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From Technostress to Disengagement: A Conceptual Framework for Workplace Learning Interventions and Resource Protection

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ABSTRACT: Digital work intensification and rapid artificial intelligence adoption have made technostress a persistent challenge to business productivity and employee well-being. Although its psychological consequences are widely acknowledged, its systemic implications for employee adaptation and workplace learning remain under-examined. This conceptual paper develops a framework linking technostress to work engagement through emotional exhaustion, with particular attention to the implications of digital overload for formal and informal workplace learning. Integrating Conservation of Resources (COR) theory and the Job Demands–Resources (JD-R) model, the paper proposes that persistent technological demands deplete employees' psychological resources, leading to emotional exhaustion and reduced vigour, dedication, and absorption. These outcomes may subsequently undermine employees' participation in workplace learning and continuous professional development. Building on these theoretical relationships, the paper introduces a Dual-Level Intervention Model that outlines organizational-level upskilling initiatives and individual-level employee counselling strategies to help mitigate technostress and sustain a learning-oriented work environment. The proposed framework positions emotional exhaustion as a proximal mechanism connecting technostress with work engagement and its potential implications for workplace learning. The paper contributes to the literature by integrating established theoretical perspectives into an actionable framework for learning designers, training supervisors, and organizational practitioners. As a conceptual contribution, the proposed relationships and interventions require empirical validation and may vary across occupational contexts and technological environments.

1. INTRODUCTION

The nature of the demand that is made on employees in all industries across the globe has fundamentally changed in recent years, driven by the speed of digitisation of work, as well as remote and hybrid working, constant connectivity, and, more recently, artificial intelligence (AI) tools (Rashid and Kausik, 2024). The accelerating pace at which these technical systems evolve frequently outstrips an organization's structural capacity to educate and train staff to use them sustainably. Decision-making, communication and work productivity are actively supported by digital technologies; and their adoption is associated with a heavy psychological burden on the workforce that is expected to operate in the future (Tursunbayeva and Chalutz-Ben

Gal, 2024). These are “hyper-connected” environments, such as email, messaging services, and ongoing case management and AI-enabled tools, which regularly pursue employees after work hours have ended.

This psychological burden has been examined in terms of the concept of technostress, which refers to the systematic stress, anxiety and negative feelings that result from the inability to manage the speed, complexity and intrusiveness of technology in the workplace (Ragu-Nathan et al., 2008). There is a significant amount of literature that has been published on the correlation between prolonged technostress and poor employee mental health and well-being, such as clinical anxiety, burnout and a decrease in life satisfaction (La Torre et al., 2019; Kim and Lee, 2024). However, what is missing in existing workforce development studies is a well-defined psychological process by which this degradation takes place. Clarity is needed with respect to the structural underpinning of technostress on work engagement, specifically mapping how these resource strains limit an employee's capability to deploy the three core dimensions vigour, dedication, and absorption—within workplace learning environments.

This question holds critical value beyond academic theory. Work engagement serves as one of the most robust predictors of retention, organizational commitment and performance. Its erosion is frequently the earliest visible indicator of a developing workforce mental health issue, surfacing long before formal sickness-absence or clinical burnout diagnoses occur. Yet most existing workplace development frameworks remain anchored to late-stage, lagging indicators of performance disruption, equipping training coordinators to respond only once performance deficits are already established. For training supervisors, learning designers, and organizational leaders, a workforce that is quietly disengaging presents a far more complex professional development challenge than one that is overtly experiencing performance issues. This is because subtle disengagement rarely triggers standard performance improvement plans or traditional training development interventions. Consequently, a conceptual framework that maps the exact mechanism connecting technostress to disengagement provides direct, actionable value for how corporate training effectiveness is structurally designed, evaluated, and targeted. To date, technostress and work engagement have been studied separately as organizational issues, which has resulted in the under-theorisation of the mediating psychological states. This paper proposes a conceptual model by incorporating the theoretical concepts of Conservation of Resources (COR) theory (Hobfoll, 1989) and the Job Demands-Resources (JD-R) model (Bakker and Demerouti, 2007) placing emotional exhaustion as the central mechanism between technostress and reduced engagement. Moreover, it offers a two-tiered intervention model specifically designed for organizations, training managers, and corporate educators responsible for driving training effectiveness and workplace learning. This is a model to drive an operational plan to stop the resource depletion pathway before it reaches debilitating burnout. This paper includes a thorough literature review, theoretical foundation, description of the conceptual framework, description of the intervention model, implications for professional training and practice, and a conclusion.

1.1 Technostress as a Demanding Obstacle to Workplace Learning Skills

Technostress creators have been recognized in 5 dimensions of technostress: techno-overload, techno-complexity, techno-uncertainty, techno-invasion, and techno-insecurity (Ragu-Nathan et al., 2008). The pressure to work faster and longer because of the ability to work faster and longer is techno-overload; the blurring of boundaries between work and home, as people are constantly connected online, is techno-invasion; the feeling of being technically under-equipped is techno-complexity; the uncertainty surrounding rapid changes in technology is techno-uncertainty; the fear that technology will render one's job redundant is techno-insecurity. Each of these dimensions is considered a chronic job demand in the Job Demands-Resources (JD-R) model, as they are characteristics of the contemporary work context that require continued psychological investment, and that cause acute physiological and cognitive demands (Bakker and Demerouti, 2007).

Technostress is an occupational stressor for workforce development that systematically undermines personal and professional well-being and reduces job satisfaction and is significantly associated with clinical behavioural disorders and high turnover in productivity (La Torre et al., 2019). Even though the occurrence and characteristics of individual persons are likely to affect the intensity of the experience of technostress that leads to acute workplace burnout (Srivastava, Chandra and Shirish, 2015), the overall direction of the relationship (that is, increased technostress causes reduced psychological outcomes) is consistent across various occupational fields and geographic contexts around the world (Dragano and Lunau, 2020).

For corporate training specialists and educators, it is especially important to note that not every digital demand yields the same impact on learning skills. Technological pressures are evaluated as "challenging" in some facets and therefore stimulate

professional development and provide opportunities to acquire new skills, while other aspects are purely "limiting" and are detrimental to employees' psychological well-being (Ayyagari, Grover and Purvis, 2011). How much cognitive appraisal, whether seen as an opportunity to learn or a threat to life, an employee shows towards a digital demand determines how much it will turn into an operational strain. This highlights the importance of institutional training environments and coping mechanisms as much as the technology itself (Tarafdar, Cooper and Stich, 2019). Workplace learning refers here to both formal learning (training programmes, upskilling initiatives) and informal learning (experimentation, peer exchange, learning from daily tasks). It differs from work engagement: engagement is an energetic-motivational state, whereas learning is a behavioural and developmental process that engagement is expected to support. The framework therefore treats engagement as the proximal condition for learning, and learning as the downstream outcome.

1.2 Technostress as a Direct Driver of Emotional Exhaustion

Emotional exhaustion constitutes the core energy-depletion component of burnout, marking a psychological state where an individual's cognitive and affective resources are entirely spent (Maslach, Schaufeli and Leiter, 2001). Burnout is defined as organizational cynicism, emotional exhaustion, and decreased professional efficacy, directly related to unmanaged stressors in the workplace (Demerouti and Bakker, 2025). Similarly, Edú-Valsania, Laguía and Moriano (2022) define burnout as an occupational condition caused by systemic strain that occurs when constant and heavy demands at work and the continuous need for performance cause employees to feel emotionally depleted, structurally disconnected and lack confidence in their work.

This profound emotional depletion is well documented to be preceded by technostress. The forced, rapid digitalisation periods were found to increase the relationship between digital strain and emotional exhaustion, as shown by Buenadicha-Mateos, Sánchez-Hernández and González-López (2022). More recently, Zheng and Zhang (2025) expanded this paradigm to the field of AI, showing that as employees continuously evaluate the AI threat (AI awareness), this evaluation, in turn, mediated by job insecurity and work–family interference, led to severe emotional exhaustion. The discoveries make AI related technostress a more serious technical inconvenience into a psychological stressor with measurable emotional repercussions.

This modern reality supports the fundamentals of Info-Systems literature. Initial studies validating the technostress construct have found that technostress can consistently be used to explain high levels of role stress and reduced psychological functioning (Tarafdar et al., 2007). Such negative impact is persistent regardless of the technological configuration, the population of users and organizational settings (Tarafdar et al., 2011). This link has been relatively consistent over time and across general digital systems, educational personnel and modern AI contexts, thus establishing an effective and predictable risk relationship between technostress and exhaustion that requires specific behaviour interventions.

1.3 Emotional exhaustion and work engagement

Work engagement is a positive, fulfilled, work-centred attitude that is expressed through vigour, dedication and deep absorption (Schaufeli et al., 2002; Bakker et al., 2008). But as with emotional exhaustion, the motivational track (resources stimulating engagement) is structurally linked to the health-impairment track (excessive demands reducing exhaustion): Excessive demands leading to emotional exhaustion will actively reduce the important energy needed for active work engagement (Bakker and Demerouti, 2007).

This is not an exhaustive list of what is being considered the act of eroding. Pires (2025) employed moderated mediation modelling to demonstrate that, as expected, the state of acute job insecurity negatively affects both psychological well-being and active work engagement, altogether confirming that resource-threat states have a reliable impact on employee vitality. The negative consequences of chronic job insecurity, such as reduced job satisfaction, weakened organizational commitment and increased voluntary turnover intentions (Silla et al., 2010), follow an advanced cycle of resource depletion. Perceived job threats damage employee functioning in 4 different ways, according to a comprehensive meta-review by Shoss (2017): a stress pathway, a social-exchange pathway, a job-preservation-motivation pathway, and a proactive-coping pathway. Of these, the stress pathway is the most pertinent to the model proposed in this paper. It states that digital threats do not lead to a purely behavioural response but that, through the ongoing stress on emotions and depletion of psychological resources, work engagement can only be described as a collapse. It is a particularly valuable early diagnostic indicator for training specialists to design interventions before an absolute collapse in employee learning skills occurs.

1.4 Technostress, work engagement and mental health outcomes: evidence and gaps

The link between technostress and active work engagement is only recently starting to be resolved in empirical studies in the field of occupational health. In an analysis of educational personnel, Harunavamwe, Ward and Marange (2025) found technostress has a significant negative direct impact on work engagement, and POS partially mediates the relationship. Another parallel study by the same group of researchers found that technostress negatively affects workplace flourishing at a systemic level, primarily through work–family conflict and organisational support channels (Harunavamwe and Ward, 2022). Wadhwa et al. (2025) followed up this line of inquiry with contemporary A.I. systems and found that psychological wellbeing fully mediated the link between A.I.-inducing job insecurity and overall job performance. Critically, in each of these studies, emotional exhaustion occupies a different structural position than the one proposed here. In Zheng and Zhang (2025), emotional exhaustion is modelled as the terminal outcome of a serial mediation chain running through job insecurity and work–family interference, rather than as the mechanism transmitting technostress to a behavioural outcome such as engagement. In Harunavamwe et al. (2025) and Harunavamwe and Ward (2022), the mediating variables are external, resource-based constructs, perceived organisational support and work–family conflict, rather than an internal, energetic state. Wadhwa et al. (2025) mediate through general psychological well-being, a broader and less specific construct than emotional exhaustion, and link to job performance rather than engagement. This leaves a critical vulnerability in workplace learning models: if emotional exhaustion acts as an internal bottleneck that locks individuals into defensive energy preservation, then traditional training programs focused purely on technological mechanics or technical skills will fail. Organizations must first clear the emotional resource deficit through deliberate learning interventions before successful adaptive learning can take root; this is the precise gap this paper's framework addresses. This further suggests a mechanism whereby resources are depleted rather than a direct, unmediated behavioural change. More complexities arise in terms of how these technical requirements relate to cognitive effects. Kim and Lee (2024) demonstrated the importance of psychological self-efficacy as a key moderating factor in the relationship between AI adoption and the mental health of the workforce. Those with higher self-efficacy are well protected from the psychological consequences of fast digital transformations. This is a reminder to workplace trainers that self-efficacy is an important trainable state. Likewise, Zhang et al. (2025) have reported that the way employees cognitively perceive technostress as a constructive challenge or a destructive hindrance will determine whether technostress becomes acute job anxiety and/or reduces innovative behaviour. This reiterates the idea that the same digital needs result in very different psychological outcomes depending on how it is internally understood and taught. A synthesis of this literature reveals two components of the theoretical route advocated in this paper: Digital technostress leads to a systemic exhaustion state; This systemic exhaustion state leads to a loss of engagement of employees and psychological wellbeing. But, in the current study, emotional exhaustion has not been incorporated and analyzed as the direct and immediate intervening variable between technostress and work engagement within a single study. Existing research focuses largely on factors outside of the individual, such as organizational support (Harunavamwe, Ward and Marange, 2025), or factors within individuals, such as work–family conflict (Harunavamwe and Ward, 2022), or on state-level factors, such as general psychological wellbeing (Wadhwa et al., 2025). These are helpful, evidence-based avenues, but they do not isolate emotional exhaustion. This is a missing concept, as the Conservation of Resources theory and the Job Demands-Resources model anticipate exhaustion as the immediate, proximal response to chronic job demands. The creation of clarity here is readily and directly applicable to the workforce development process. If emotional exhaustion is the motivation, then isolated endeavours aimed at merely technological skill training or simple engagement attempts will be unsuccessful. They pretty much bypass a contracting state of mind going on inside them.

2. THEORETICAL FRAMEWORK

This conceptual framework is grounded in two complementary, internationally recognised theories: Conservation of Resources (COR) theory (Hobfoll, 1989) and the Job Demands-Resources (JD-R) model (Bakker and Demerouti, 2007). COR theory states that individuals are driven to invest in their psychological resources, including time, mental energy focus and feelings that they value, to develop, defend and invest in these resources. Stress is an acute response that occurs whenever these important resources are jeopardised, lost or invested without a corresponding psychological reward. Theoretically, technostress creators fit this. The emotional and mental reservoir of the employee is drained continuously because of the intrusive connectivity, complex digital systems and constant need to keep pace with the fast-changing technology. From a workforce development perspective, these psychological resources are not innate traits but attributes that need to be developed. If an individual cannot replace their digital resources in the number of resources lost, COR theory predicts a serious depletion condition. Emotional exhaustion, as represented by Maslach, Schaufeli and Leiter (2001) in occupational behaviour literature, is used to evaluate this

state. The JD-R model adds a two-pathway model of work dynamics. The path of health impairment is continuous digital and technostress with AI consumption of active resources. In the motivational pathway, however, structural job resources help to maintain work engagement. These two pathways are not separate, but for training coordinators and corporate learning specialists, they are of vital importance. Although the two theories are complementary, they play distinct roles in this framework. JD-R is a structural model: it classifies work characteristics as demands or resources and specifies two processes, health impairment and motivation. It identifies *what* is linked to *what* (technostress as a demand, engagement as a motivational outcome). COR is a process theory: it explains how depletion unfolds through the primacy of loss over gain, loss spirals in which depleted individuals become more vulnerable to further loss, and defensive resource conservation (Hobfoll, 1989). JD-R therefore supplies the architecture of the model, and COR supplies the mechanism that connects exhaustion to disengagement and the replenishment logic behind the interventions. The link from exhaustion to reduced engagement sits where the two meet: JD-R places both processes in one system, and COR explains why depletion in one suppresses the other. This is a critical period: the psychological depletion that occurs because of an overwhelming digital need is the same energy needed by the motivational process to energize employees' lives. So, the addition of an increasing exhaustion rate has a very strong suppressing effect on engagement downstream even in the presence of high baseline motivations. From the theoretical point of view, this intersection is valuable to study emotional exhaustion as a dynamic phenomenon, which can become a source of further technostress and a decrease in engagement. This pathway provides the right time for workplace practitioners to strategically plan the right interventions before getting into clinical burnout.

3. CONCEPTUAL FRAMEWORK

The widespread swift digitisation of the modern workplace has revolutionised the way work is done and created constant technostress on global workforces. Organisations deploy technological systems to improve productivity, but at the same time, they can be a great psychological risk when the organizational training and support mechanisms are not keeping up with it. This paper aims to fill this gap in the existing literature on workforce development by proposing a complete conceptual framework linking multi-dimensional technostress to the decline in employee work engagement through a proximal psychological mechanism.

Grounded in Conservation of Resources (COR) theory and the Job Demands-Resources (JD-R) model, the proposed framework positions **emotional exhaustion** as the core mediating transmission mechanism through which digital strains impair workforce vitality. The structural path of this model is visualised below:

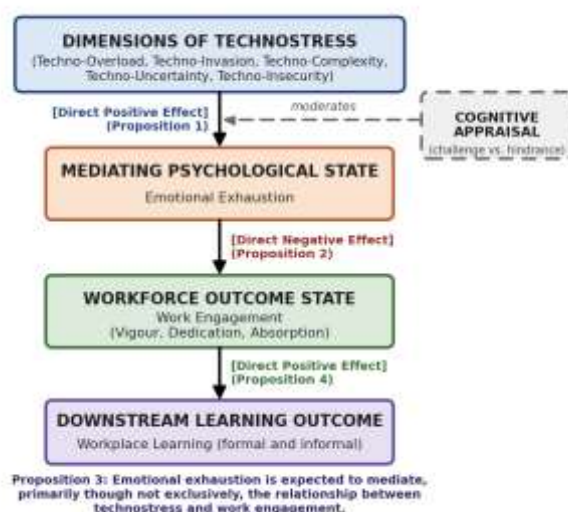


Figure 1. Conceptual model linking technostress, emotional exhaustion, work engagement and workplace learning, with cognitive appraisal as a moderator

Source: Authors' own creation

The model also incorporates workplace learning as a downstream outcome, and cognitive appraisal (challenge versus hindrance) as a moderator of the technostress–exhaustion path (Ayyagari, Grover and Purvis, 2011; Tarafdar, Cooper and Stich, 2019).

3.1 Synthesis of Conceptual Propositions

To operationalise the theoretical mechanics of the framework, the underlying links are formalised into four distinct propositions. These propositions translate the core tenets of COR theory and the JD-R model into clear, testable pathways. For corporate training specialists and educators, it is especially important to note that not every digital demand yields the same impact on learning skills. Table 1 synthesises the structural direction, core theoretical mechanisms, and operational focus of each pathway within the workforce development landscape.

Table 1 Synthesis of conceptual propositions

Proposition	Path direction	Theoretical framework	Core psychological mechanism	Operational training focus
P1: Technostress & Emotional Exhaustion	Direct positive	JD-R model & COR theory	Digital overstimulation, boundary erosion, and skills anxiety deplete finite cognitive and psychological assets faster than they can be replenished	Preemptive Resource Protection: Developing structured technical training and digital literacy to mitigate perceived skill gaps.
P2: Emotional Exhaustion & Work Engagement	Direct negative	JD-R model	Expendable psychological reserves force employees into a defensive, resource-preservation state, systematically suppressing vigour, dedication, and absorption.	Restorative Interventions: Creating dedicated cognitive recovery windows and psychological safety protocols to replenish spent energy.
P3: Emotional Exhaustion Mediation	Mediating transmission	Integrated COR–JD-R Matrix	Technostress functions as the structural environmental trigger; exhaustion is the proximal psychological manifestation of loss; disengagement is the behavioural outcome.	Targeted Framework Alignment: Moving away from generic motivation schemes toward interventions that actively interrupt the internal exhaustion cycle.
P4: Engagement and Workplace Learning	Direct positive	JD-R model	Engagement supplies the energy, absorption, and persistence needed for formal and informal learning; its erosion reduces learning participation and transfer.	Learning-Sustaining Design: Aligning training timing, load, and format with employees' energy state

Note: P1, P2, P3 and P4 denote Propositions 1–4, discussed in turn in the following section.

3.2 Framework Validation and Logic

3.2.1 The Stressor-to-Mediator Track (P1)

The five dimensions of technostress—overload, invasion, complexity, uncertainty, and insecurity together are a chronic, energy-depleting job demand in the health-impairment process of the JD-R model. Techno-overload ensnares workers into the need to process streams of data quicker and for longer, while techno-invasion tears down the cognitive walls required for a recovery period. At the same time, techno-complexity and techno-uncertainty foster constant dilemmas over skill shortages, through a never-ending cycle of software updates, and techno-insecurity undermines the stability of an employee's job in an automated system.

COR theory suggests that these multifaceted obstacles demand constant use of resources of limited cognitive capacity. If such a resource drain occurs on an ongoing basis, and organizational training, educational and recovery intervals are inadequate, employees experience psychological bankruptcy. This chronic loss of emotional and energy resources is directly reflected in emotional exhaustion.

3.2.2 The Mediator-to-Outcome Track (P2)

Work engagement is an energy-dependent psychological state requiring high levels of vigour, deep absorption, and intrinsic dedication. Within the motivational process of the JD-R framework, sustaining engagement is contingent upon the availability of surplus psychological and emotional capital.

When emotional exhaustion takes root, it drains the core energetic reserves required to maintain active engagement. An emotionally spent employee lacks the psychological capacity to exhibit vigour, becomes detached from their professional responsibilities (cynicism), and experiences a decline in felt professional efficacy. When employees are fatigued, their emotional resources are limited, and they move into the “defensive, resource preservation” mode and start investing less cognitively and emotionally in daily work to avoid further damage to their psychological assets.

3.2.3 The Mediated Transmission Pathway (P3)

According to COR theory and the JD-R model, the relationship between technostress and behavioural work engagement is expected to operate primarily, though not necessarily exclusively, through emotional exhaustion. While technostress is an environmental factor that starts the process of resource loss, emotional exhaustion is the structural indicator of that internal loss, and reduced work engagement is the behavioural, downstream consequence of the depletion of internal resources. Separating emotional exhaustion as the proximal mediator fills an important gap in the literature for corporate training specialists and educators. It shows that disengagement isn't a one-off behavioural problem or lack of motivation but is a direct byproduct of a continuous sequence of resource depletion that is unchecked.

3.2.4 The Engagement-to-Learning Track (P4)

Reduced engagement is expected to limit learning behaviour. Engagement is an energy-dependent state; as vigour, dedication, and absorption decline, employees are likely to participate less in formal training, experiment less, and transfer less learning to their work. This is a theoretically derived expectation, not an established finding, and it requires testing.

3.2.5 The Dual-Level Intervention Model for Resource Protection

The conceptual framework reflects the problem and its mechanisms: technostress produces emotional exhaustion, which in turn suppresses work engagement and downstream well-being. Relying on individual resilience alone is structurally insufficient. Breaking the technostress → emotional exhaustion → disengagement cascade requires a synchronized, multi-tier strategy built directly into workplace learning styles and upskilling frameworks.

Organisational-level tactics: The two levels target different points on the pathway. Organisational interventions act mainly on P1 by reducing the intensity of technostress creators and adding job resources, in line with the JD-R view that demands are best addressed at source. Individual interventions act mainly on P2 by helping employees conserve and replenish resources

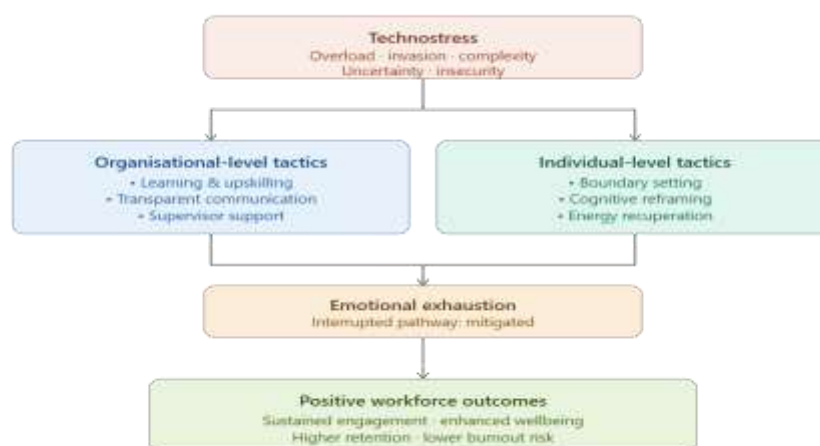
once some strain is unavoidable, in line with COR's replenishment logic. Neither level is sufficient alone: organisational changes cannot remove all digital strain, and individual strategies cannot compensate for structurally excessive demands.

Learning and upskilling. Structured, low-stakes upskilling programmes build professional self-efficacy, converting a perceived technological threat into a manageable developmental milestone (Kim and Lee, 2024).

Transparent communication. Clear communication about technological change, data usage and automation goals establishes workplace predictability and trust, lowering employee anxiety and psychological resistance (Glassberg, Brender-Ilan and Zwilling, 2025).

Supervisor support. Supervisor is an organisational resource that validates positive perceptions and emotional responses toward new technology; effective, human-centred leadership is essential to building trust and engagement during digital transformation (Atoyebi and Sopuru, 2025).

Figure 2. Dual-level intervention model for resource protection



Source: Authors' own creation

4. INDIVIDUAL-LEVEL TACTICS

Counselling and support. Where strain persists despite organisational adjustment, access to confidential employee counselling or structured coaching provides a space to address exhaustion before it generalises. Training supervisors need not deliver this support but should know when and how to refer, consistent with the early-warning approach in Section 5.

Boundary setting. Rigid boundaries between work and personal life are tied to greater interference between the two domains, while flexible but intentional boundaries are tied to better work–personal life enhancement (Bulger, Matthews and Hoffman, 2007). Because technostress-driven boundary erosion extends beyond the individual employee into the home environment, family members are often indirect stakeholders in this recovery process, and training content on boundary setting may usefully be extended to include guidance for employees on communicating digital boundaries within their household.

Cognitive reframing. Employees who shift from viewing digital tools as a competitor to viewing them as an assistive asset report lower skills anxiety and a more active, learning-oriented mindset (Wang and Lu, 2025).

Energy recuperation. Structured micro- and macro-recovery windows through the day preserve cognitive resources, preventing minor daily strain from consolidating into severe emotional exhaustion, consistent with the resource-replenishment logic of COR theory (Hobfoll, 1989).

Individual tactics. The individual-level tactics are likewise evidence-informed rather than validated technostress interventions. They draw on adjacent literatures (boundary management, cognitive reframing, recovery), and their effectiveness in reducing exhaustion specifically remains to be tested.

Operational synergy

Organisational tactics scale back the baseline intensity of technostress creators; individual tactics buffer the residual strain that unavoidable digital workloads still produce. Together, they are designed to interrupt the pathway before technostress depletes emotional capacity, protecting work engagement without relying on reactive clinical intervention alone.

5. DISCUSSION AND IMPLICATIONS

The propositions outlined above carry direct consequences for how formal and informal learning interventions are designed and executed in occupational settings. Most existing corporate education programs are built around recognizing late-stage, lagging indicators of performance failure or structural disengagement. The framework proposed here argues for shifting curriculum content earlier in the causal chain: training supervisors and managers of the training function to recognize early resource depletion. Practically, this means embedding the five technostress factors into manager-training content as concrete, nameable learning obstacles rather than treating digital change as a vague concern. A training supervisor equipped to spot techno-invasion or techno-uncertainty is positioned to intervene with learning skills adjustments long before exhaustion collapses team productivity. This proximal framing also has value for practitioner-facing assessment tools. Because vigour, dedication, and absorption are the first behavioural signals to erode under emotional exhaustion, tracking declines in these three learning skills offers training facilitators an early-warning marker that can be built directly into workplace employee counselling protocols. Unlike static performance evaluations that merely confirm a learning failure after it has occurred, engagement-decline indicators can be built into routine instructional check-ins, staff feedback cycles, or training supervision conversations as a proactive checkpoint layer. This gives practitioners a defensible basis for early, non-pathologizing conversations with employees, rather than intervention only once formal referral criteria are met. The same logic extends to supervision and referral pathways: where disengagement remains localised and appears linked to identifiable, addressable technostress creators, such as a specific software rollout, or a lack of transparent communication about automation, the appropriate response sits at the organisational level, drawing on the learning, communication and supervisor-support tactics described above (Atoyebi and Sopuru, 2025). Where exhaustion indicators persist despite these organisational adjustments, or an individual shows signs of the exhaustion state generalising beyond the digital trigger itself, this signals a point at which specialized internal professional upskilling tracks or structural training redesign interventions become appropriate.. Making this distinction explicit within workplace learning paths gives training managers a structured basis for deciding when a case remains an addressable upskilling matter and when it requires specialized organizational support tracks.

Finally, the framework points to a critical professional development need for training specialists themselves. Digital-era occupational strain driven by AI adoption, hybrid setups, and constant connectivity represents a comparatively new competency area. Many practitioners trained in traditional workplace learning models have limited grounding in technostress dynamics specifically. Embedding COR theory and the JD-R model's application to digital demands within continuing professional development programs ensures that the instructors responsible for delivering workplace learning interventions are themselves equipped to recognize and neutralize these modern barriers to training effectiveness.

6. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This framework is conceptual and has not yet been empirically tested; Propositions P1–P4 are theoretically derived from COR theory and the JD-R model and require validation through future quantitative research, such as cross-sectional or longitudinal surveys measuring technostress, emotional exhaustion and engagement directly. The model also treats emotional exhaustion as a uniform mediating mechanism, but individual differences already noted in the literature review, including self-efficacy (Kim and Lee, 2024) and cognitive appraisal of digital demands as either a challenge or a hindrance (Ayyagari, Grover and Purvis, 2011; Zhang et al., 2025), likely moderate the strength of this pathway and are not formally modelled here. Finally, the framework is presented as generalisable across occupational sectors, but its applicability may vary by industry, digital maturity, and cultural context; sector-specific replication is needed before the proposed dual-level intervention model can be considered validated practice guidance rather than a theoretical starting point. The framework is conceptual, and the proposed relationships (P1–P4) and the intervention mechanisms are theoretically derived and have not been empirically tested. Technostress is also unlikely to operate uniformly. Its effects may vary across occupations (for example, knowledge workers versus frontline staff) and technology environments (AI tools versus communication platforms, mandatory versus voluntary use, remote versus on-site work), and the generalisability of the model across these contexts is untested.

Future research should (a) test P1–P4 using longitudinal or diary designs that measure technostress, emotional exhaustion, engagement, and learning outcomes directly; (b) test whether the proposed interventions reduce exhaustion, and whether exhaustion carries their effect on engagement, using quasi-experimental or intervention designs; and (c) compare the model across sectors, occupations, and technology types.

7. CONCLUSION

Digital processes have been gaining in speed across all industries worldwide, making technostress a major concern in the workplace. The human resource cost is often found as silent disengagement while organizations quickly jump on new software or automation tools to boost productivity. The current paper has offered a conceptualisation that helps to shed light on the specific psychological mechanism implicated in this change. Together, the Job Demands-Resources (JD-R) and Conservation of Resources (COR) models reveal that digital strains can be more than a debilitating effect on employee motivation. Instead, they activate a pathway in a systematic way to compromise health and then lead to emotional fatigue. In this state of core energy depletion, workers are then lacking the psychological resources to maintain active work engagement (vigour, dedication and absorption). This paper suggests the Dual Level Intervention Model to stop this detrimental depletion cascade. Hyper-connected corporate ecosystems require more than individual resilience. Instead, it requires a system of organizational tactics and individual asset conservation strategies. The priority in the organizational setting is to ensure the continuing process of learning, an open, transparent operating context and proactive support from supervisors to establish stable resource buffers. At the personal level, training programs must include skill sets for boundary management, cognitive reframing, and structured energy recuperation. This approach is readily applicable to learning supervisors, training designers, HR educators, and organizational leaders in general. It shifts the focus of operations from late-stage reactive clinical treatments or superficial motivational campaigns. Instead, it directs professional development activities towards a key middle ground: keeping the workforce from losing their vitality through emotional burnout. These pathways are conceptual and should be treated as hypotheses requiring empirical validation, including testing of the intervention mechanisms and variation across occupations and technology environments. To further inform targeted mental health training and sustainable workforce development protocols, these pathways should be replicated in other occupational areas by empirical studies in the future.

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Author Contributions

Shivika Soni: Conceptualization, Literature Review, Theoretical Framework Development, Writing, Original Draft Preparation.

Dr Divya Goel: Supervision, Validation, Writing—Review & Editing.

All authors have read and approved the final manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethics Statement

Ethical approval was not required for this study because it is a conceptual paper based on existing literature and does not involve human participants, animal subjects, or the collection of primary data.

Data Availability Statement

No new data were collected or generated for this conceptual study. The paper is based on a theoretical synthesis of existing literature, which is cited in the manuscript.

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