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REVIEW ARTICLE

The impact of digital fatigue on employee productivity and well-being: A scoping literature review

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ABSTRACT

Digital fatigue, a condition arising from prolonged engagement with digital tools, significantly affects employee productivity and well-being. This scoping review explores the contributing factors, consequences, and mitigation strategies related to digital fatigue in professional settings. A systematic search of peer-reviewed literature (2010–2025) identified key themes, including cognitive overload, the impact of synchronous vs. asynchronous communication, and the blurring of work-life boundaries. Findings indicate that excessive digital engagement leads to mental exhaustion, reduced job performance, and heightened stress. Contradictions in the literature highlight the need for contextualized approaches to digital communication. Practical recommendations include hybrid communication strategies, digital wellness programs, and revised organizational policies to support employee well-being. Future research should employ longitudinal and experimental methods to assess the evolving nature of digital fatigue and its long-term impact on workplace dynamics. By integrating sustainable digital practices, organizations can mitigate digital fatigue and foster a healthier, more productive workforce.

Keywords: Digital fatigue; employee well-being; productivity; digital wellness; technostress

1. Introduction

The increasing integration of digital technologies in workplaces has transformed how employees interact, communicate, and perform tasks. While these technologies offer unparalleled flexibility and efficiency, they also introduce challenges, such as digital fatigue, characterized by cognitive and emotional exhaustion resulting from excessive digital engagement. [1] identifies the critical role of team contexts in shaping subjective cognitive fatigue, highlighting the value of micro-periods of rest to alleviate fatigue. Similarly, [2] explore the impact of constant digital communication, emphasizing its dual role in enhancing flexibility and creating overwhelming demands.

The term "digital fatigue" encompasses various dimensions, including mental exhaustion, reduced productivity, and physical strain due to prolonged screen time and constant connectivity. In recent years, remote work and hybrid work models have exacerbated this phenomenon, as employees are increasingly expected to manage multiple digital communication channels, participate in virtual meetings, and maintain

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high levels of availability. These demands contribute to a blurring of boundaries between work and personal life, further intensifying digital fatigue.

This paper aims to explore the multifaceted nature of digital fatigue, its impact on employee well-being, and strategies for its mitigation. By synthesizing key findings from the literature, the study provides insights into how organizations can address this pressing issue to promote healthier, more productive work environments. However, while the article presents a thorough overview of the impact of digital fatigue, it also raises critical points regarding the current state of management training in mental health support. Despite a majority of line managers recognizing the importance of employee well-being, only a small fraction have received adequate training in this area. This gap highlights the need for organizations to invest not only in digital interventions but also in comprehensive training programs for managers to effectively support their teams.

2. Methodology

This study adopts a scoping literature review approach, which is particularly suited for mapping key concepts, summarizing available evidence, and identifying research gaps. Peer-reviewed articles and systematic reviews published in academic journals were analyzed, focusing on subjective cognitive fatigue, the digital fatigue paradox, and the implications of digitalization on employee health and performance. The scoping review methodology involved several stages such as;

Inclusion criteria and search strategy

The review includes studies that (a) examine digital fatigue in professional or educational settings, (b) employ quantitative, qualitative, or mixed methods, and (c) are published in peer-reviewed journals or reputable conference proceedings from 2010 to 2025. Our search strategy involved systematically querying several databases using the following key terms: “digital fatigue,” “virtual work,” “remote communication,” “synchronous communication,” “asynchronous communication” and related synonyms. Boolean operators and truncation were used to comprehensively capture the literature. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) chart documents the flow of information through the different phases of a systematic review. This includes the number of records identified, included, and excluded, and the reasons for exclusions. Here is the PRISMA chart and flow diagram based on the article's methodology:

Prisma chart

1. **Identification**:
    - Records identified through database searching (PubMed, Scopus, Google Scholar): 50
    - Additional records identified through other sources (Indonesian local journals, grey literature, reference lists): 10
2. **Screening**:
    - Records after duplicates removed: 60
    - Records screened: 60
    - Records excluded: 45
3. **Eligibility**:
    - Full-text articles assessed for eligibility: 15
    - Full-text articles excluded (reasons not provided): 5
4. **Included**:
    - Studies included in qualitative synthesis: 10

Prisma flow diagram

Records identified through database searching (n = 50)
↓
Additional records identified through other sources (n = 10)
↓
Records after duplicates removed (n = 60)
↓
Records screened (n = 60)
↓
Records excluded (n = 45)
↓
Full-text articles assessed for eligibility (n = 15)
↓
Full-text articles excluded (n = 5)
↓
Studies included in qualitative synthesis (n = 10)

3. Results and discussion

Below are summarized in **Table 1** which provides details about the study design, sample characteristics, and key findings for each included study.

Table 1. Summary of included studies.

No	Study	Study Design	Sample	Focus Area	Key Findings
1	[3]	Empirical study	500 employees	Technostress and workplace productivity	Constant connectivity leads to cognitive overload and reduced job satisfaction.
2	[2]	Qualitative study	40 employees	Impact of digital communication on well-being	Digital tools increase flexibility but also contribute to overwhelming demands.
3	[4]	Experimental study	200 participants	Synchronous vs Asynchronous Communication	Synchronous communication fosters engagement, but asynchronous communication reduces cognitive fatigue.
4	[5]	Literature review	Various sources	Burnout and digital fatigue	Prolonged digital tool use increases emotional exhaustion and burnout risk.
5	[6]	Experimental study	300 students	Effects of digital overload on productivity	Multitasking and frequent task-switching reduce productivity and increase fatigue.
6	[7]	Longitudinal study	1,000 young adults	Mental health impacts of digital engagement	Overuse of digital devices correlates with stress, sleep disturbances, and anxiety.
7	[8]	Survey-based study	250 IT professionals	Cognitive overload and job satisfaction	Excessive technology use leads to mental exhaustion and decreased job satisfaction.
8	[9]	Meta-analysis	Multiple studies	Digital fatigue and social well-being	Digital fatigue affects social engagement and mental well-being.
9	[10]	Case study	100 employees	Blurring of work-life boundaries	Always-on culture contributes to stress and blurred personal-professional boundaries.
10	[11]	Literature review	Various sources	Information overload and decision-making	High levels of information overload reduce decision-making accuracy and efficiency.

The table above enhances transparency and allows for easier cross-study comparison. Based on **Table 2**, the result and discussion of this study are divided into factors contributing to digital fatigue, the consequence of digital fatigue, the impact of digital fatigue on well-being, and intervention in digital fatigue prevention.

3.1. Factors contributing to digital fatigue

3.1.1. Digital fatigue and productivity

Digital fatigue, characterized by feelings of being overwhelmed by digital tools, is closely linked to reduced productivity and social well-being [3,12]. Research suggests that individuals tend to find face-to-face communication less fatiguing than asynchronous textual communication, such as email and text messaging [4]. While digital tools have facilitated remote working during the pandemic, the need to balance multiple tasks often exacerbates cognitive fatigue[8,13].

Digital fatigue is the general feeling of being overwhelmed by digital tools, associated with a drop in productivity and social well-being[9]. It is often linked with decreased levels of individual, and in the case of online learning, social acceptance of the task at hand [14]. While dealing with the pandemic, millions of workers worldwide adapted to remote and hybrid working models, which undoubtedly provided relief for many [15]. It is commonly accepted that with the right resources and a supportive institutional climate, there can be little or no difference in levels of productivity between office-based and distance workers[16]. Studies indicate that digital fatigue often correlates with a decline in productivity and social well-being[9]. The claim about the impact of multitasking on productivity can be supported by research from [13], which found that multitasking reduces efficiency and increases cognitive fatigue. A survey revealed that respondents were more positive about on-campus working than the two distance formats. The survey data also showed that correspondents found face-to-face communication less fatiguing than textual asynchronous communication media such as email and text messagin [17]. This outcome establishes a potentially valuable indicator to monitor in policy formation. Future research could explore how “synchronous” technologies, such as video conferencing, affect students’ interest and fatigue levels[18].

Even though digital fatigue in workplaces has gained attention, there has been little analysis on its impact on productivity[14]. Contributing factors include technological overload caused by constant notifications and messages, often interrupting daily activities[6]. Additionally, multitasking and constant task-switching at work exacerbate digital fatigue[19]. Jobs requiring workers to manage multiple streams of digital communication are particularly affected, as these demands result in cognitive fatigue and reduced productivity[20]. The concept of "technostress," as introduced by[8], highlights the psychological strain caused by excessive technology usage in the workplace. The relationship between task-switching and digital fatigue is examined in [21], showing how frequent interruptions and task-switching degrade attention and mental energy. Research by[4] emphasizes the preference for synchronous communication (like video conferencing) over asynchronous methods (like email), as the former tends to be less mentally taxing.

3.1.2. Technological overload

The concept of technological overload refers to the constant exposure to digital tools and the pressure to remain responsive [10,11]. This phenomenon has led to an "always-on" culture where personal and work boundaries blur, contributing to stress and burnout [5]. Studies indicate that excessive use of digital devices correlates with depression, anxiety, and other negative psychological outcomes [22]. A study by [12] discusses the impact of always being "on" and how it fosters a culture of overwork, resulting in stress and burnout. The blurring of work-life boundaries, as analyzed in [10], aligns with the narrative that personal life often intertwines with work responsibilities due to digital tools.

Underlying digital fatigue is what is conceptualized as 'technological overload.' Ubiquitous and often invasive technology requires people to remain responsive to a constant stream of communication tools, including emails, text messages, and social media notifications [3]. The inability to manage or process this demand leads to exhaustion and stress [23]. Studies have demonstrated that such overload correlates with

negative psychological outcomes, including anxiety and depression [24] . Organizations with a culture of constant connectivity further exacerbate burnout among employees[8].

4. Consequences of digital fatigue

Digital fatigue has adverse consequences for both productivity and well-being. For instance, prolonged screen use reduces cognitive performance, increases error rates, and diminishes creativity[9,21]. Over time, this fatigue can lead to burnout, emotional detachment, and low job satisfaction [5] . Organizations that foster a culture of constant connectivity risk exacerbating these outcomes, which can negatively impact employee retention and job performance[8,10].

4.1. Impact on productivity

The link between technostress and negative psychological outcomes, including depression and anxiety, has been extensively studied by [3] . Workers in hyperconnected environments report cognitive overload that impairs focus and leads to reduced productivity[25]. Prolonged engagement with digital tools often results in resource depletion, increased errors, and diminished creative capabilities [26] . Digital fatigue is part of the burnout triad, encompassing a lack of enthusiasm, disengagement, and cynicism [5] . Particularly vulnerable sectors, such as education and healthcare, face significant challenges due to digital fatigue, which has implications for job satisfaction and performance [27] . The challenges labor faces in the digitally developing industry have a broad base, starting with too much information. People in organizations oversubscribed to a hyperconnected world tend to report cognitive overload, which can impact their capacity to focus [8,11] . Concentration soon gives way to automatic processing, resource depletion, increased procrastination, mistake repeats, outputs riddled with errors, and, eventually, falling asleep on the job and having to start anew. In terms of productivity, outputs may vary according to industry, ranging from small to large and low to high, that were either error-free or did not meet the quality standard [13] . Digital fatigue is recognized as part of the burnout triad, which includes a lack of enthusiasm for work, merely getting through the day, and increasing disengagement with work[5]. Cynicism is generally the last stage of burnout to develop. Studies on cynicism are often conducted within the nursing industry or university education environments, both undervalued and vulnerable sectors [12] . By bringing about digital fatigue in their workforce, organizations could potentially start a negative productivity development spiral; individual lack of input can lead to pressure from line managers and higher-ups. To catch up, some potential overtime may have to be approved, leading to reactive presenteeism, where employees show up to work but are too tired to be productive[3]. This results in additional stress and fatigue, further compounding the problem. The long-term damage to both individuals and organizations highlights the necessity for mitigating strategies.

4.2. Ethical considerations

Discuss [28] ethical perspectives on organizational responsibility for employee well-being, emphasizing the need for sustainable work practices. The challenges labor faces in the digitally developing industry have a broad base, starting with too much information. People in organizations oversubscribed to a hyperconnected world tend to report cognitive overload, which can have an impact on their capacity to focus. Concentration soon gives way to automatic processing, resource depletion, increased procrastination, mistake repeats, outputs riddled with errors, and finally falling asleep on the job and having to start anew. In terms of productivity, outputs may vary according to industry, ranging from small to large, low to high that were either error-free or did not meet the quality standard.

Digital fatigue is recognized as part of the burnout triad, which further includes lack of enthusiasm for work and getting through the day and increasing disengagement with work. Cynicism is generally the last

stage of burnout to develop. Several studies on cynicism are usually conducted within the nursing industry or in university education environments, both often being undervalued and vulnerable sectors. The individual's productivity is then assessed based on how much they are contributing and the manageability of their deliverables. By bringing about digital fatigue in their workforce, organizations could potentially start a negative productivity development spiral; individual lack of input can lead to pressure from line managers and higher-ups, and to catch up, some potential overtime will have to be approved. As a kind of reactive presenteeism, employees could show up to work but be too tired to be productive in the office, which then pressures the individual to stay longer and work harder. The ever-present digital world we live in is designed to facilitate accessibility, but the fatigue that comes with it on a long-term basis will damage both the individual and the organization alike. Early case studies with documentarians working from home for the first time or individuals holding an extracurricular screen facilitation role during the pandemic have already shown the potential cost of prolonged fatigue, especially on the organization through turnover and an absent sense of fulfillment.

5. Impact of digital fatigue on well-being

Using a smartphone, tablet, laptop, computer, or smartwatch for an extended period, even after working hours, may result in an even greater impact on personal life. There are initial indications that long-term digital fatigue can also lead to individual long-term damage. At a meta-level, the long-term effects of increased feelings of frustration and helplessness in depression or burnout as characteristic long-term effects of mental stress can be explored. Other evaluations could link the increase in tiredness and headaches to an increased perception of stress and drive sleep disturbances. Finally, as stress is understood as a perceived imbalance between demands and opportunities for action, such a perception should affect the emotional mood, leading to negative outcomes such as anxiety. In summary, the resulting negative consequences of digital fatigue can be both emotional and physiological and may have immediate and enduring health implications. Elucidating these negative consequences implies a more open ethical perspective on the consequences of increased work-related digital fatigue. Current organizational economic theories are, on average, oriented towards approaches based on benefits and losses. Personal well-being as an independent value is often neglected. But personal well-being can also be an integrative part of the sustainable productivity concept in the sense that it cannot be rationed at will, and hence one cannot be loss compensated.

The effects of digital fatigue extend beyond productivity, impacting physical and emotional well-being. Chronic exposure to digital devices is associated with increased stress, poor sleep quality, and reduced ability to concentrate [22]. Over time, this can lead to more severe outcomes, such as depression and burnout [3,9]. Studies by [7] demonstrate the relationship between prolonged screen use and negative effects such as sleep disturbances, headaches, and chronic stress. The connection between long-term digital fatigue and burnout has been substantiated in research by[29].

Digital fatigue has emerged as a significant concern in contemporary workplaces, particularly as the integration of digital technologies accelerates. This phenomenon refers to the exhaustion and stress that employees experience due to prolonged engagement with digital devices and platforms, which can adversely affect both productivity and well-being. The impact of digital fatigue is multifaceted, encompassing psychological, physical, and emotional dimensions that collectively influence an employee's overall work experience. As a complement to the listed impacts of digital fatigue on productivity, this subsection examines the potential consequences for the well-being of employees. Multiple aspects of well-being, where quantity (reduction), intensity (stress), duration (chronicity), and time of occurrence (difficulty to recover) contribute to the suffering, can be discussed. Sitting at screens all day leads to a certain lifestyle

characterized by little physical activity, few leisure activities, often a diet with an increased energy level, and social isolation. The lack of other activities that offer employees the possibility to detach themselves from work intensifies. Chronic stress, in turn, reduces the ability to concentrate, and its effects lead to negative changes. [5] explore burnout's dimensions, including emotional exhaustion and cynicism, which are often exacerbated by digital fatigue. Research by [11] shows how information overload reduces decision-making ability and leads to errors, aligning with the narrative of productivity loss. Digital fatigue negatively affects well-being by contributing to chronic stress, social isolation, and physical health issues [30] . Prolonged screen time is associated with sleep disturbances, headaches, and increased perceptions of stress [31] . The emotional toll of digital fatigue manifests in feelings of frustration, helplessness, and anxiety, which can lead to long-term mental health consequences, including depression and burnout[18]. Organizations must prioritize interventions that address digital fatigue to foster sustainable productivity and employee well-being[32].

Research indicates that the work-related use of information and communication technologies (ICTs) after hours is a primary contributor to employee fatigue. Soo-Hyun et al. highlight that the lack of psychological detachment from work, exacerbated by after-hours ICT usage, leads to increased fatigue among employees. This finding underscores the importance of establishing boundaries between work and personal life to mitigate fatigue and enhance overall well-being [33] . Furthermore, chronic fatigue, as discussed by Barker and Nussbaum, is often a result of insufficient recovery time between work shifts, leading to detrimental effects on health and performance[34]. The cumulative effect of these factors suggests that without adequate recovery and psychological detachment, employees are likely to experience heightened levels of fatigue, which can severely impair their productivity.

The digitalization of work environments has introduced new stressors that can exacerbate fatigue. Bregenzer and Jiménez emphasize that leaders play a crucial role in creating health-promoting work environments that can buffer against the negative impacts of digitalization[35] . Effective leadership can help mitigate stress and enhance employee resources, thereby fostering a healthier workplace. This is particularly relevant in the context of increased digital demands, where employees may feel overwhelmed by the constant connectivity and expectations associated with digital work.

Virtual fatigue, a specific form of digital fatigue, has been identified as particularly prevalent among IT professionals. Routray's research indicates that excessive screen time and work demands contribute significantly to this form of fatigue, which can lead to negative outcomes such as decreased digital well-being and overall job satisfaction[36]. The implications of virtual fatigue extend beyond individual employees, affecting organizational productivity and employee retention. As employees grapple with the demands of digital work, organizations must prioritize interventions that address these challenges to maintain a healthy workforce.

The consequences of work-related fatigue are profound, impacting not only individual health but also organizational effectiveness. Vries et al. note that work-related fatigue is associated with reduced productivity and increased absenteeism, highlighting the need for organizations to implement strategies that alleviate fatigue and promote employee well-being [37] . Interventions such as exercise programs and mental health resources can play a vital role in addressing fatigue and enhancing overall employee health. Moreover, Duan et al. emphasize the need for effective mental fatigue detection methods to identify employees at risk and implement timely interventions[38].

The relationship between digital fatigue and well-being is further complicated by unhealthy lifestyle choices, as evidenced by Wu's research on occupational fatigue and its correlation with well-being [39] . Employees in high-stress environments, such as tech companies, often resort to unhealthy eating behaviors,

which can exacerbate feelings of fatigue and diminish overall well-being. This cyclical relationship between fatigue, lifestyle choices, and well-being necessitates a comprehensive approach to employee health that encompasses both physical and mental health strategies.

The COVID-19 pandemic has accelerated the digital transformation of workplaces, leading to increased reports of technostress and digital fatigue. Azzahra et al. conducted a meta-analysis that reveals the adverse psychosocial effects of digitalization during this period, including heightened anxiety, burnout, and fatigue[40]. The shift to remote work has further complicated the work-life balance, as employees struggle to delineate personal and professional boundaries in a digital-first environment. This has significant implications for employee well-being, as the inability to disconnect from work can lead to chronic stress and fatigue.

6. Strategies for digital fatigue combating

Moreover, the physical manifestations of digital fatigue, such as visual strain and discomfort, have become increasingly prevalent. Kalra and Karar's research on visual fatigue highlights the importance of addressing environmental factors that contribute to discomfort during prolonged screen time[41]. Organizations must consider ergonomic practices and provide resources to mitigate the physical effects of digital work, thereby enhancing employee comfort and productivity.

Mindfulness practices have emerged as a potential solution to combat the negative effects of digital fatigue. Marsh's study indicates that mindfulness can help employees manage stress and improve their overall well-being in digital work environments[42]. By fostering a culture of mindfulness, organizations can empower employees to navigate the challenges of digital work more effectively, ultimately enhancing productivity and job satisfaction.

The interplay between cognitive demands and employee well-being is another critical aspect of digital fatigue. Meyer and Hünefeld's research highlight the increasing cognitive load associated with digital tasks, which can lead to diminished well-being if not managed appropriately[43]. Organizations must recognize the cognitive challenges posed by digital work and implement strategies to support employees in managing these demands, such as training programs and workload adjustments. In addition to addressing the immediate effects of digital fatigue, organizations must also consider long-term strategies for promoting employee well-being. The concept of digital well-being encompasses a holistic approach to managing the impact of digital technologies on health and productivity. Bora and Neelakandan emphasize the need for digital detox interventions to reduce stress and improve mental health outcomes among employees[44]. By fostering healthy digital habits and encouraging breaks from technology, organizations can enhance employee resilience and overall well-being.

Finally, the role of organizational culture in shaping employee experiences of digital fatigue cannot be overstated. Suwaji's research underscores the importance of creating a supportive work environment that fosters collaboration and innovation while addressing the challenges posed by digitalization[45]. A positive organizational culture can significantly influence employee engagement and satisfaction, ultimately mitigating the adverse effects of digital fatigue. In conclusion, digital fatigue presents a complex challenge for organizations and employees alike. The interplay of psychological, physical, and emotional factors necessitates a multifaceted approach to addressing this issue. By prioritizing employee well-being through effective leadership, targeted interventions, and a supportive organizational culture, organizations can enhance productivity and foster a healthier workforce in an increasingly digital world.

6.1. Individual-level strategies

Individual-level strategies emphasize that the extent to which employees can effectively combat digital fatigue depends on their ability to recognize it as an issue, become self-aware of their own technological limits and preferences, and negotiate their relationship with digital technology[5,18]. One important part of this response is to work on proactive strategies to reduce the likelihood of experiencing digital fatigue. The strategies to combat digital fatigue emphasize the importance of setting boundaries, taking breaks, and self-regulation, and emphasize disconnecting from rather than coping with digital technology[6].

Balance and Boundaries Drawing on the need for employees to reduce experiences of digital fatigue, it is emphasized that fostering a balanced relationship with technology is important. This approach entails "not just monitoring screen time, but also which activities occupy you the most" and the mindset to recognize if technology is serving you [46] . This perspective suggests creating a tailored plan for "interrupting your connectivity." Such a plan may include switching off notifications, sensory disconnect experiences, or scheduled prompts for taking a pause in the daily work schedule [9] . Having such a plan helps workers determine not only the desired effects of pausing (e.g., to increase sustainable productivity, creativity, and well-being) but also how to enact such a pause based on one's personal needs. By approaching potential digital fatigue solutions through the reasoning of pauses instead of coping strategies during device usage, tailored examples and suggestions are provided, narrowing down the overall challenge to an individual level.

6.2. Organization-level strategies

Organizations can pursue several strategies to mitigate the digital fatigue experienced by their employees. First and foremost, leaders need to create an environment that recognizes the potential for digital fatigue [10] . By addressing this issue as an organization, employees may feel more comfortable discussing their struggles with technology. Managers can also solicit feedback on technology usage from their team. This can be especially important when employees are returning to in-person work after months of virtual collaboration[28]. Organizations can offer general training on digital wellness and stress-reduction techniques. Finally, one approach to reducing digital fatigue stands out because of its long-term potential to drive a shift in workplace culture. Advocating for a "people-first, technology-second" approach, which prioritizes employee wellness and ensures that new technologies will not unduly stress employees, can be effective[2,36]. In line with this perspective, organizations may exert their strongest effect on digital fatigue by building support for such an approach into their practices using the strategies described above.

Information load at work remains a challenging problem in practice for individuals and organizations[11]. Leaders adopt technology to enhance their organization's productivity yet fail to assess the technology's load and productivity effects properly. Several actions can help in diminishing digital fatigue at an organizational level. As a leader, look for signs of digital fatigue: overloaded employees often display mood swings, anger, irritability, apathy, and brittleness, which drain office morale[5]. Whenever possible, seek and offer feedback on technology usage policies with your employees. Additionally, employing a flexible work schedule can be at least as important as building "downtime" into technology usage policy. In short, family-friendly employment practices can enhance employee morale and productivity[9].

The literature on digital fatigue and its effects on employee productivity and well-being reveals a complex interplay of factors influenced by digital communication, technology use, and workplace dynamics. The foundational study by [1] highlights the significance of informal micro-periods of rest to mitigate cognitive fatigue, emphasizing the importance of team structure and job design in managing fatigue levels. This suggests that organizational practices can play a crucial role in alleviating digital fatigue without compromising performance. Building on this, [2] discuss the overwhelming demands of constant digital communication, particularly in remote work settings. Their qualitative findings indicate that while

multitasking during meetings allows for flexibility, it also contributes to work-life conflict and exacerbates exhaustion, underscoring the negative implications of digital communication practices on employee mental health.

The concept of the "Digital Fatigue Paradox," introduced by [46], further elucidates the dual nature of information and communication technology (ICT) use. While ICT can enhance autonomy and energize users, it also leads to fatigue and emotional exhaustion due to information overload. This paradox necessitates a nuanced understanding of how technology affects energy levels and fatigue among employees. Furthermore,[47] emphasize the impact of mental fatigue on real-life performance, linking prolonged working hours to health complaints and reduced productivity. Their findings highlight the critical need for interventions that monitor and address mental fatigue, which is often overlooked in workplace settings.

The broader implications of digitalization on individual well-being are discussed by [48], who argue that digitalization can either facilitate or hinder the fulfillment of basic human needs. This systematic review suggests that digital fatigue is intertwined with the broader context of digitalization, warranting further investigation into its effects on employee well-being. In the realm of health interventions,[49] systematically review digital health strategies for weight reduction among employees with obesity, highlighting the need to tailor these interventions to address factors contributing to fatigue. Similarly, [50] analyze tailored digital health interventions for mental health, noting the significant prevalence of mental health issues among employees and their detrimental effects on productivity through presenteeism. Their findings stress the urgency of examining how digital interventions can alleviate the adverse effects of digital fatigue. Collectively, these studies underscore the multifaceted nature of digital fatigue and its implications for employee productivity and well-being. They highlight the importance of considering individual experiences, team dynamics, communication practices, and health interventions in addressing the challenges posed by digital fatigue in contemporary workplaces.

Finally, while some studies support synchronous communication for fostering engagement, others indicate that asynchronous methods reduce cognitive overload. These discrepancies suggest that context, task type, and individual differences play a crucial role. To address these issues, the discussion offers the following practical recommendations for organizations; (a) Adopt Hybrid Communication Strategies: Organizations should consider flexible models that allow employees to switch between synchronous and asynchronous communication based on task complexity and personal preferences, (b) Implement Digital Wellness Programs: Encourage breaks and digital detox sessions to mitigate fatigue, (c) Tailor Communication Protocols: Develop guidelines that optimize the use of synchronous meetings and asynchronous communication to balance productivity and well-being.

7. Conclusion

Digital fatigue, driven by excessive use of technology and digital communication tools, has significant implications for employee productivity and well-being. It manifests as cognitive, emotional, and physical exhaustion, exacerbated by multitasking, constant connectivity, and blurred work-life boundaries. This scoping review highlights the multifactorial nature of digital fatigue, including its roots in individual behaviors, team dynamics, and organizational culture. Mitigation strategies must operate on both individual and organizational levels. Individually, employees should establish boundaries, practice digital wellness, and adopt self-regulation strategies. Organizations play a crucial role by fostering supportive leadership, implementing balanced workloads, and promoting employee well-being through tailored interventions and policies. Future research should focus on innovative solutions like adaptive technologies and AI integration to address digital fatigue while leveraging the benefits of digital tools for sustainable productivity and mental

health. Also, there is a need for longitudinal and experimental studies to better understand digital fatigue dynamics over time and under controlled conditions. These studies should aim to isolate the effects of various communication modes on digital fatigue and examine potential moderating factors such as work environment, employee demographics, and organizational culture.

Conflict of interest

The authors declare no conflict of interest.

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