



Generative AI and Technostress in South African Higher Education: Insights from University Lecturers

¹ Vusumzi Funda, ² Oluwatosin Bamigboye, & ³Noluthando Busiswa Agape Mbangeleli

^{1&2}University of Fort Hare, Department of Information Systems, Faculty of Management and Commerce, East London, South Africa.

<https://orcid.org/0000-0001-9185-8237>

<https://orcid.org/0000-0002-3907-3624>

³University of Johannesburg Business School, Johannesburg, South Africa.

<https://orcid.org/0000-0003-2140-2458>

Corresponding author: vfunda@ufh.ac.za

Abstract. The rapid adoption of Generative Artificial Intelligence (GenAI) in higher education presents both opportunities and challenges, particularly regarding technostress among university lecturers. This study investigates the relationship between GenAI adoption and technostress within South African higher education institutions. A qualitative phenomenological design was adopted, with data collected through semi-structured interviews from 15 university lecturers with experience in GenAI integration. Data was analysed using thematic analysis supported by NVivo software. The findings reveal two overarching themes: (1) Drivers of technostress in GenAI adoption, including cognitive overload, rapid technological change, and ethical uncertainty; and (2) Institutional support mechanisms, highlighting gaps in training, policy ambiguity, and the importance of peer collaboration. While GenAI enhances efficiency and pedagogical innovation, it simultaneously increases workload, blurs work–life boundaries and raises concerns regarding academic integrity. The study concludes that technostress in the GenAI era is a multidimensional phenomenon shaped by the interaction between individual capabilities and institutional readiness. It recommends structured professional development, clear institutional policies, and contextually relevant support systems to ensure sustainable AI integration in South African higher education.

Keywords: *Generative Artificial Intelligence; Technostress; Higher Education; University Lecturers; Workload and Well-being; South Africa.*

1. Introduction and background

The educational context is changing due to the development of Generative Artificial Intelligence (GenAI) solutions. Across South Africa, professors must contend with insurmountable technological changes driven by GenAI advancements that are reshaping traditional teaching and research as well as administrative norms (Mhlanga, 2023). Such

changes have caused increasing stress and tension among the academic staff, even as they promise unprecedented opportunities in further enhancing educational institutions.

Technostress, a phenomenon first conceptualised by Brod (1984), has received renewed attention amid the rapid adoption of AI in educational institutions. The concept describes the psychological and physiological stress individuals experience when they struggle to adapt to new technologies or feel overwhelmed by technological demands (Tarafdar et al., 2019). In the South African higher education setting, where institutions are working hard to be relevant in the international academic ranking and simultaneously address local developmental challenges, there are both good and bad sides of the use of GenAI for university teaching.

Despite the increasing integration of GenAI tools in higher education, there is limited empirical understanding of how these technologies affect the psychological well-being of university lecturers, particularly in developing country contexts. In South Africa, lecturers are expected to adopt rapidly evolving AI technologies without adequate institutional support, clear policies, or training. This creates a mismatch between technological demands and lecturer preparedness, resulting in technostress that may negatively affect teaching effectiveness and educational quality. South African higher education faces unique barriers to AI integration, including historical inequalities, funding constraints, and a need to maintain space for indigenous knowledge systems (Moyo, 2022). University lecturers often find themselves caught between institutional expectations for technological innovation on the one hand and their comfort levels with emerging technologies on the other. Hence, such awkwardness leads to the various forms of technostress affecting both the well-being of an individual and ultimately educative outcomes.

In recent years, advances in GenAI, particularly the GPT-like architectures of ChatGPT, Claude, and Bard, have led to a complete change in the way educational work is theorised and applied. These programs offer help in producing content, conducting research, providing feedback to students, and organising personalised educational paths that could not have been dreamt of a few years ago (Kasneci et al., 2023). Introducing these influential and transformational interventions, however, often puts lecturers under pressure to become proficient in GenAI technologies without the necessary instructions or resources. The introduction of AI into the South African higher education system is faced with impediments such as ancient patterns of exclusion as well as funding shortages as well as the associated tensions of furthering technological tools and preserving indigenous systems (Moyo, 2022). This is a situation that is frustrating for lecturers because perhaps the expected level of technological change in the institution is more advanced than the ones they are familiar with. This creates conflict and stress amongst the lecturers which can be detrimental to the lecturers as well as to the quality of education offered by a university.

Understanding the relationship between GenAI and technostress among university lecturers is crucial for several reasons. The first is that a lecturer's state affects what happens inside the classroom, that is teaching and student learning. Secondly, implementing AI effectively depends on the understanding of people as it is the humans who determine whether technology will be successful or not. And third, there is a need for proven interventions to help staff within institutions of higher education during the transition from one technology to another.

This study addresses a specific and underexplored gap in literature. While prior research has examined technostress in digital and e-learning environments, three key gaps remain:

1. Limited focus on GenAI-specific technostress, particularly the unique stressors associated with AI-generated content, automation, and ethical ambiguity.
2. Lack of empirical studies from developing country contexts, especially within South African higher education, where structural inequalities shape technology adoption.
3. Insufficient focus on lecturers as primary actors, despite their central role in mediating AI integration in teaching and learning.

By addressing these gaps, this study contributes both contextually and theoretically to the emerging discourse on AI and technostress.

1.1 Research Objectives

This study aims to investigate the relationship between the adoption of GenAI and technostress among university lecturers in South African higher education institutions. The research seeks to understand how GenAI technologies influence stress experiences and to identify factors that contribute to or mitigate technostress in this context. The objective is to examine the nature and extent of technostress experienced by university lecturers regarding the adoption of GenAI. The secondary research questions are:

1. How does the integration of generative AI contribute to technostress in higher education?
2. What support mechanisms can educational institutions implement to mitigate technostress while promoting the effective integration of AI?

2. Literature

2.1 Generative AI in Higher Education

The emergence of Generative AI marked a pivotal moment for educational technologies, offering unprecedented capabilities in content creation, personalised learning delivery, and the generation of administrative opportunities. LLMs like GPT-4, Claude, and domain-specific AI tools have undergone dramatic developments in generating human-like text, explanations, educational materials, and supporting research activities (Rudolph et al., 2023). In higher education, GenAI applications are used in various areas, including curriculum development, assessment design, student support, and research assistance. Such tools allow instructors to design lesson plans, generate practice questions, give feedback on students' work, and conduct literature reviews. However, these technologies require significant adaptations in pedagogical techniques and professional conduct (Kasneji et al., 2023).

The use of GenAI for education might have its foils in South Africa as GenAI tools promote equal opportunity in education, as well as cross-cultural communication. It questions all the subtle protest goings-on against academic integrity, the creeping bias in AI systems, and accordingly, the accidental diverging of reputations with each institutional rating given by practitioners themselves (Tlili et al., 2023). What the texts tell us on GenAI adoption in education settings can have a blend of attitudes: Some attest to its prowess and creativity, whereas others warn of an overdependence and hence extinction of skills. GenAI, fostering advancement at a pace faster than those who create it, ultimately makes one of the endless, exhausting, everlasting tasks: expecting the teacher to continuously upgrade and keep abreast with skills and knowledge (Borenstein et al., 2023; Wang et al., 2008).

2.2 Interventions for Managing Technostress in Higher Education

The educational realm creates a most peculiar environment for technostress, as within it lie knowledge transmission, student-centred learning, and professional growth that support

expectations. Professors and teachers find themselves put under a lot of pressure as they are forced to work with the new technologies toward educational quality while simultaneously taking care of the needs of a diverse student population (Zhao et al., 2021). Wang et al. (2008) considered technostress amongst educators and found that inadequate training, the lack of technical support, pressure of time, and fear of technological failure were very much stressors. In order to efficiently interact with evolving technologies and lessen feelings of complexity and overload, structured training programs that improve digital competence are especially crucial (Wang et al., 2023). Borenstein et al. (2023) found that stress was stronger when teachers were forced to use a technology that they felt was irrelevant to their teaching aims or where technology integration increased their workload with no benefits.

Technology adoption was accelerated by the pandemic, providing insights into technostress. During the period, the research revealed increased stress levels from educators coping with the sudden changes in technology, not being given enough time for preparation, and having to keep teaching under very difficult circumstances (Sokal et al., 2020). In the South African scenario, additional layers begin to be peeled apart concerning institutional limitations, digital divide concerns, and cultural factors influencing the adoption of technology. Lecturers from universities in South Africa face peculiar problems arising from inconsistent internet connectivity, differential access to technology among students, and the need to balance technological trends from the international sphere with local educational requirements (Ramaphosa et al., 2022). It has been demonstrated that organisational strategies like ongoing technical assistance, digital literacy programs, and cultivating a positive institutional culture have a positive impact on people's capacity to handle technological demands and even turn stress into beneficial outcomes like technostress (Nascimento et al., 2024). In order to promote sustainable and successful technological integration, emerging research further emphasises that comprehensive institutional assistance should include pedagogical, operational, and governance dimensions such as AI policy creation and infrastructure provision (Chan, 2023).

2.3 GenAI and Technostress: Emerging Connections

The connection between GenAI and technostress is still a nascent research field, with few empirical studies addressing this intersection specifically. Yet, there is emerging evidence that AI technologies create peculiar stress variants differing from the typical operational manifestations of technostress. The first was about one of the massive concerns about many AI systems being "black boxes," meaning LFS stands for neither the lecturers nor the instructors: It's not clear to them how the outputs of many AI systems are generated, which generates anxiety for educators (Shin, 2021). The need to learn AI literacy, along with being proficient in disciplinary areas, further creates an additional burden on the cognitive load, with a possible increase in stress.

The rapid development of AI poses a challenge to the proper functioning of organisations and individuals. New AI capabilities and tools keep springing up and changing so quickly that they impose continuous adaptation and learning on every establishment (Dergaa et al., 2023). Added yet another layer of complexity and potential stress are ethical considerations associated with the use of AI in education. Teachers have to grapple with questions surrounding academic integrity, student privacy, the bias of AI systems, and just how far AI-assisted instruction should extend. Ongoing decisions based on these concerns will demand considerable professional judgment and may become mentally exhausting (Holmes et al., 2019).

3. Theoretical framework

This study will draw upon the Technostress framework formulated by Ayyagari, Grover, and Purvis (2011), which adapts the person-environment fit model to conceptualise how technology characteristics contribute to technostress via stressors and strains. Stress and rejection may set in if individuals view technology as hard to understand or not useful. This integration of GenAI tools into academic environments raises novel challenges to traditional paradigms about what technology can be good for and how easy it is to use, thus laying some of the groundwork for technostress to set in.

Since it was first broached, technostress has undergone significant shifts in meaning, leading to diverse theoretical frameworks aimed at providing a better understanding of the technology-related stress phenomenon. Brod (1984) refers to the original notion of technostress as the inability of a human being to cope with new computer technologies healthily; however, the contemporary understanding accepts a broader technological domain and its psychological impacts.

One of the most influential frameworks for describing technostress was presented by Tarafdar et al. (2007), which identified five dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. When an individual is forced to work faster due to technological advances, they may experience techno overload. Next, the infringement of privacy, from the perspective that interconnection does not allow anyone to switch off, blurs the boundaries between the professional and personal spheres through techno-invasion. Techno-complexity, on the other hand, refers to the fear of confronting and managing complex systems; techno-insecurity describes the fear of losing one's job due to technology; and techno-uncertainty describes the anxiety caused by continuous technological change. Person-environment fit theory possibly extends other explanations of technostress in education. Stress occurs when there is a mismatch between capability and demand or between need and supply (Kristof-Brown et al., 2005). In the context of adopting GenAI, university lecturers may often feel stressed when their technology competencies are not quite in line with the demands implicit in new AI tools, or when the prospects of these tools are not aligned with their teaching needs.

4. Research design and methods

4.1 Research Design

This study is grounded in an interpretivist research paradigm, which assumes that reality is socially constructed and that individuals assign meaning to their experiences (Creswell & Poth, 2018). This paradigm is appropriate for understanding how university lecturers subjectively experience technostress in the context of GenAI adoption. A qualitative research approach was adopted to enable an in-depth exploration of lecturers' lived experiences, perceptions, and coping mechanisms. This approach is suitable for capturing complex, context-dependent phenomena such as technostress (Denzin & Lincoln, 2018). The study employed a phenomenological research design, focusing on the lived experiences of lecturers engaging with GenAI technologies. Phenomenology allows for the identification of the essence of experiences and how individuals interpret technological change within their professional contexts (Moustakas, 1994).

4.2 Research Setting

The study is situated within a selected higher education institution in South Africa. The focus is on academics who are integrating GenAI tools into their teaching and learning practices. This context provides an opportunity to examine how faculty members adopt, adapt, and respond to AI technologies in their pedagogical approaches, as well as the institutional environment that shapes these practices. South Africa's peculiar context for higher education, with its diversity in institutional types, offers a contrasting level of

resources when considered within the realm of technostress studies in GenAI (Department of Higher Education and Training, 2023).

The case institution was chosen based on its engagement with GenAI technologies, either through formal adoption or through informal use by academic staff, such that the participants would offer valuable input into technostress experiences with substantial engagement with GenAI tools. The research setting is multidisciplinary, enabling the study of potential differences in how GenAI is applied across various disciplines. The multidisciplinary approach rests on the assumption that how AI technologies imprint their influence may differ depending on the academic domain; therefore, how technostress is experienced may also be distinguished by disciplinary norms and practices.

4.3 Sampling Procedure

A purposive sampling strategy was employed to select participants with relevant experience in GenAI adoption. The study included 15 university lecturers from a South African higher education institution. These participants were selected based on the following criteria:

Inclusion criteria:

- Currently employed as a university lecturer
- Actively using GenAI tools for teaching, research, or administration
- Willing to participate in an in-depth interview

Exclusion criteria:

- Administrative staff with no teaching responsibilities
- Lecturers with no exposure to GenAI tools

Participants represented diverse disciplines, levels of experience and technological proficiency, ensuring maximum variation sampling. Data saturation was reached at 15 participants, consistent with qualitative research standards (Guest et al., 2006).

4.4 Methods of Data Collection

Semi-structured interviews are the primary mode of data collection in the study. Semi-structured interviews offer the greatest flexibility in questioning while maintaining consistency in covering topical areas throughout all interviews. They are, therefore, preferred in research designs that investigate complex phenomena, such as technostress (Brinkmann & Kvale, 2015).

The interview protocol, as outlined in Appendix C, consists of open-ended questions designed to elicit detailed participant responses on GenAI experiences, sources of stress, and related contexts. The questions revolve around major themes, including initial experiences with GenAI, specific stressors associated with GenAI use, coping mechanisms, institutional support, and perceived effects on teaching and the performance of research activities. The individual interviews were conducted with each participant online due to geographical limitations.

4.5 Data analysis approach

For this qualitative research, NVivo software was used for organising, coding, and analysing interview data. NVivo is a highly suitable tool for this study, as it enabled the researcher to systematically analyse large qualitative datasets while maintaining transparency in the analytical process (Bazeley & Jackson, 2013).

Thematic analysis was used for analysing data, consisting of identifying, analysing, and reporting patterns within the data. Thematic analysis is relevant to this study as it allows for flexibility in theme identification whilst adhering to analytical rigour (Braun & Clarke, 2006).

The analytical process begins with a familiarisation phase that involves repeated reading of interview transcripts. During this phase, the researcher becomes well-acquainted with the data and begins to identify potential patterns and emerging themes.

Initial coding involves systematically reviewing the data identifying interesting features and potential themes. This process is both inductive, allowing themes to emerge from the data, and deductive, in those already existing theoretical frameworks about technostress guide decision-making on codes.

After the initial coding, the researcher proceeded with the search for themes by collating codes into potential thematic categories. In doing so, one examines the relationship between various codes and how they may be interrelated to create overarching themes that capture important aspects of the data.

Theme development proceeds with reviewing and refining those possible themes so that they properly reflect the data and yield insight concerning the research questions. This process is iterative and continues until a coherent set of themes emerges to capture most of the meaning in participants' experiences.

4.6 Ethical considerations

The research complies with the ethical principles approved by the institutional review committee at the University of Fort Hare (Ethics Clearance No.: FUN004-24). The principle of informed consent is applied, whereby participants must understand the purpose of the research, the procedures involved, the potential risks and benefits, and their rights as research participants.

Confidentiality of participants is mediated by using pseudonyms in all research reports and by conscientiously eliminating any identifying information. All recordings of interviews and transcripts will be kept secure and viewed only by authorised members of the research team. An emphasis is placed on voluntary participation, with clear instructions stating that participants can withdraw from the study at any time without penalty or consequence. This stipulation is designed to ensure that participation is truly voluntary and that participants do not feel pressured to share their experiences.

The research design protects participants from possible harm by concentrating on professional rather than personal experiences and by assuring that the questions asked during the interviews are respectful and non-intrusive. In case of distress, participants will be referred to support resources as necessary. Storage and management of data abide by the requirements of the institution and data protection laws. Electronic data will be stored in secured servers with adequate access controls, whereas physical documents will be locked away.

4.7 Trustworthiness

To ensure methodological rigour, the study applied the following criteria:

Credibility: Achieved through prolonged engagement with data, member checking, and verbatim transcription of interviews.

Dependability: Ensured through a clear audit trail documenting data collection and analysis procedures.

Confirmability: Maintained by grounding findings in participant quotations and minimising researcher bias.

Transferability: Supported through thick description of context, participants, and research processes.

5. Findings

This section presents a refined and analytically grounded account of the study findings, structured explicitly around the two research questions. In line with a rigorous thematic

analysis approach, the findings are organised into two overarching themes that directly respond to the research questions. Each theme integrates sub-themes derived from participants' lived experiences, while also demonstrating clear alignment with the technostress framework and the person–environment fit perspective outlined in the study. The analysis draws on verbatim participant accounts and is interpreted in relation to existing scholarly discourse.

5.1 Theme 1: Drivers of Technostress in GenAI Adoption

Addressing the first research question, the findings reveal that technostress among university lecturers is driven by a constellation of interrelated technological, cognitive, and institutional factors. As per Appendix A, these factors collectively reflect key dimensions of technostress, including techno-overload, techno-complexity, techno-uncertainty, and techno-invasion (Tarafdar et al., 2007; Tarafdar et al., 2019). However, the findings extend these dimensions by demonstrating how GenAI introduces novel stressors, particularly around ethical ambiguity and pedagogical disruption.

5.1.1 Cognitive Overload and Technological Complexity

A dominant theme emerging from the data is the experience of cognitive overload associated with the complexity of GenAI tools. Participants consistently described the mental strain involved in learning new platforms, interpreting outputs, and integrating AI into pedagogical practices. This aligns with the concept of techno complexity, where users feel inadequate due to the sophistication of technological systems (Tarafdar et al., 2007). Lecturers reported that the use of GenAI does not simply automate tasks but requires continuous cognitive engagement, particularly in verifying the accuracy and relevance of AI-generated content. This process introduces what Ayyagari et al. (2011) conceptualise as technology-induced strain, where the effort required to manage technology outweighs its perceived benefits. Participants noted that they were “juggling between learning the tool, applying it, and ensuring outputs meet academic standards,” illustrating the layered cognitive demands involved.

Furthermore, the findings suggest that GenAI exacerbates information overload, a phenomenon well documented in digital learning environments (Wang et al., 2008). The abundance of tools and outputs creates decision fatigue, with lecturers expressing uncertainty about which tools to adopt and how to use them effectively. This contributes to diminished confidence and heightened anxiety, reinforcing the mismatch between technological demands and individual capabilities, as posited by person–environment fit theory (Kristof-Brown et al., 2005).

5.1.2 Rapid Technological Change and Persistent Uncertainty

The rapid evolution of GenAI technologies emerged as a significant source of technostress, reflecting the dimension of techno-uncertainty. Participants described a continuous cycle of learning and adaptation, where newly acquired knowledge quickly becomes obsolete due to frequent updates and the emergence of new tools.

This finding is consistent with recent literature highlighting the accelerated pace of AI development and its implications for professional practice (Dergaa et al., 2023). Lecturers reported feeling that they were “always catching up,” indicating a persistent sense of instability and lack of control. Such conditions contribute to chronic stress, as individuals are unable to establish a stable knowledge base or routine.

Importantly, the absence of structured institutional guidance intensifies this uncertainty. Without clear direction, lecturers are compelled to engage in self-directed learning, which increases both cognitive load and emotional strain. This reinforces the argument that technostress is not solely a technological issue but is deeply shaped by organisational contexts (Tarafdar et al., 2019).

5.1.3 Workload Intensification and Boundary Blurring

Contrary to the efficiency narrative often associated with AI, the findings indicate that GenAI adoption has led to workload intensification. Participants reported spending additional time redesigning assessments, monitoring AI use among students, and experimenting with new tools. These activities extend beyond formal working hours, resulting in the erosion of work–life boundaries.

This reflects the concept of techno-invasion, where technology intrudes into personal life and creates expectations of constant connectivity (Tarafdar et al., 2007). Lecturers described working evenings and weekends to remain technologically relevant, indicating a shift towards what Upadhyay and Sharma (2024) describe as AI-driven work intensification.

Moreover, the findings highlight the emergence of “invisible labour” associated with GenAI. Tasks such as verifying AI outputs and detecting AI-generated student work are not formally recognised within workload models, yet they significantly increase effort. This contributes to emotional exhaustion and aligns with prior research linking increased technological demands to burnout in educational settings (Sokal et al., 2020).

However, it is important to note the dual nature of GenAI’s impact. Some participants acknowledged efficiency gains in specific tasks, such as automated marking and content generation. This duality reinforces the notion that technostress is context-dependent and mediated by how technology is integrated into existing workflows (Xia, 2023).

5.1.4 Ethical Concerns and Academic Integrity Risks

A distinctive and contextually significant driver of technostress identified in this study is ethical uncertainty. Participants expressed concerns about plagiarism, authorship, data privacy, and the reliability of AI-generated content. These concerns introduce a moral and professional dimension to technostress that extends beyond traditional ICT-related stressors.

Lecturers reported anxiety regarding the authenticity of student work and the limitations of existing detection tools. The lack of clear institutional policies further exacerbates this uncertainty, forcing lecturers to make individual judgments about acceptable AI use. This aligns with findings by Holmes et al. (2019), who emphasise the ethical complexity of AI in education.

Additionally, concerns about algorithmic bias and the marginalisation of African perspectives were raised, reflecting broader debates about the socio-cultural implications of AI (Moyo, 2022). These concerns highlight that technostress in the GenAI era is not technical but also epistemological, as it challenges established norms of knowledge production and validation.

5.2 Theme 2: Institutional Support Mechanisms for Mitigating Technostress

In response to the second research question, the findings as per Appendix B identify several institutional factors that either exacerbate or mitigate technostress. These findings underscore the critical role of organisational support in shaping lecturers’ experiences of GenAI adoption.

5.2.1 Inadequate and Generic Training Provision

Participants overwhelmingly reported that institutional training initiatives were insufficient, sporadic, and overly generic. Workshops were described as introductory in nature, focusing on basic functionalities rather than pedagogical integration or discipline-specific applications.

This finding is consistent with prior research indicating that inadequate training is a key driver of technostress in educational contexts (Wang et al., 2008). The lack of tailored

training increases reliance on self-directed learning, which contributes to cognitive overload and uneven levels of competence among lecturers.

Furthermore, the findings suggest that effective training must move beyond technical skills to include critical AI literacy, ethical considerations, and pedagogical strategies. This aligns with Kasneci et al. (2023), who argue for holistic professional development frameworks to support AI integration in education.

5.2.2 Policy Ambiguity and Lack of Institutional Direction

The absence of clear and comprehensive institutional policies on GenAI use emerged as a critical stressor. Participants highlighted uncertainty regarding assessment design, plagiarism detection, and acceptable AI use, resulting in inconsistent practices across departments. This policy vacuum shifts the burden of decision-making onto individual lecturers, increasing stress and undermining confidence. From a person–environment fit perspective, this represents a misalignment between institutional expectations and available support structures (Kristof-Brown et al., 2005).

The findings further indicate that existing guidelines are often vague and not regularly updated, limiting their effectiveness in addressing the rapidly evolving nature of GenAI. This underscores the need for dynamic policy frameworks that balance innovation with ethical and academic integrity considerations.

5.2.3 Peer Collaboration as an Informal Coping Mechanism

In the absence of formal support, lecturers have developed informal networks of collaboration to navigate GenAI adoption. These communities of practice facilitate knowledge sharing, experimentation, and emotional support, serving as a critical buffer against technostress.

This finding aligns with organisational support theory, which emphasises the role of social resources in mitigating workplace stress (Tarafdar et al., 2019). Participants described peer support as more practical and accessible than formal training, highlighting its importance in building confidence and competence.

The emergence of peer collaboration also reflects adaptive coping strategies, where individuals collectively negotiate technological challenges. This reinforces the importance of fostering collaborative cultures within higher education institutions.

5.2.4 Need for Contextualised and Sustainable Support Systems

A key insight from the findings is the need for contextually relevant support systems that reflect the realities of South African higher education. Participants noted that many AI tools and training resources are designed for global contexts and do not adequately address local challenges, such as resource constraints and diverse student needs.

This finding is consistent with literature on digital inequality in South Africa, which highlights disparities in access to technology and infrastructure (Ramaphosa et al., 2022). Lecturers emphasised the importance of ongoing, context-sensitive professional development rather than one-off interventions.

Moreover, participants called for integrated support systems that combine training, policy guidance, and technical assistance. Such systems would enhance institutional readiness and reduce the mismatch between technological demands and lecturer capabilities, thereby mitigating technostress.

6. Discussion of findings

The findings of this study deepen understanding of the relationship between Generative Artificial Intelligence (GenAI) adoption and technostress by demonstrating that lecturers' experiences are shaped by a dynamic interaction between technological demands,

individual capabilities, and institutional conditions. Rather than viewing technostress as a singular outcome of technological complexity, the results position it as a multidimensional and socio-technical phenomenon, consistent with contemporary interpretations of technostress (Tarafdar et al., 2019; Xia, 2023).

A central contribution of this study lies in its empirical elaboration of the technostress framework. The identified drivers of technostress, including cognitive overload, rapid technological change, workload intensification, and boundary blurring, align closely with the established dimensions of techno-overload, techno-complexity, techno-uncertainty, and techno-invasion (Tarafdar et al., 2007). The findings illustrate how GenAI amplifies these stressors in distinctive ways. For instance, cognitive overload is not only a function of learning new systems but also of continuously verifying AI-generated outputs and adapting them for pedagogical use. This reflects a shift from traditional ICT engagement to what may be conceptualised as “cognitively augmented labour,” where human oversight remains indispensable despite automation (Ayyagari et al., 2011).

Importantly, the study extends the technostress framework by identifying ethical uncertainty as a critical and contextually embedded dimension of technostress in the GenAI era. While prior research has acknowledged concerns about system reliability and complexity (Shin, 2021), this study demonstrates that issues of academic integrity, authorship, data privacy, and algorithmic bias constitute a distinct source of psychological strain. Lecturers are required to make ongoing ethical judgments in the absence of clear institutional guidelines, thereby increasing cognitive and emotional burden. This finding resonates with Holmes et al. (2019), who argue that AI in education introduces complex ethical dilemmas that demand heightened professional responsibility. In this regard, technostress is not a technical or operational challenge but also an ethical and epistemological one, particularly within disciplines where knowledge authenticity and critical inquiry are central.

The findings further gain explanatory power when interpreted through the lens of person–environment fit theory (Kristof-Brown et al., 2005). The rapid pace of GenAI development, coupled with insufficient institutional support, creates a persistent misalignment between environmental demands and lecturers’ competencies. This misfit manifests in feelings of inadequacy, loss of control, and anxiety, particularly as lecturers are expected to integrate evolving technologies into already demanding academic roles. The situation is exacerbated in resource-constrained contexts, where disparities in infrastructure, training opportunities, and digital literacy widen this gap (Ramaphosa et al., 2022). The evidence thus supports the proposition that technostress emerges not simply from exposure to technology but from the inability of institutional environments to adequately scaffold that exposure.

In relation to organisational dynamics, the study corroborates and extends existing literature on the role of institutional support in mitigating technostress. Consistent with Wang et al. (2008), inadequate and generic training provision was found to intensify cognitive overload and contribute to uneven levels of competence across lecturers. The reliance on self-directed learning reflects a shift of responsibility from institutions to individuals, reinforcing perceptions of organisational neglect and increasing stress. Similarly, the absence of clear and coherent policy frameworks creates ambiguity in areas such as assessment design, plagiarism detection, and acceptable AI use. This policy vacuum not only heightens uncertainty but also undermines lecturers’ confidence in decision-making, thereby reinforcing techno-uncertainty.

At the same time, the findings highlight the critical role of peer collaboration as an emergent and informal coping mechanism. In line with Tarafdar et al. (2019), collegial networks function as social support systems that buffer the negative effects of technostress. Participants’ reliance on peer learning communities underscores the importance of

relational and collective approaches to technology adoption. However, the informal nature of these networks also points to a gap in formal institutional support structures, suggesting that while peer collaboration is effective, it should not substitute for systematic organisational interventions.

Another significant insight relates to workload intensification and the erosion of work–life boundaries. While GenAI is often positioned as a tool for efficiency and productivity (Kasneji et al., 2023), the findings reveal a more complex reality in which initial efficiency gains are offset by increased demands for continuous learning, content verification, and assessment redesign. This dual impact aligns with Upadhyay and Sharma (2024), who argue that AI can simultaneously enhance productivity and exacerbate workload pressures. The concept of “invisible labour” is particularly salient here, as much of the additional work associated with GenAI adoption remains unrecognised within formal workload models. This contributes to emotional exhaustion and reinforces techno-invasion, as lecturers extend their working hours to keep pace with technological change.

Crucially, the study situates these dynamics within the specific context of South African higher education, thereby contributing a nuanced and context-sensitive perspective to the global discourse on AI and technostress. The findings demonstrate that technostress is shaped by broader structural and systemic factors, including historical inequalities, resource constraints, and the need to balance global technological trends with local educational realities (Moyo, 2022; Czerniewicz et al., 2020). The misalignment between globally developed AI tools and local pedagogical contexts further intensifies stress, as lecturers must adapt technologies that are not always designed for their specific environments.

Taken together, the discussion highlights that technostress in the GenAI era cannot be adequately addressed through technological solutions alone. Instead, it requires a holistic approach that integrates individual capacity building, institutional policy development, and contextually relevant support systems. These findings directly inform the study’s conclusions and recommendations, particularly the need for structured professional development, clear and adaptive policy frameworks, and sustainable communities of practice. By linking the empirical findings to both theoretical frameworks and existing literature, this study advances a more comprehensive understanding of technostress as a socio-technical and context-dependent phenomenon, with significant implications for the sustainable integration of GenAI in higher education.

7. Recommendations

This study explored how the adoption of GenAI shapes experiences of technostress among university lecturers within South African higher education institutions. Through thematic analysis, three dominant themes emerged: GenAI technostress collaboration, ethical and institutional support, and the impact of GenAI workload and life balance stress. These themes collectively addressed the five objectives of the study, demonstrating that the experience of technostress is multifaceted and shaped by individual coping strategies, institutional contexts, and the ethical complexities of GenAI integration.

The findings confirm that GenAI adoption creates both opportunities and challenges. On one hand, lecturers recognised the potential of GenAI to streamline tasks such as lecture preparation and assessment design, while also enabling new forms of collaboration and innovation. On the other hand, the pace of technological change, inadequate institutional support, and unresolved ethical concerns contributed to cognitive overload, blurred work–life boundaries, and heightened anxiety. The dual nature of these experiences underscores that the successful integration of GenAI into higher education cannot be achieved through technological availability alone, but requires careful consideration of human, institutional, and ethical dimensions.

Based on these findings, several recommendations can be made. First, higher education institutions should invest in structured and continuous professional development on GenAI, ensuring that training is discipline-specific, contextually relevant, and responsive to the rapid evolution of GenAI tools. Second, institutions should establish clear and comprehensive policies on GenAI use, particularly addressing issues of academic integrity, plagiarism, and data privacy, in line with South African regulatory frameworks such as the Protection of Personal Information Act (POPIA). Third, universities should encourage the formation of communities of practice that enable lecturers to share resources, experiences, and coping strategies, thereby reducing isolation and fostering collective resilience. Fourth, stress management interventions tailored to technology adoption should be developed, integrating psychological support with practical guidance on workload management. Finally, institutional leaders must adopt a holistic approach that balances innovation with staff well-being, recognising that the sustainability of GenAI integration depends as much on lecturer confidence and support as it does on technological capacity.

8. Conclusion

This study contributes to the growing body of literature on technostress by situating it within the specific context of GenAI adoption in South African higher education. It demonstrates that technostress is not merely a by-product of technology, but a phenomenon deeply embedded in the interplay between individual agency, institutional responsibility, and ethical considerations. Addressing these complexities will be essential if universities are to harness the benefits of GenAI while safeguarding the well-being and professional identity of lecturers.

Acknowledgement

Research reported in this publication was supported by the South African Medical Research Council under a Self-Initiated Research Grant. The views and opinions expressed are those of the author(s) and do not necessarily represent the official views of the SAMRC.

References

- Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. *MIS Quarterly*, 35(4), 831–858. <https://doi.org/10.2307/41409963>
- Bazeley, P., & Jackson, K. (2013). *Qualitative data analysis with NVivo* (2nd ed.). SAGE Publications.
- Borenstein, J., Miller, K. W., Santoni de Sio, F., Floridi, L., Birhane, A., & Hagendorff, T. (2023). AI ethics: A long history and a recent burst of attention. *Computer*, 56(1), 10–17.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Brinkmann, S., & Kvale, S. (2015). *InterViews: Learning the craft of qualitative research interviewing* (3rd ed.). SAGE Publications.

- Brod, C. (1984). *Technostress: The human cost of the computer revolution*. Addison-Wesley.
- Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *Computers and Education: Artificial Intelligence*.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Czerniewicz, L., Agherdien, N., Badenhorst, J., Belluigi, D., Chambers, T., Chili, M., de Villiers, M., Felix, A., Gachago, D., Gokhale, A., Ivala, E., Kramm, N., Madiba, M., Pallitt, N., Prinsloo, P., Solomon, K., Strydom, S., Swanepoel, M., Waghid, F., & Wissing, G. (2020). A wake-up call: Equity, inequality and COVID-19 emergency remote teaching and learning. *Postdigital Science and Education*, 2(3), 946–967. <https://doi.org/10.1007/s42438-020-00187-4>
- Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research* (5th ed.). SAGE Publications.
- Department of Higher Education and Training. (2023). *Statistics on post-school education and training in South Africa: 2021*. Author.
- Dergaa, I., Chamari, K., Zmijewski, P., & Ben Saad, H. (2023). From human writing to artificial intelligence generated text: Examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport*, 40(2), 615–622.
- Dergaa, I., et al. (2023). ChatGPT and artificial intelligence in higher education: A review of current trends and implications. *Education and Information Technologies*. Advance online publication. <https://doi.org/10.1007/s10639-023-11896-0>
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59–82. <https://doi.org/10.1177/1525822X05279903>
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdinger, F., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A meta-analysis of person–job, person–organization, person–group, and person–supervisor fit. *Personnel Psychology*, 58(2), 281–342. <https://doi.org/10.1111/j.1744-6570.2005.00672.x>

- Mhlanga, D. (2023). Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning. *Education and Information Technologies*. Advance online publication. <https://doi.org/10.1007/s10639-023-11865-7>
- Mhlanga, D. (2023). Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning. *Education Sciences*, 13(4), 387.
- Moustakas, C. (1994). *Phenomenological research methods*. Sage Publications.
- Moyo, N. (2022). COVID-19 and the future of higher education in Africa: Challenges and opportunities. *African Journal of Higher Education*, 10(1), 1–12.
- Moyo, S. (2022). Artificial intelligence and the future of higher education in Africa: A critical review. *International Journal of Educational Technology in Higher Education*, 19(1), 1–18.
- Nascimento, L., Correia, M. F., & Califf, C. B. (2024). Towards a bright side of technostress in higher education teachers: Identifying several antecedents and outcomes of techno-eustress. *Technology in Society*, 76, 102428. <https://doi.org/10.1016/j.techsoc.2023.102428>
- Patton, M. Q. (2015). *Qualitative research and evaluation methods: Integrating theory and practice* (4th ed.). SAGE Publications.
- Ramaphosa, C., Ndofirepi, E., & Shava, G. (2022). Digital inequality and higher education in South Africa. *South African Journal of Higher Education*, 36(4), 1–18.
- Ramaphosa, K., Jita, L., & Vandeyar, T. (2022). The digital divide and emergency remote teaching during COVID-19: Experiences of university students in South Africa. *Education Sciences*, 12(8), 542.
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 1–22. <https://doi.org/10.37074/jalt.2023.6.1.9>
- Shin, D. (2021). The effects of explainability and causability on perception, trust, and acceptance: Implications for explainable artificial intelligence. *International Journal of Human-Computer Studies*, 146, 102551. <https://doi.org/10.1016/j.ijhcs.2020.102551>
- Sokal, L., Trudel, L. E., & Babb, J. (2020). Canadian teachers' attitudes toward change, efficacy, and burnout during the COVID-19 pandemic. *International Journal of Educational Research Open*, 1, 100016. <https://doi.org/10.1016/j.ijedro.2020.100016>
- Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007). The impact of technostress on role stress and productivity. *Journal of Management Information Systems*, 24(1), 301–328. <https://doi.org/10.2753/MIS0742-1222240109>

- Tarafdar, M., Cooper, C. L., & Stich, J. F. (2019). The technostress trifecta: Techno-eustress, techno-distress, and design. *Information Systems Journal*, 29(1), 6–42. <https://doi.org/10.1111/isj.12169>
- Tlili, A., Burgos, D., Huang, R., Mishra, S., Sharma, R. C., Bozkurt, A., et al. (2023). Is ChatGPT here to stay? A global survey on AI in education. *Smart Learning Environments*, 10(1), 1–20. <https://doi.org/10.1186/s40561-023-00224-0>
- Upadhyay, N., & Sharma, S. (2024). Artificial intelligence and employee productivity: A paradoxical perspective. *Journal of Business Research*, 172, 114378. <https://doi.org/10.1016/j.jbusres.2023.114378>
- Wang, K., Shu, Q., & Tu, Q. (2008). Technostress under different organizational environments: An empirical investigation. *Computers in Human Behavior*, 24(6), 3002–3013. <https://doi.org/10.1016/j.chb.2008.05.007>
- Wang, Q., Zhao, G., & Zeng, J. (2023). The effects of facilitating conditions, digital competence, and technostress on higher education students' digital informal learning. *Australasian Journal of Educational Technology*. <https://doi.org/10.14742/ajet.9324>
- Xia, B. (2023). Technostress in the digital age: A systematic review and future research agenda. *Information Technology & People*. Advance online publication. <https://doi.org/10.1108/ITP-01-2023-0056>
- Zhao, Y., Llorente, A. M. P., & Gómez, M. C. S. (2021). Digital competence in higher education research: A systematic literature review. *Computers & Education*, 168, 104212. <https://doi.org/10.1016/j.compedu.2021.104212>