robite, Emily E.	West Visayas State University,	Philippines	1	2
Villanueva, Paulo Martin B.	Polytechnic State University of Bicol	Philippines	1	2

The 05 most cited articles are presented. Sixty percent of them have been published in 2020 and only one of the total has more than 100 citations (Table 6).

Table 6: Articles on zoom fatigue with the largest number of citations

Document title	Type of documents	Author	Journal	Year	Scopus citations
Connecting through Technology during the Coronavirus Disease 2019 Pandemic: Avoiding "zoom Fatigue"	Editorial	Wiederhold, B.K.	Cyberpsychology, Behavior, and Social Networking	2020	110
Understanding "Zoom fatigue": Theorizing spatial dynamics as third skins in computer-mediated communication	Article	Nadler, R.	Computers and Composition	2020	29
An observational study of engineering online education during the COVID-19 pandemic	Article	Asgari S. et al.	PLoS ONE	2021	14
Avoid zoom fatigue, be present and learn	Article	Peper, E. et al.	NeuroRegulation	2021	9
Social distancing as a critical test of the micro-sociology of solidarity	Article	Collins, R.	American Journal of Cultural Sociology	2020	9

With the 87 descriptors selected from a total of 221 registered in the 41 documents retrieved, the grouping of two clusters is evident. Cluster 1 (red) includes the results of studies on the use of videoconferencing as a means of communication during the COVID-19 pandemic, showing a certain level of fatigue and tiredness when using this means of communication. Cluster 2 (green) shows the relationship between the research that has been done on e-learning as a teaching and learning medium during COVID-19 and the establishment of the term Zoom fatigue as a state of tiredness and boredom that the user may experience when attending multiple online classes or events.

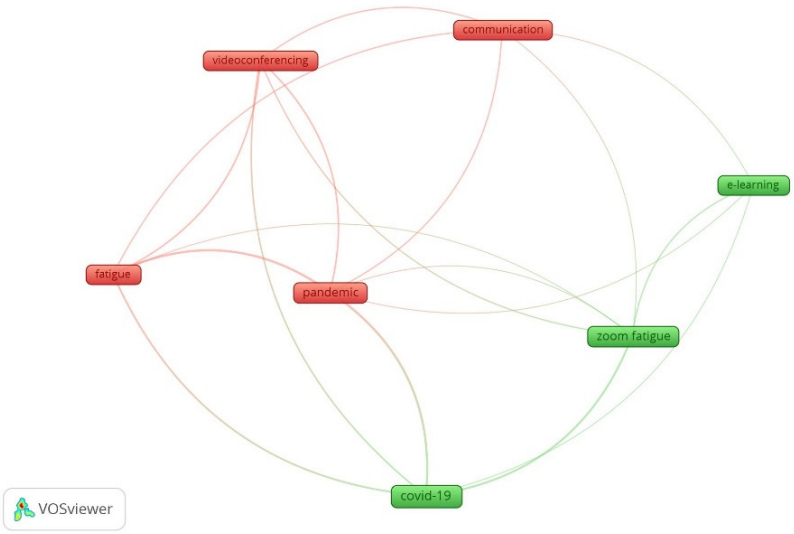

Figure 1: Cluster grouping on the basis of selected descriptors

4. Discussion

The COVID -19 pandemic has had an unprecedented impact on all aspects of life (Amponsah et al., 2022). Since then, many employees have initiated a new facet known as remote work and have reported feelings of burnout attributed to videoconferencing (Nesher Shoshan & Wehrt, 2021). This is where the terms "zoom fatigue" or "zoom burnout" became well known. (Wiederhold, 2020). This new syndrome is a consequence of a prolonged and inadequate use of videoconferencing tools (Riedl, 2021) and also that research on this topic is scarce (Bennett et al., 2021; Shockley et al., 2021). Based on Kranzberg's (1986) theory that states that technology is not good or bad, but neutral, it is important to know how this new topic is being addressed and therefore, the objective of this research was to analyze the scientific production on Zoom fatigue.

The findings of this research mention that 56% of the scientific production are research articles, and that they have been progressively increasing in the last two years especially in the context of pandemic (Torres-Salinas, 2020). This report is similar to other fields of study such as environment where original articles are the largest number of documents (Casado-Aranda et al., 2021) or as the case of the Latin American production on COVID-19 which has had an exponential growth in the last two years (Gregorio-Chaviano et al., 2020).

Among the countries with the highest production, the United States, the Philippines and Germany stand out. This result is understandable since the Americans had a significant increase as a result of COVID-19 in remote work (Dunatchik et al., 2021) coupled with the fact that the United States shows a steady academic growth due to high collaboration with several institutions from different continents (Mohadab et al., 2020). However, in the case of the Philippines, the COVID-19 pandemic caused a sudden transformation especially of the educational landscape (Cleofas & Rocha, 2021) and with an increase in remote work (Soriano & Oducado, 2021). In Germany, the pandemic forced severe isolation and rapid adaptation to the new normal (World Health Organization, 2020). This context would explain the results found in this research.

It is important to highlight Philippine institutions such as the West Visayas State University, which in collaboration with the Polytechnic State University of Bicol, are developing research groups that are analyzing this new subject on zoom fatigue led by researcher Michael Oducado (Oducado et

al., 2021), who is also the most prolific author in this field of study. This would answer the results in terms of institutions and authors of this research.

Among the most important journals is the American Journal Of Loss And Trauma which is a journal specialized in stress and coping. In turn, the contributions on zoom fatigue analyzed in this study occur in the highest level journals located in the first quartiles, which could also reveal their possible quality (Gregorio-Chaviano et al., 2020). Quartiles are indicators that evaluate the relative importance of a journal within a specific area (León et al., 2020) and are measured through SJR or JCR (Bustos-González, 2019). It is highlighted that Anglo-Saxon journals lead the world scientific production in several fields (Moreta & Said-Hung, 2020; Reverter-Masia et al., 2016) as is also observed in the topic of Zoom fatigue.

Among the most cited articles is editorial by Wiederhold (2020) who highlights the mass use of Zoom by workers worldwide and the desynchronization of time, concentration distractors and intimidation among other aspects that can cause restlessness, burnout and stress. The other document belongs to Nadler (2020) who based on a broader context with the theory of computer-mediated communication burnout, highlights the little person-to-person interaction due to the changes from physical space to virtual space, which can generate different types of fatigue. There is also the article written by Asgari et al. (2021) who highlights concentration difficulties and Zoom fatigue in students after attending multiple online sessions.

The most outstanding descriptors found in this study is cluster one, which analyzes the effects of the use of videoconferencing as a means of communication generating a certain level of fatigue and tiredness. Similar studies show that the media we use in our relationships with people influence those same relationships, and that spatial sentiment predicts user behavior (Nadler, 2020). Numerous studies report that the use of videoconferencing generates feelings of burnout (Nesher Shoshan & Wehrt, 2021; Wiederhold, 2020), as well as studies that theorize the mechanisms that can cause Zoom fatigue (Bailenson, 2021). Researchers further emphasize future fields of research in which the benefits of videoconferencing and the reduction of psychological costs, as well as its effects on children, should be analyzed (Bailenson, 2021) (Geraldine Fauville et al., 2021).

Cluster two highlights e-learning and the establishment of the term Zoom fatigue as a state of tiredness and boredom experienced when attending multiple online classes or events. Recent reports mention that it is more difficult for students to maintain attention especially when multitasking (Peper et al., 2021), as well as studies that emphasize that in order to ensure concentration it is necessary to avoid multitasking while in session zoom (Amponsah et al., 2022). The psychological literature indicates, for example, that technostress results from app multitasking, overload, and constant connectivity (Bonanomi et al., 2021; Tarafdar et al., 2010) and that humans are terrible at multitasking (Loukopoulos et al., 2016; Wang & Tchernev, 2012). Also, reports show that multitasking generally does not increase work productivity, but even contributes to stress and fatigue (Riedl, 2021). In the educational field, many students reported feeling overloaded and eyestrain after e-learning (Sasmal & Roy, 2021) and that boredom coupled with multitasking leads to Zoom fatigue (Ebardo et al., 2021).

Finally, this study has some limitations. First of all, to recognize that the Scopus database was used and it is likely that some articles were not considered, for example, the case of Latin America, which uses Scielo and Redalyc for its publications, where there are recent studies on Zoom fatigue. Neither were preprints or early versions of scientific articles considered. Second, it is important to recognize that this study had a window of time in which the articles were collected, and understanding that scientific production is exponential, it is likely that several articles were not considered in this research.

5. Conclusion

In conclusion, the scientific production on Zoom fatigue reported 41 manuscripts published in journals indexed in Scopus between January 2020 and December 2021. Likewise, the highest

percentage corresponds to original articles and with the United States and the Philippines as the most productive countries.

Beyond the increase in the number of publications, positive trends are observed in the bibliometric indicators of visibility and impact, highlighting the higher proportion of papers published in journals within the first two quartiles of the SJR classification. In addition, two lines of research associated with the use of videoconferencing and e-learning as teaching and learning strategies were identified; however, few knowledge networks were identified, with low consolidation and interrelation between them.

Finally, it is essential to implement research policies aimed at strengthening scientific production, its visibility and impact on the international scientific community, but it is necessary to continue increasing the number of works of Latin American researchers published in international journals indexed in databases, as well as their relationship with research needs, in order to meet the current challenges of our educational system.

References

Al-Habaibeh, A., Watkins, M., Waried, K., & Javareshk, M. B. (2021). Challenges and opportunities of remotely working from home during Covid-19 pandemic. Global Transitions, 3, 99–108. https://doi.org/10.1016 /j.glt.2021.11.001

Amponsah, S., van Wyk, M. M., & Kolugu, M. K. (2022). Academic Experiences of "Zoom-Fatigue" as a Virtual Streaming Phenomenon During the COVID-19 Pandemic. International Journal of Web-Based Learning and Teaching Technologies, 17(6), 1–16. https://doi.org/10.4018/IJWLTT.287555

Anderson, K., & Looi, J. C. L. (2020). Chronic Zoom Syndrome: emergence of an insidious and debilitating mental health disorder during COVID-19. Australasian Psychiatry, 28(6), 669–669. https://doi.org/10.1177/1039856220960380

Asgari, S., Trajkovic, J., Rahmani, M., Zhang, W., Lo, R. C., & Sciortino, A. (2021). An observational study of engineering online education during the COVID-19 pandemic. PLOS ONE, 16(4), e0250041. https://doi.org/10.1371/journal.pone.0250041

Bailenson, J. N. (2021). Nonverbal overload: A theoretical argument for the causes of Zoom fatigue. Technology, Mind, and Behavior, 2(1). https://doi.org/10.1037/tmb0000030

BBC News Mundo. (2020). Coronavirus: por qué Zoom se ha vuelto tan popular para realizar videollamadas (y otras 3 aplicaciones gratuitas). https://www.bbc.com/mundo/noticias-52040148

Bennett, A. A., Campion, E. D., Keeler, K. R., & Keener, S. K. (2021). Videoconference fatigue? Exploring changes in fatigue after videoconference meetings during COVID-19. Journal of Applied Psychology, 106(3), 330–344. https://doi.org/10.1037/apl0000906

Bonanomi, A., Facchin, F., Barello, S., & Villani, D. (2021). Prevalence and health correlates of Onine Fatigue: A cross-sectional study on the Italian academic community during the COVID-19 pandemic. PLOS ONE, 16(10), 1–19. https://doi.org/10.1371/journal.pone.0255181

Bustos-González, A. (2019). Tránsito de universidad docente a universidad de investigación. ¿Un problema de información académica, de taxonomías o de rankings universitarios? El Profesional de la Información, 28(4), 1–14. https://doi.org/10.3145/epi.2019.jul.22

Carpenter, E. L., Adams, A. M., Chick, R. C., Stull, M. C., Hale, D. F., Propper, B. W., Clifton, G. T., & Vreeland, T. J. (2022). Maximizing Benefit of Virtual Learning: Lessons from the COVID-19 Pandemic. Journal of Surgical Research. https://doi.org/10.1016/j.jss.2022.01.020

Casado-Aranda, L.-A., Sánchez-Fernández, J., & Viedma-del-Jesús, M. I. (2021). Analysis of the scientific production of the effect of COVID-19 on the environment: A bibliometric study. Environmental Research, 193(November 2020), 110416. https://doi.org/10.1016/j.envres.2020.110416

Cleofas, J. V., & Rocha, I. C. N. (2021). Demographic, gadget and internet profiles as determinants of disease and consequence related COVID-19 anxiety among Filipino college students. Education and Information Technologies, 26(6), 6771–6786. https://doi.org/10.1007/s10639-021-10529-9

Dunatchik, A., Gerson, K., Glass, J., Jacobs, J. A., & Stritzel, H. (2021). Gender, Parenting, and The Rise of Remote Work During the Pandemic: Implications for Domestic Inequality in the United States. Gender & Society, 35(2), 194–205. https://doi.org/10.1177/08912432211001301

Ebardo, R., Padagas, R., & Trapero, H. (2021). Do Boredom, Escapism, Apathy, and Information Overload lead to Zoom Fatigue? 29th International Conference on Computers in Education Conference, ICCE 2021 - Proceedings, 2, 372–379.

Fauville, G., Luo, M., Queiroz, A. C. M., Bailenson, J. N., & Hancock, J. (2021). Zoom Exhaustion & Fatigue Scale. Computers in Human Behavior Reports, 4, 100119. https://doi.org/10.1016/j.chbr.2021.100119

Fauville, Geraldine, Luo, M., Queiroz, A. C. M., Bailenson, J. N., & Hancock, J. (2021). Nonverbal Mechanisms Predict Zoom Fatigue and Explain Why Women Experience Higher Levels than Men. SSRN Electronic Journal, 1–18. https://doi.org/10.2139/ssrn.3820035

Gregorio-Chaviano, O., Limaymanta, C. H., & López-Mesa, E. K. (2020). Análisis bibliométrico de la producción científica latinoamericana sobre COVID-19. Biomédica, 40(Supl. 2), 104–115. https://doi.org/10.7705/biomedica.5571

Kranzberg, M. (1986). Technology and History: "Kranzberg's Laws". Technology and Culture, 27(3), 544. https://doi.org/10.2307/3105385

León, J., Socorro, A., Cáceres, maritza, & Pérez, C. (2020). Scientific production in latin america and the caribbean in the period 1996-2019. Revista Cubana de Medicina Militar, 49(3), 1–10. http://scielo.sld.cu/pdf/mil/v49n3/1561-3046-mil-49-03-e573.pdf

Loukopoulos, L. D., Dismukes, R. K., & Barshi, I. (2016). The Multitasking Myth. Routledge. https://doi.org/10.4324/9781315555416

Mahr, A., Cichon, M., Mateo, S., Grajeda, C., & Baggili, I. (2021). Zooming into the pandemic! A forensic analysis of the Zoom Application. Forensic Science International: Digital Investigation, 36, 301107. https://doi.org/10.1016/j.fsidi.2021.301107

Mamani- Benito, O., Landa-Barzola, M., Carranza Esteban, R. F., Elguera-Pajares, A., & Mejia, C. R. (2021). Diseño y validación de una escala de uso de medios académicos virtuales durante la pandemia COVID-19. Propósitos y Representaciones, 9(2). https://doi.org/10.20511/pyr2021.v9n2.1390

Marinucci, M., Pancani, L., Aureli, N., & Riva, P. (2022). Online social connections as surrogates of face-to-face interactions: A longitudinal study under Covid-19 isolation. Computers in Human Behavior, 128, 107102. https://doi.org/10.1016/j.chb.2021.107102

Mohadab, M. El, Bouikhalene, B., & Safi, S. (2020). Bibliometric method for mapping the state of the art of scientific production in Covid-19. Chaos, Solitons and Fractals, 139, 1–16. https://doi.org/10.1016/j.chaos.2020.110052

Moreta, C. D. O., & Said-Hung, E. (2020). La producción científica en el estudio de experiencia de usuario en educación: caso Web of Science y Scopus. Transinformação, 32(2), 1–12. https://doi.org/10.1590/2318-08892020032e190003

Nadler, R. (2020). Understanding "Zoom fatigue": Theorizing spatial dynamics as third skins in computer-mediated communication. Computers and Composition, 58, 102613. https://doi.org/10.1016/j.compcom.2020.102613

Nesher Shoshan, H., & Wehrt, W. (2021). Understanding "Zoom fatigue": A mixed-method approach. Applied Psychology, 1–26. https://doi.org/10.1111/apps.12360

Oducado, R. M. F., Fajardo, M. T. R., Parreño-Lachica, G. M., Maniago, J. D., Villanueva, P. M. B., Dequilla, M. A. C. V., Montaño, H. C., & Robite, E. E. (2021). Predictors of Videoconference Fatigue: Results from Undergraduate Nursing Students in the Philippines1. Asian Journal for Public Opinion Research, 9(4), 310–330. https://doi.org/http://dx.doi.org/10.15206/ajpor.2021.9.4.310

Organización Mundial de la Salud. (2020). Pandemic fatigue Reinvigorating the public to prevent COVID-19 (Número November). https://apps.who.int/iris/handle/10665/335820

Palacios Cruz, M., Santos, E., Velázquez Cervantes, M. A., & León Juárez, M. (2021). COVID-19, una emergencia de salud pública mundial. Revista Clínica Española, 221(1), 55–61. https://doi.org/10.1016/j.rce.2020.03.001

Peper, E., Wilson, V., Martin, M., Rosegard, E., & Harvey, R. (2021). Avoid Zoom Fatigue, Be Present and Learn. NeuroRegulation, 8(1), 47–56. https://doi.org/10.15540/nr.8.1.47

Peters, S. E., Dennerlein, J. T., Wagner, G. R., & Sorensen, G. (2022). Work and worker health in the post-pandemic world: a public health perspective. The Lancet Public Health, 7(2), e188–e194. https://doi.org/10.1016/S2468-2667(21)00259-0

Reverter-Masia, J., Hernández-González, V., Jové-Deltell, C., & Legaz-Arrese, A. (2016). Producción en Web of Science y Scopus de profesores funcionarios con sexenio de las ciencias del deporte en España. Revista Interamericana de Bibliotecologia, 39(2), 149–162. https://doi.org/10.17533/udea.rib.v39n2a06

Riedl, R. (2021). On the stress potential of videoconferencing: definition and root causes of Zoom fatigue. Electronic Markets. https://doi.org/10.1007/s12525-021-00501-3

Sasmal, S., & Roy, M. (2021). Perception of undergraduate nursing students regarding e-learning during COVID-19 pandemic in West Bengal. International Journal Of Community Medicine And Public Health, 8(4), 1892. https://doi.org/10.18203/2394-6040.ijcmph20211251

Shockley, K. M., Gabriel, A. S., Robertson, D., Rosen, C. C., Chawla, N., Ganster, M. L., & Ezerins, M. E. (2021). The fatiguing effects of camera use in virtual meetings: A within-person field experiment. Journal of Applied Psychology, 106(8), 1137–1155. https://doi.org/10.1037/apl0000948

Soriano, G., & Oducado, R. M. (2021). Shifting the Education Paradigm amid the COVID 19 Pandemic: Nursing Students' Attitude to E Learning. Africa Journal of Nursing and Midwifery, 23(1). https://doi.org/10.25159/2520-5293/8090

Tarafdar, M., Tu, Q., & Ragu-Nathan, T. S. (2010). Impact of Technostress on End-User Satisfaction and Performance. Journal of Management Information Systems, 27(3), 303–334. https://doi.org/10.2753/MIS0742-1222270311

Tibbetts, M., Epstein-Shuman, A., Leitao, M., & Kushlev, K. (2021). A week during COVID-19: Online social interactions are associated with greater connection and more stress. Computers in Human Behavior Reports, 4, 100133. https://doi.org/10.1016/j.chbr.2021.100133

Torres-Salinas, D. (2020). Ritmo de crecimiento diario de la producción científica sobre Covid-19. Análisis en bases de datos y repositorios en acceso abierto. El Profesional de la Información, 29(2). https://doi.org/10.3145/epi.2020.mar.15

Wang, Z., & Tchernev, J. M. (2012). The "Myth" of Media Multitasking: Reciprocal Dynamics of Media Multitasking, Personal Needs, and Gratifications. Journal of Communication, 62(3), 493–513. https://doi.org/10.1111/j.1460-2466.2012.01641.x

Wiederhold, B. K. (2020). Connecting Through Technology During the Coronavirus Disease 2019 Pandemic: Avoiding "Zoom Fatigue". Cyberpsychology, Behavior, and Social Networking, 23(7), 437–438. https://doi.org/10.1089/cyber.2020.29188.bkw

Williams, N. (2021). Working through COVID-19: 'Zoom' gloom and 'Zoom' fatigue. Occupational Medicine, 71(3), 164–164. https://doi.org/10.1093/occmed/kqab041