



The Digital Burnout Phenomenon: A Case Study on the Impact of Educational Technology on Teacher Well-being

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Received 23/12/2025

Revised 11/01/2026

Accepted 28/03/2026

Abstract

Background and Aim: The rapid acceleration of digital transformation in education has intensified concerns about teacher workload, stress, and professional well-being. Although educational technology is widely positioned as a key mechanism for advancing Sustainable Development Goal 4, less attention has been given to how digital reforms are framed in relation to teachers' psychosocial working conditions.

Materials and Methods: This study examines the "digital burnout" phenomenon through a qualitative document analysis of secondary sources published between 2020 and 2025. The dataset consists of purposively selected policy reports, research syntheses, and professional publications produced by international organizations, governmental agencies, unions, and professional associations. Using directed content analysis guided by the Job Demands–Resources (JD-R) model, the study analyzes how digital demands and leadership-related resources are represented across these documents. AI-assisted qualitative data analysis software was used as an analytic instrument to support systematic coding, pattern identification, and data management, with researcher-led validation procedures applied to enhance analytic trustworthiness.

Results: The synthesis suggests that while digital competence and innovation are emphasized in education policy discourse, the reviewed literature consistently documents increased digital workload, blurred work–life boundaries, and limited institutional safeguards for teachers. Reports further indicate that leadership practices such as workload regulation, professional autonomy, and policies supporting a "right to disconnect" are frequently identified as mitigating resources.

Conclusion: The study concludes that teacher well-being is framed across the literature as a necessary condition for sustainable digital education reform and should be more explicitly embedded within digital transformation policies.

Keywords: Teacher well-being; Digital burnout; Educational technology; Leadership; Job Demands–Resources model

Introduction

The global commitment to sustainable development positions education as a central driver of social, economic, and human advancement. Within the United Nations' 2030 Agenda (United Nations, 2020), Sustainable Development Goal (SDG) 4 emphasizes inclusive and equitable quality education, while SDG 3 foregrounds health and well-being as foundational to societal resilience. International policy frameworks increasingly acknowledge that these goals are interdependent: the provision of quality education depends not only on access, infrastructure, and innovation, but also on the well-being, stability, and retention of the teaching workforce (UNESCO, 2023). This normative alignment establishes teacher well-being as a policy concern of global relevance rather than an individual or peripheral issue.

Parallel to these commitments, education systems worldwide have undergone accelerated digital transformation, particularly since 2020. Authoritative institutional reports from UNESCO, the OECD,





and the European Commission (European Commission Joint Research Centre. (2023) describe digitalization as a systemic shift encompassing governance, curriculum, assessment, and professional practice, rather than merely the adoption of discrete tools (OECD, 2023; UNESCO, 2025). Within this policy discourse, educational technology is frequently framed as an enabler of SDG 4 by expanding access, improving efficiency, and supporting innovation. However, while the benefits of digital transformation for learners are extensively articulated, its implications for teachers' working conditions are addressed less consistently and often indirectly.

A growing body of peer-reviewed research and large-scale institutional studies has documented that teacher well-being is closely associated with workload, professional autonomy, leadership support, and organizational climate (Skaalvik & Skaalvik, 2021; OECD, 2021). Within this literature, digitalization emerges as a significant contextual factor shaping teachers' job demands. Studies on technostress indicate that sustained exposure to digital systems can intensify workload, blur work–life boundaries, and generate cognitive and emotional strain, particularly when implementation is rapid or insufficiently supported (Fernández-Batanero et al., 2021; Passey, 2021). These findings suggest that digital technologies are not neutral additions to teaching work but may function as structural job demands within contemporary education systems. At the same time, much of the available empirical evidence on digital stress and burnout is fragmented across disciplines or focused on specific tools, contexts, or national settings. Moreover, while unions, professional organizations, and advocacy groups have produced influential reports highlighting burnout, attrition, and digital overload, these sources often adopt normative or rights-based positions that are not systematically integrated with policy analysis. As a result, there remains a need for research that synthesizes how teacher well-being and digital transformation are collectively framed across authoritative policy documents, research syntheses, and professional publications, rather than measuring individual outcomes directly.

Addressing this gap, the present study adopts a document-based qualitative content analysis to examine how teacher well-being is represented within the discourse of digital education reform between 2020 and 2025. Rather than conducting a field-based mixed-methods investigation, this study focuses on secondary sources, including policy reports, institutional studies, and professional publications issued by intergovernmental organizations, governmental agencies, research bodies, unions, and professional associations. This design allows for systematic examination of dominant narratives, assumptions, and recommended leadership practices at the policy and systems level.

Guided by the Job Demands–Resources (JD-R) model, the study analyzes how digital transformation is constructed as a source of job demands such as workload intensification, techno-invasion, and continuous upskilling and how leadership-related resources, including professional autonomy, workload regulation, and well-being safeguards, are positioned as mitigating mechanisms. By consolidating and analyzing these framings across a defined corpus of documents, the study aims to clarify the policy-level relationship between digital transformation and teacher well-being and to identify leadership practices that are consistently presented as protective within the literature. In doing so, the paper situates teacher well-being not as an outcome measured at the individual level, but as a structural condition shaped by governance, leadership, and policy choices in digitally transforming education systems.

Objectives

This study aims to systematically examine how teacher well-being is framed within the discourse of digital education reform through a qualitative content analysis of secondary documents published between 2020 and 2025. Specifically, the study seeks to:

1. **To analyze how teacher well-being and digital transformation are conceptualized and linked** in official education policy documents and institutional reports produced by major international and regional bodies (including UNESCO, OECD, the European Union, and related agencies) during the period 2020-2025.

2. **To identify and categorize leadership-related safeguards and practices** recommended in policy reports, research syntheses, and professional publications to address digital workload,





technostress, and work-life boundary erosion, using a directed coding scheme informed by the Job Demands Resources (JD-R) model.

3. **To examine the dominant assumptions and problem framings** underpinning these recommended leadership practices, including how digital demands are defined and what forms of organizational or policy-level resources are positioned as mitigating mechanisms.

4. **To assess the extent to which a rights-based perspective on teacher well-being is articulated** across the analyzed documents, with particular attention to references to labor protections, professional autonomy, duty of care, and emerging concepts such as the “-right to disconnect within education-sector discourse.

Literature review

Digital Transformation in Education: Descriptive Policy Trends and Analytical Gaps (2020–2025)

Since 2020, international education policy discourse has consistently framed digital transformation as a systemic and irreversible shift. Across official reports issued by UNESCO (2021), the OECD, and the European Commission (European Commission, 2020), digitalization is described not merely as the adoption of instructional technologies but as a reconfiguration of education systems encompassing governance, curriculum, assessment, and professional practice. In these documents, digital transformation is positioned as a key mechanism for advancing educational access, continuity, and innovation, particularly in the context of pandemic disruption and post-pandemic recovery.

Treating these policy documents as empirical data reveals a recurring pattern in how teacher well-being is positioned relative to digital reform. Across OECD and UNESCO publications, teacher well-being is typically acknowledged as important, yet it is most often framed implicitly embedded within discussions of capacity-building, professional development, or system resilience rather than articulated as a primary policy objective. For example, competence frameworks emphasize continuous upskilling, adaptability, and digital fluency, while references to workload, stress, or psychosocial impact remain secondary or conditional. This descriptive trend suggests that while digital transformation is framed as a strategic priority, teacher well-being is more frequently treated as an enabling condition or downstream concern rather than a core design parameter.

Analytically, this framing creates what several scholars describe as a competence–reality gap: policies prioritize technological capability and system efficiency while under-specifying the organizational conditions under which teachers are expected to enact these reforms. Rather than asserting misalignment normatively, this study approaches misalignment as an emergent pattern in the corpus observable through the relative frequency, placement, and specificity of references to digital demands versus well-being safeguards in policy texts.

Technostress and the Conceptual Status of “Digital Burnout”

Research on teacher well-being has long documented occupational burnout as a multidimensional syndrome involving emotional exhaustion, depersonalization, and reduced professional efficacy. Within the context of digitalized work, however, scholars have increasingly focused on technostress as a more precise construct. Seminal work defines technostress as stress experienced due to the use of information and communication technologies, operationalized through well-established dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. These dimensions have been empirically validated across occupational contexts and are commonly measured using standardized survey instruments.

By contrast, the term digital burnout does not yet correspond to a widely accepted or standardized measurement scale. In the literature and professional discourse reviewed for this study, digital burnout appears primarily as a thematic or interpretive label rather than a distinct clinical or psychometric construct. It is used to describe the cumulative impact of sustained digital demands particularly workload intensification and boundary erosion on teachers’ emotional and cognitive well-being. This distinction is critical for a document-based study: claims about prevalence or severity are not derived from direct measurement but from how burnout-related outcomes are described, inferred, or emphasized across reports, surveys, and policy analyses.





Accordingly, this study treats digital burnout as a conceptual synthesis emerging from document discourse, grounded in established technostress dimensions but not asserted as a discrete, measurable syndrome. Document-based evidence is therefore used to identify how frequently and in what contexts burnout-related consequences such as exhaustion, attrition intent, or disengagement are associated with digital demands, rather than to estimate their empirical magnitude.

Operationalizing the Job Demands–Resources (JD-R) Model as an Analytic Framework

The Job Demands-Resources (JD-R) model provides a robust theoretical structure for examining how work characteristics influence well-being. Rather than serving as a general backdrop, the JD-R model is operationalized in this study as a directed coding framework guiding document analysis. Within this approach, digital transformation is examined through its representation as a source of job demands, while leadership practices and organizational policies are examined as potential job resources.

Across the reviewed corpus, several categories of digital job demand recur consistently: increased administrative workload associated with digital platforms, expectations of constant availability, continuous upskilling requirements, and the cognitive load of managing multiple systems. These demands align closely with established technostress dimensions. Conversely, job resources are framed in terms of leadership support, professional autonomy, workload regulation, access to training, and institutional policies that protect work-life boundaries.

Technostress is conceptualized within the JD-R framework as a mediating condition linking digital demands to implied outcomes such as exhaustion, burnout, reduced job satisfaction, and attrition intent. While the documents rarely use JD-R terminology explicitly, the model provides a coherent analytic lens for interpreting how demands, resources, and outcomes are discursively connected across policy and professional texts. This operationalization enables systematic comparison of how different documents emphasize or omit specific pathways within the JD-R process.

Leadership, Duty of Care, and the Right to Disconnect as Discursive Constructs

Leadership emerges across the literature as a central mediating factor in the relationship between digital transformation and teacher well-being. However, the way leadership responsibility is framed varies significantly by document type and institutional origin. Rather than treating concepts such as duty of care and right to disconnect as normative prescriptions, this study examines them as discursive constructs deployed by different actor groups.

Intergovernmental and governmental policy documents tend to frame leadership responsibility in managerial and systemic terms, emphasizing supportive environments, professional development, and system coherence. In contrast, union and professional association publications more frequently frame leadership obligations through a rights-based lens, explicitly invoking labor protections, regulated working time, and enforceable boundaries around digital communication. Survey-based reports often bridge these perspectives by linking leadership practices to reported well-being outcomes, such as stress or intent to leave.

Comparatively analyzing how these constructs are used by whom, in what contexts, and with what implied solutions allows the study to move beyond advocacy toward evidence-based synthesis. Patterns of frequency, co-occurrence, and narrative emphasis across the corpus provide insight into how leadership responsibility for digital well-being is negotiated within contemporary education discourse.

Synthesis and Research Gap

Taken together, the literature reveals a consistent tension: digital transformation is framed as essential and inevitable, while teacher well-being is acknowledged but unevenly operationalized within policy and leadership discourse. Existing research offers strong empirical foundations for understanding technostress, yet policy documents often abstract or diffuse these findings into generalized commitments without specifying enforceable safeguards. By systematically analyzing how digital demands, leadership resources, and well-being outcomes are framed across authoritative documents, this study addresses a critical gap between empirical research, policy rhetoric, and professional advocacy in the digital education landscape.





Theoretical Framework

The theoretical framework for this study will be grounded in the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007), which provides a robust lens for understanding the phenomenon of teacher burnout. This model posits that employee well-being and burnout are influenced by the interplay of two primary categories of work characteristics: job demands and job resources.

Job Demands are the physical, psychological, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological or psychological costs. In the context of this study, job demands are represented by the challenges and stressors related to the integration of educational technology. This includes technostress, a specific form of demand characterized by the anxiety, fatigue, and feeling of being overwhelmed due to the use of technology. The content analysis will identify how policy documents and professional publications frame these demands, such as increased workload, the need for continuous upskilling, and a lack of technical support.

Job Resources are the physical, psychological, social, or organizational aspects of the job that are functional in achieving work goals, reducing job demands and the associated physiological and psychological costs, and stimulating personal growth, learning, and development. For this research, job resources will be the supportive leadership practices, professional development opportunities, and organizational policies identified in the content analysis. These resources, when properly framed and implemented, are expected to buffer the negative impact of job demands and contribute to teacher well-being.

The JD-R model predicts that high job demands combined with low job resources lead to burnout, while high job resources can foster engagement and well-being. By analyzing how different documents discuss these demands and resources, the study will build a theoretical framework for how education leadership's response to technology integration influences teacher well-being, contributing to a deeper understanding of the "digital burnout" phenomenon.

H1 (Discursive Framing of Digital Demands). Policy documents, research syntheses, and professional publications from 2020-2025 increasingly frame techno-invasion and digital workload intensification as primary pathways through which digital transformation is associated with teacher exhaustion and burnout-related outcomes.

H2 (Leadership and Policy Safeguards as Mitigating Resources). Across the analyzed corpus, leadership practices and organizational policies such as workload regulation, professional support structures, and boundary-setting measures are consistently framed as job resources that mitigate the negative effects of digital demands on teacher well-being.

H3 (Professional Autonomy and Rights-Based Protections). Documents that emphasize teacher autonomy, duty of care, and rights-based protections including references to the right to disconnect more frequently frame digital transformation as compatible with teacher well-being than documents that focus primarily on technological efficiency or system performance.



Conceptual Framework

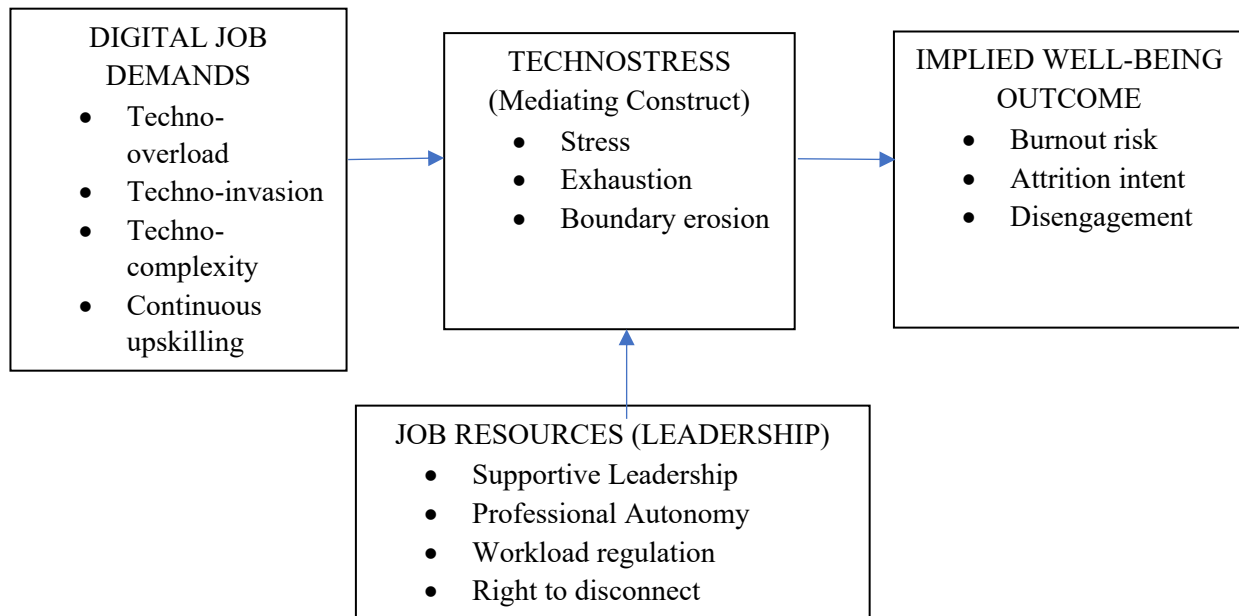


Figure 1. Conceptual Framework

To ensure analytic rigor, each component of the framework is operationalized through observable textual indicators rather than individual-level measurement.

Digital Job Demands. In the analyzed documents, digital job demands are identified through explicit references to increased workload, after-hours availability, administrative burden linked to digital platforms, rapid technological change, and continuous skills upgrading. Indicators include terms such as *digital overload*, *24/7 connectivity*, *blended workload*, *platform fatigue*, and *technology-driven administrative demands*.

Technostress (Mediating Construct). Technostress is operationalized through language describing psychological or cognitive strain associated with technology use, including stress, exhaustion, anxiety, fatigue, and boundary erosion. References to burnout, emotional exhaustion, or mental health concerns attributed to digital work are coded as manifestations of this mediating condition.

Job Resources (Leadership and Policy Supports). Job resources are identified through references to leadership practices and institutional mechanisms that aim to reduce digital strain or enhance professional agency. These include leadership support, workload management strategies, professional autonomy, access to training, psychosocial support, and formal policies such as limits on after-hours communication or the right to disconnect.

Well-Being Outcomes (Implied). Because this study does not measure teacher outcomes directly, well-being is inferred through discursive signals such as references to burnout risk, teacher attrition, intent to leave, disengagement, morale decline, or workforce sustainability concerns. Positive framing includes references to resilience, retention, engagement, or sustainable teaching conditions.

Scope and Limitation

The scope is to systematically analyze a specific body of online documents to understand how education leadership, well-being, and technology are framed in policy and professional discourse. This approach is limited by the availability and accessibility of public online documents; it does not capture the on-the-ground experiences of teachers. The findings are restricted to what has been published and



may not reflect unpublished or institutional realities. Both studies are limited by the rapid evolution of technology and the potential for a snapshot view that may not remain current as new tools and policies emerge.

Significance of the Study

The significance of this study, *The Digital Burnout Phenomenon: Investigating the Impact of Educational Technology on Teacher Well-being*, can be understood by its potential impact on various stakeholders:

For Teachers. The study gives a voice to educators, validating their struggles with technology-related stress and burnout. By providing data-driven evidence and qualitative narratives, the research can lead to a greater awareness of their challenges and inform the development of concrete support systems, professional development, and healthier work environments.

For School Administrators and Leaders. The findings will provide actionable insights for school leadership. By identifying the specific practices and policies that contribute to or mitigate digital burnout, the study can help administrators make informed decisions about technology integration, resource allocation, and supportive leadership strategies to improve teacher well-being and retention.

For Policymakers. The research will directly contribute to global education policy by providing a deeper understanding of the challenges associated with achieving Sustainable Development Goals (SDGs) 3 and 4. The results can inform the creation of national and regional policies that promote a holistic approach to education, balancing the push for digital transformation with the critical need to support the well-being of the teaching workforce.

For the Academic Community. This study addresses a significant gap in the existing literature by exploring the nuanced relationship between technology use, technostress, and digital burnout. By employing a mixed-methods or content analysis approach, it offers a novel contribution to the field, providing a comprehensive framework for future research on the psychological impacts of educational technology.

Methodology

RESEARCH DESIGN

This study adopts a qualitative document-based content analysis research design to examine how teacher well-being is framed within the discourse of digital education reform. This design is selected as the most appropriate approach given the study's reliance on secondary textual data, including policy documents, institutional reports, research syntheses, and professional publications, rather than primary data collected directly from teachers or school leaders.

Rationale for the Research Design

A document-based content analysis is well suited to studies that aim to analyze policy narratives, institutional priorities, and discursive patterns across authoritative sources. In the context of this research, the central objective is not to measure teachers' lived experiences or to test causal relationships, but to systematically examine how digital transformation, leadership practices, and teacher well-being are constructed, linked, and problematized across influential education documents published between 2020 and 2025. Alternative designs, such as survey-based or mixed-methods approaches, would require direct engagement with participants and the use of psychometric instruments to measure burnout, technostress, or job satisfaction. While such designs are appropriate for individual-level outcome studies, they are not aligned with the present study's focus on policy-level framing and leadership discourse. Accordingly, a qualitative content analysis allows for rigorous examination of how assumptions about digital demands and well-being are embedded in policy texts and professional guidance.

Type of Content Analysis

The study employs a directed qualitative content analysis, guided by the Job Demands–Resources (JD-R) model. Directed content analysis is appropriate when existing theory provides a structured framework for interpreting data while allowing for the identification of emergent themes. In





this study, the JD-R model functions as an analytic engine, informing the development of a priori coding categories related to:

- *Digital job demands* (e.g., techno-overload, techno-invasion, continuous upskilling),
- *Job resources* (e.g., leadership support, professional autonomy, workload regulation),
- *Technostress as a mediating construct*, and
- *Implied well-being outcomes* (e.g., burnout risk, attrition intent, disengagement).

At the same time, inductive sub-codes are used to capture context-specific or unexpected patterns that arise within the documents.

Scope and Unit of Analysis

The unit of analysis in this study is the document, defined as a discrete policy report, institutional publication, research synthesis, or professional/union report issued by recognized organizations involved in education governance, research, or advocacy. The scope of analysis is delimited to documents published between 2020 and 2025, a period marked by accelerated digital transformation in education systems globally.

The study focuses on documents produced by:

- International and regional intergovernmental organizations (e.g., UNESCO, OECD, European Union),
- National or regional government agencies,
- Research institutions and think tanks, and
- Professional and union organizations representing educators.
- Analytic Logic and Trustworthiness

Rather than testing hypotheses in a statistical sense, the research design supports analytic propositions concerning how digital demands, leadership resources, and well-being outcomes are framed across documents. Analytic rigor is ensured through transparent corpus construction, systematic coding procedures, and iterative comparison across document types. AI-assisted qualitative data analysis software is used as an analytic instrument to support data management, coding consistency, and pattern identification. Final coding decisions, thematic refinement, and interpretation remain researcher-led to ensure credibility and reflexivity.

Alignment with the Study's Purpose

By adopting a document-based qualitative content analysis, this research design ensures full coherence between the study's aims, data sources, analytic framework, and claims. The design enables the study to contribute an evidence-based synthesis of how teacher well-being is positioned within digital education reform discourse, offering insights relevant to policymakers, education leaders, and researchers concerned with sustainable and human-centered digital transformation.

RESEARCH ENVIRONMENT

In the context of a study that exclusively uses readily available online materials as its data sources, the research environment is not a physical location but a digital space. This virtual environment comprises a vast and complex network of information, where the data exists in the form of official policy documents, academic journals, reports from non-governmental organizations, and other professional publications accessible via the internet. This study's field is therefore this curated online landscape, rather than a specific school or classroom. This digital environment provides a unique opportunity to access a wide range of perspectives and policies from multiple countries and organizations, allowing for a broader, more comparative analysis than would be possible in a traditional, single-location study. The primary limitations and considerations of this environment are related to the accessibility, credibility, and availability of the information, as you will be dependent on what is publicly shared and archived online by various institutions.

SOURCES OF DATA AND SAMPLING

The population for this study consists of authoritative policy, research, and professional documents that address digital transformation and teacher well-being within the education sector.

Definition of the Document Population

The document population is defined as publicly available, English-language documents published between January 2020 and December 2025 that explicitly address one or more of the following themes:





digital transformation in education, teacher well-being, workload, technostress, leadership practices, or workforce sustainability.

The population includes documents produced by the following categories of institutions:

1. Intergovernmental and Regional Organizations: Policy reports, monitoring reports, and working papers issued by bodies such as UNESCO, the OECD, the United Nations system, the European Union, and affiliated research units (e.g., Joint Research Centre).
2. Governmental and Quasi-Governmental Agencies: National or regional policy briefs and education reports that are cited or referenced within international policy discourse.
3. Research Institutions and Peer-Reviewed Sources: Research syntheses, working papers, and peer-reviewed journal articles published by recognized academic publishers and research organizations that examine digitalization, technostress, leadership, or teacher well-being.
4. Professional and Union Organizations: Survey reports, policy position papers, and professional guidance documents produced by teacher unions, professional associations, and education-sector advocacy bodies, where these documents provide empirical survey data or systematic analysis rather than opinion pieces.

Inclusion and Exclusion Criteria

To ensure transparency and replicability, documents were included if they met all of the following criteria:

- Publication date: 2020–2025
- Language: English
- Relevance: Explicit discussion of digital education reform and its implications for teachers, leadership, workload, or well-being
- Institutional credibility: Issued by recognized international organizations, government bodies, academic publishers, or established professional/union organizations
- Analytic substance: Contained empirical findings, systematic reviews, policy analysis, or structured survey results

Documents were excluded if they:

- Were purely promotional, journalistic, or opinion-based without analytic content
- Focused exclusively on student outcomes or technical system design with no reference to teachers or leadership
- Lacked identifiable authorship, institutional affiliation, or publication provenance

Geographic Coverage

The study adopts a global and comparative scope, drawing primarily on international and regional documents that synthesize evidence across multiple countries. While some documents focus on specific national or regional contexts (e.g., European Union or East Asia), the emphasis is on sources that inform transnational education policy discourse, rather than single-site case studies.

Scope of Analysis and Bias Mitigation

The scope of analysis is intentionally delimited to high-level policy and professional discourse, rather than classroom-level practice or individual teacher experience. This delimitation aligns with the study's purpose of examining how teacher well-being is framed within digital education reform at the systems and leadership level. To mitigate selection bias and avoid "cherry-picking," document selection followed a purposive but criterion-based strategy, guided by predefined inclusion thresholds and cross-referencing across institutional sources. Documents were analyzed comparatively across institution types intergovernmental, governmental, academic, professional to ensure balanced representation of perspectives.

RESEARCH INSTRUMENT

The primary research instrument for this study is an AI-assisted qualitative data analysis (QDA) platform within the class of established qualitative analysis software (e.g., NVivo-, ATLAS.ti-, or MAXQDA-type environments) that integrates machine-learning-supported analytic functions. The platform was used to support data management, initial pattern detection, and coding organization, while all substantive analytic decisions remained researcher-led.





Instrument Capabilities and Configuration

The AI-assisted QDA platform was configured to perform the following supportive analytic functions:

- Text segmentation and indexing to enable systematic navigation of large policy and report documents
- Keyword frequency and co-occurrence analysis to surface recurring terms related to digital demands, leadership practices, and well-being
- Topic clustering and pattern suggestion, used to identify candidate thematic groupings across documents
- Code suggestion features, where available, to propose potential code labels based on textual similarity

These functions were used exploratory and confirmatory, not deterministically. The AI did not generate final codes, themes, or interpretations, nor did it autonomously apply coding without researcher review.

Role of the Researcher

The researcher retained full responsibility for all analytic judgments, including:

- Developing the initial directed coding scheme based on the Job Demands–Resources (JD-R) model
- Reviewing, accepting, modifying, or rejecting AI-suggested codes or clusters
- Conducting manual coding and recoding of documents
- Interpreting relationships among digital demands, job resources, technostress indicators, and implied well-being outcomes

AI outputs were treated as analytic prompts, not as evidence.

Bias Mitigation and Validation Procedures

To reduce the risk of automation bias and enhance analytic trustworthiness, the following validation steps were employed:

- **Manual Review of AI-Suggested Outputs**
All AI-generated topic clusters and code suggestions were manually reviewed against source texts. Suggestions that lacked conceptual alignment with the JD-R framework or the study objectives were excluded.
- **Test–Retest Coding Reliability**
A subset of documents was coded twice at different points in the analysis process. Coding consistency was reviewed to ensure stability of code application over time.
- **Negative Case Analysis**
Documents or passages that did not conform to dominant patterns (e.g., framing digital transformation without reference to stress or workload) were deliberately examined to refine or qualify emerging interpretations.
- **Audit Trail Maintenance**
Coding decisions, revisions to the codebook, and rationale for accepting or rejecting AI-assisted suggestions were documented to support transparency and replicability.

Appropriateness of the Instrument

The AI-assisted QDA platform was selected because it is well suited to managing a large and heterogeneous corpus of policy and professional documents. Its use enhanced analytic efficiency and pattern visibility while preserving interpretive rigor through researcher control. Consistent with qualitative research standards, the instrument functioned as a supportive analytic tool, not as a substitute for theory-driven interpretation.

RESEARCH TOOL

Coding Scheme and Codebook: This is the most critical tool. It is a structured set of rules and definitions for classifying and categorizing the content that will be analyzed. The coding scheme will define the themes and categories identified, such as "Emotional Labor," "Leadership Practices," and "Job Resources." The codebook is the detailed document that explains each code, provides examples, and outlines how to apply them consistently.





Sampling Criteria: This serves as a tool for defining the boundaries of the study. The criteria that have been already established such as publication date, keywords, and geographical focus—will act as a filter to ensure that the documents collected are relevant and manageable. This tool ensures that the analysis is focused and replicable.

Data Collection Protocol: This is a systematic procedure on finding and collecting the documents. It will include a list of specific databases, repositories, and websites that will be searched (e.g., university libraries, government ministry websites, NGO publication pages). This protocol ensures consistency in the data collection process and enhances the study's reliability.

Analytical Framework: This is the theoretical lens through which will interpret the data. The use of the Job Demands-Resources (JD-R) model is the analytical tool. It will guide the interpretation of the coded data by helping the researcher to identify patterns and relationships between job demands (like technostress) and job resources (like supportive leadership) as they are presented in the documents.

DATA COLLECTION

Sources and Retrieval of Documents

Data for this study consist of publicly available secondary documents collected from official institutional repositories, academic databases, and organizational websites. Primary sources included the official publication portals of intergovernmental and regional bodies (e.g., UNESCO, OECD, European Union), government and quasi-government agencies, peer-reviewed academic journals accessed through established databases, and professional or union organizations representing educators. Documents were identified through targeted searches using predefined keywords related to digital transformation, teacher well-being, leadership, technostress, workload, and burnout. Searches were conducted directly within institutional repositories and academic databases to ensure source authenticity and traceability, rather than through automated web scraping or uncontrolled URL harvesting.

Document Capture and Storage Procedures

All included documents were manually downloaded in their original published formats primarily PDF and stored locally in a structured digital archive organized by institution type, publication year, and document category. Each file was assigned a unique identifier to support systematic tracking throughout the analysis.

For version control and reproducibility, the following metadata were recorded for every document:

- Full bibliographic citation
- Publishing institution and document type
- Publication date and, where available, DOI or report number
- Source URL and date of retrieval
- File version (publisher-issued PDF or archived copy)

Where documents were updated or revised by issuing organizations, the specific version analyzed was retained, and later revisions were not substituted after analysis commenced.

Corpus Finalization and Audit Trail

The final corpus was finalized prior to formal coding to prevent retrospective selection bias. An audit trail documenting search terms; source platforms, inclusion decisions, and exclusion justifications was maintained to enhance transparency and replicability. This corpus construction process ensures that findings are grounded in a clearly defined and reproducible set of texts.

Data Management and Preparation for Analysis

Following collection, documents were imported into qualitative data analysis software for coding and analysis. AI-assisted ingestion tools were used solely for data management purposes, such as organizing files, enabling text search, and supporting coding consistency. These tools did not autonomously retrieve documents from external URLs and were not used to generate or modify source content. All analytical decisions including coding, theme refinement, and interpretation were researcher-led. The role of AI was limited to supporting efficiency and organization, consistent with accepted qualitative research practices.

Ethical and Copyright Considerations

Because the study relied exclusively on publicly available documents, no human subject's approval was required. Copyrighted materials were used strictly for scholarly analysis under fair-use





principles. Documents were not redistributed, altered, or reproduced beyond short quoted excerpts with appropriate citation. Secure storage was maintained to prevent unauthorized dissemination.

DATA ANALYSIS

For this study, the analysis emphasized framing analysis, directed content analysis guided by the Job Demands–Resources (JD-R) model, and comparative analysis across document sources.

Unit of Analysis

The primary unit of analysis was the textual segment, defined as a paragraph or coherent section within a document that addressed digital transformation, teacher well-being, leadership practices, workload, or related outcomes. Whole documents served as the contextual unit for comparative analysis, while coding was applied at the paragraph or section level to preserve analytic precision and avoid overgeneralization.

Codebook Development

A hybrid coding approach was employed, combining deductive and inductive strategies.

1. Deductive Codes (A Priori). An initial codebook was developed based on the JD-R model and the study’s conceptual framework. Core deductive categories included:

1.1 Digital job demands (e.g., techno-overload, techno-invasion, continuous upskilling)

1.2 Job resources (e.g., leadership support, professional autonomy, workload regulation)

1.3 Technostress indicators (e.g., stress, exhaustion, boundary erosion)

1.4 Implied well-being outcomes (e.g., burnout risk, attrition intent, disengagement)

2. Inductive Subcodes (Emergent). During the first cycle of coding, inductive subcodes were added to capture context-specific framings, terminology, or policy mechanisms not fully anticipated in the initial codebook (e.g., digital well-being, duty of care, right to disconnect). All additions or refinements were documented to maintain an audit trail.

Coding Procedure

Coding proceeded in three iterative phases:

- First-Cycle Coding: Documents were coded using the initial codebook, with AI-assisted QDA tools supporting text retrieval and pattern suggestion. All coding decisions were made manually by the researcher.
- Second-Cycle Coding and Refinement: Codes were reviewed for overlap, redundancy, and conceptual clarity. Related codes were clustered into higher-order themes aligned with the JD-R framework. Definitions were refined to ensure consistent application across documents.
- Validation and Stability Checks: A subset of documents was recoded after a time interval to assess coding stability (test-retest reliability). Discrepancies were resolved through code definition refinement rather than frequency adjustment.

Framing Analysis

Beyond thematic coding, the study employed framing analysis to examine how digital transformation and teacher well-being were discursively constructed. This involved analyzing:

- How problems were defined (e.g., efficiency challenge vs. well-being risk)
- What causes were emphasized or downplayed
- Which solutions were foregrounded (technical fixes vs. leadership safeguards)
- How responsibility was allocated (individual teachers, school leaders, systems)

Framing analysis was particularly applied to policy documents, where tone and sentiment are often constrained. For this reason, generic sentiment analysis was not used as a primary analytic technique, as bureaucratic texts tend to exhibit low emotional variance and standardized language. Instead, meaning was derived from issue salience, emphasis, omission, and narrative positioning.

Cross-Source Comparative Analysis

To strengthen analytic depth and originality, findings were compared across document source categories, including:

- Intergovernmental and governmental policy documents
- Research and institutional reports
- Professional and union publications





This comparative analysis examined differences in how digital demands, leadership responsibilities, and well-being outcomes were framed, allowing identification of convergences, tensions, and contradictions across actor groups.

Handling Contradictions and Negative Cases

Documents or sections that diverged from dominant patterns such as those framing digital transformation primarily as a benefit without reference to workload or stress were treated as negative cases. These were analyzed to refine interpretations and avoid overgeneralization. Contradictions were reported analytically rather than resolved artificially, contributing to a more nuanced synthesis.

Analytic Output

The final stage of analysis involved synthesizing themes and framings across documents to address the research questions and analytic propositions. Findings were reported with attention to both frequency of themes and discursive significance, ensuring that dominant narratives and marginal perspectives were appropriately contextualized.

Results and Discussion

This section presents findings from the qualitative content analysis of the finalized document corpus. Results are organized according to the three research questions and are derived from directed coding (JD-R framework), framing analysis, and cross-source comparison. Patterns are reported in terms of frequency of concepts, differences across institution types, and temporal shifts between early-pandemic (2020–2021) and post-pandemic (2023–2025) documents. Illustrative excerpts are included to demonstrate how themes were discursively constructed in the analyzed texts.

Research Question 1: How are “teacher well-being” and “digital transformation” framed in official education policies and reports (2020–2025)?

Finding

Across the corpus, digital transformation is framed as a systemic necessity, while teacher well-being is framed as a conditional or enabling concern rather than a central design principle. Coding frequencies indicate that references to digital innovation, skills, platforms, and system efficiency appear substantially more often than explicit references to workload, stress, or psychosocial risk, particularly in intergovernmental policy documents.

Temporal comparison shows a notable shift: documents published in 2020–2021 primarily frame well-being in terms of emergency support and resilience, whereas documents from 2023–2025 increasingly reference burnout, workload sustainability, and “digital well-being,” though often without operational detail.

Interpretation

This pattern suggests a persistent asymmetry in policy discourse. While digital transformation is articulated as urgent and inevitable, teacher well-being is more often positioned as an outcome that may follow successful implementation rather than as a prerequisite for it. The shift toward more explicit acknowledgment of burnout in later documents reflects growing awareness but does not consistently translate into concrete safeguards.

Exemplar Evidence from the Corpus

- Early-pandemic policy documents emphasize continuity and adaptability, framing teachers as agents of rapid digital implementation with limited reference to workload constraints.
- Later reports introduce language such as *digital overload*, *work–life balance*, and *well-being risks*, but frequently situate these concerns within professional development rather than organizational redesign.

Implications

From a JD-R perspective, policy discourse emphasizes job demands associated with digitalization while under-specifying job resources required to mitigate them. This imbalance helps explain why leadership and institutional safeguards become more prominent in non-policy documents, as discussed in subsequent findings.





Research Question 2: What leadership practices are recommended to support teacher well-being during digital transformation?

Finding

Leadership practices are framed as key mitigating resources across the corpus, but their articulation varies systematically by document type. Coding comparisons show that:

- Intergovernmental and governmental reports emphasize supportive leadership in abstract terms (e.g., enabling environments, capacity-building).
- Professional and union publications more frequently specify concrete practices, including workload regulation, communication boundaries, and enforceable well-being policies.

Across all document types, leadership support is most frequently linked to workload management and professional autonomy, with fewer references to formal accountability mechanisms.

Interpretation

The comparative analysis indicates a discursive division of labor: policy documents tend to frame leadership as facilitative and aspirational, while professional and union sources frame leadership responsibility as operational and enforceable. This divergence suggests that the same leadership concept functions differently depending on institutional standpoint.

Exemplar Evidence from the Corpus

- Policy texts commonly reference leadership roles in supporting innovation without specifying limits on digital demands.
- Union and professional documents explicitly reference leadership obligations to regulate after-hours communication and protect non-working time.

Implications

Within the JD-R framework, leadership is consistently framed as a job resource, but the absence of specificity in policy discourse may weaken its buffering function. The findings highlight a gap between rhetorical commitment and operational guidance, with implications for implementation at the school level.

Research Question 3: What themes emerge regarding challenges and successes in promoting teacher well-being with technology?

Finding

Three dominant themes emerged across the corpus:

- Digital Workload Intensification – Frequent references to increased administrative tasks, platform management, and constant availability.
- Boundary Erosion – Recurrent framing of blurred work–life boundaries, particularly in survey-based and union documents.
- Rights-Based Framing – Increasing use of rights-oriented language (e.g., “duty of care,” “right to disconnect”) in professional and advocacy texts, with limited uptake in formal policy documents.

Negative case analysis identified a minority of documents primarily innovation-focused policy texts that frame digitalization exclusively as an efficiency gain, omitting references to stress or workload.

Interpretation

These themes indicate that while awareness of digital burnout is widespread, consensus on responsibility and remedy is fragmented. Rights-based framings emerge most strongly where documents are grounded in reported teacher experiences, suggesting that empirical proximity shapes discursive emphasis.

Exemplar Evidence from the Corpus

- Survey and union report explicitly connect digital demands to exhaustion and attrition risk.
- Policy documents more often reference sustainability and retention indirectly, without explicit causal framing.

Implications





The uneven distribution of rights-based language suggests that teacher well-being remains contested terrain within digital reform discourse. Without stronger integration of enforceable safeguards into policy narratives, leadership practices risk remaining aspirational rather than protective.

Knowledge Contribution

This study makes several substantive contributions to research, policy discourse, and practice concerning digital transformation and teacher well-being.

Theoretical Contribution

First, the study contributes to the theoretical application of the Job Demands–Resources (JD-R) model by extending its use beyond individual-level survey research to a document-based policy and discourse analysis context. By operationalizing JD-R as a directed coding framework, the study demonstrates how job demands (e.g., techno-overload, techno-invasion) and job resources (e.g., leadership support, professional autonomy, workload regulation) are discursively constructed in education policy and professional texts. This contributes to the literature by showing how JD-R can function as an analytic engine for examining structural and governance-level representations of well-being, rather than only as an explanatory model for measured outcomes.

Methodological Contribution

Second, the study offers a methodological contribution by demonstrating a rigorous and transparent approach to AI-assisted qualitative content analysis. It clarifies the appropriate role of AI tools as analytic supports rather than methodological drivers, addressing a growing concern in qualitative research about automation bias and methodological opacity. Through explicit documentation of corpus construction, codebook development, validation procedures, and negative case analysis, the study provides a replicable model for conducting document-based analysis of large, heterogeneous policy corpora.

Empirical Contribution

Third, the study provides an evidence-based synthesis of how teacher well-being is framed within digital education reform discourse between 2020 and 2025. By systematically comparing documents across institution types (intergovernmental bodies, governmental agencies, research institutions, and professional or union organizations) and across time periods, the study identifies recurring patterns, divergences, and shifts in emphasis. In particular, it empirically documents the persistent asymmetry between the prominence of digital innovation agendas and the comparatively weaker operationalization of teacher well-being safeguards in policy discourse.

Policy and Leadership Contribution

Fourth, the study contributes to policy and leadership discussions by identifying specific leadership practices and organizational safeguards that are consistently framed as mitigating digital strain across authoritative sources. Rather than advancing prescriptive claims, the study grounds its recommendations in recurring patterns observed in the corpus, thereby offering evidence-informed guidance for policymakers, system leaders, and school administrators seeking to align digital transformation with workforce sustainability.

Conceptual Contribution

Finally, the study contributes conceptually by clarifying the status of digital burnout as a discursive and thematic construct rather than a standardized clinical or psychometric outcome. By anchoring this concept in established technostress dimensions while acknowledging the limits of document-based inference, the study helps refine scholarly use of the term and avoids conceptual inflation. This clarification supports more precise future research and strengthens coherence between empirical evidence and policy rhetoric.

Recommendation

The following recommendations are derived from patterns identified in the document corpus and are organized by stakeholder group. To strengthen academic rigor, each set of recommendations distinguishes between evidence-based actions, which are consistently supported across policy, research, and professional documents, and context-dependent or aspirational actions, which require jurisdictional,





legal, or resource considerations. Where appropriate, feasibility conditions and implementation guidance are specified.

For School Administrators and Education Leaders

Evidence-Based Recommendations

1. *Implement workload audits linked to digital systems.* Across policy reports, survey-based studies, and professional publications, unmanaged digital workload emerges as a recurring demand associated with burnout risk. Leaders should conduct regular workload audits that explicitly examine administrative tasks generated by digital platforms.

Implementation: Led by school leadership teams in collaboration with teacher representatives.

Evaluation indicators: Reported workload hours, duplication of digital tasks, teacher feedback on administrative burden.

2. *Establish clear after-hours communication policies.* Documents consistently identify boundary erosion as a central driver of digital strain. School-level policies defining acceptable communication hours are repeatedly cited as protective.

Implementation: Policy ownership rests with school leadership, aligned with existing labor agreements.

Enforcement: Default scheduling delays, shared norms, and leadership modeling rather than punitive measures.

Evaluation indicators: Frequency of after-hours messaging, staff perceptions of boundary clarity.

3. *Strengthen professional autonomy in technology use.* Leadership practices that allow teachers discretion in how and when digital tools are used are consistently framed as buffering resources.

Implementation: Incorporate teacher input into platform selection and usage protocols.

Evaluation indicators: Teacher autonomy surveys, platform opt-out or flexibility provisions.

Context-Dependent / Aspirational Recommendations

4. Integrate digital well-being into leadership performance frameworks. While widely advocated in professional discourse, formal accountability mechanisms vary across systems.

Feasibility conditions: Alignment with national leadership standards, availability of well-being metrics, and administrative capacity.

For Policymakers and System-Level Leaders

Evidence-Based Recommendations

1. Embed teacher well-being safeguards explicitly within digital education strategies. Policy documents increasingly acknowledge burnout risk but often stop short of specifying safeguards. Evidence supports clearer integration of workload management and well-being indicators into digital reform plans.

Implementation: Policy units within ministries of education, in consultation with unions and professional bodies.

Evaluation indicators: Inclusion of workload and well-being benchmarks in strategy documents.

2. Support school-level boundary-setting through policy guidance. Rather than mandating uniform solutions, policymakers can provide enabling frameworks that legitimize local action on digital boundaries.

Feasibility conditions: Respect for collective bargaining agreements and institutional autonomy.

Context-Dependent / Aspirational Recommendations

3. Consider legal or regulatory protections related to digital work boundaries. The right to disconnect is increasingly discussed in international and professional discourse, but its legal feasibility varies widely.

Feasibility conditions: National labor law frameworks, public sector employment statutes, data protection regulations.





Caution: Such measures should be framed as options for exploration rather than universal mandates.

For Teachers and Professional Communities

Evidence-Based Recommendations

1. Engage collectively in shaping digital work norms. Professional and union documents demonstrate that collective articulation of digital workload concerns is more effective than individual boundary-setting.

Implementation: Use existing professional learning communities and staff forums.

2. Participate in professional development that includes digital well-being. Evidence supports professional learning that addresses not only technical skills but also sustainable digital practices.

Evaluation indicators: PD content balance between skills and well-being, teacher self-reported confidence.

Context-Dependent Recommendations

3. Advocate for policy reform using documented evidence. Advocacy efforts are most effective when grounded in survey data and policy analysis rather than anecdotal experience alone.

For the Academic and Research Community

Evidence-Based Recommendations

1. Differentiate discursive evidence from outcome measurement. This study demonstrates the value of document analysis for identifying policy framings; future work should explicitly distinguish discourse from measured well-being outcomes.

2. Examine translation from policy discourse to practice. The gap identified between policy rhetoric and operational safeguards warrants empirical investigation at national and institutional levels.

Aspirational Directions

3. Develop shared indicators of digital well-being. Cross-national collaboration could support the development of comparable indicators, subject to data protection and contextual constraints.

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