



Digital Literacy and Self-Efficacy Development Strategies for Technostress Coping Among Older Lecturers in Higher Education Institutions

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Abstract: *The massive and rapid digitalization of higher education institutions, which was further accelerated by the COVID-19 pandemic, has increased the level of technostress experienced by university lecturers. This condition is particularly evident among older lecturers who are required to adapt to various new digital technologies in their teaching and academic activities. This paper aims to explore strategies for the development of digital literacy and self-efficacy as efforts to cope with technostress, specifically by considering the needs, strengths, and limitations of older lecturers in higher education institutions. This study is based on a literature review on technostress and adult learning theory. On the basis of this review, a comprehensive framework focusing on the development of digital literacy and technological self-efficacy is proposed by applying andragogical principles. It is expected that the findings of this study can provide evidence-based strategies to assist older lecturers in managing technostress while maintaining teaching quality and personal well-being.*

Keywords: *technostress, higher education, older lecturers, digital literacy, self-efficacy, coping strategies, adult learning*

INTRODUCTION

Higher education transformation through digital technologies has fundamentally changed the nature of academic work. Artificial intelligence, learning management systems, video conferencing platforms, online assessment tools, digital collaboration spaces, and integrated teaching technologies have become essential infrastructure for contemporary higher education (Quy et al., 2023). On one hand, these technologies offer opportunities for pedagogical innovation and expanded access, but on the other hand, they simultaneously introduce technology-related stress, called technostress, that can undermine faculty well-being and teaching effectiveness (Abilleira et al., 2021).

Technostress can be defined as stress that occurs when individuals interact with information systems (Ragu-Nathan et al., 2008). Stress happens when an individual experiences imbalance between the demands of a situation and his or her ability to meet them (Ingusci et al., 2021). In the context of technostress, stress happens when technological demands exceed the ability of individuals to handle them. It appears in five primary dimensions (Zhang et al., 2022): a. Techno-overload; b. Techno-invasion; c. Techno-complexity; d. Techno-insecurity; e. Techno-uncertainty.

Technostress is a negative psychological condition that occurs between people and new technologies (Jena & Mahanti, 2014). Technostress affects individuals at work by causing fatigue, low motivation, inability to concentrate, dissatisfaction at work, and reduced productivity, which also impacts well-being and leads to higher organizational

costs (Ioannou, 2023). Technostress can be harmful to health (Bahamondes-rosado et al., 2023).

The COVID-19 pandemic forced higher education institutions to adopt online and hybrid teaching quickly, which increased technostress among academic staff (Banerjee & Gupta, 2024). The gradual adoption process turned into an urgent implementation, causing many senior lecturers to face difficulties in adapting long-used traditional teaching methods to digital formats.

Digital literacy is the set of competencies needed for active participation in a knowledge society (Gomathy, 2018). Digital literacy covers the skills to use and handle digital tools and platforms effectively, including software, apps, and online communication tools (Kadhim, 2024). Digital literacy is a multidimensional and developing concept that involves skills, knowledge, ethical understanding, and critical thinking to navigate the digital world (Xiu & Li, 2024). Digital literacy is important in today's workforce, where technology is part of daily work and helps improve productivity, efficiency, and competitiveness.

Self-efficacy is defined as a person's belief in their ability to accomplish something (Aizava et al., 2024). Self-efficacy in the digital context is the personal confidence to use technology well; it lowers anxiety and improves performance (Iraola-Real et al., 2023).

Digital literacy and self-efficacy are important factors that influence technostress because they help individuals manage and cope with the demands of technology and reduce stress caused by using digital tools. Studies show that individuals with higher digital literacy tend to experience lower technostress because they can understand and use digital tools better, which increases their confidence in managing technology and reduces negative stress reactions (Çınar & Kenek, 2025). Individuals with stronger digital literacy competencies tend to experience less technostress and higher levels of thriving (Jakstiene et al., 2025).

Research also shows that digital literacy can improve self-efficacy, and higher self-efficacy is linked to lower technostress, meaning that confident users are less likely to feel stressed when using technology (Zivi et al., 2025). Other studies in academic settings suggest that digital literacy increases self-efficacy and cognitive flexibility, which can mediate the effect of technostress on outcomes such as burnout, helping to reduce its negative impacts (Avcı, 2025). Finally, studies on psychological mechanisms show that self-efficacy in digital skills is negatively associated with technostress, suggesting that interventions to improve digital self-efficacy can help reduce stress in technology-heavy environments (Zivi et al., 2025). Overall, these findings indicate that increasing digital literacy and self-efficacy can be effective strategies to reduce technostress in various populations and settings.

Older higher education lecturers are digital immigrants. Digital Immigrants are those born before 1980 (Demirbilek, 2014). Those who are digital immigrants may struggle with adapting to technology in the workplace, and technostress may affect their well-being (Nimrod, 2018). Older lecturers often face distinctive technostress challenges that require focused attention and tailored interventions because they may experience higher levels of stress from digital technology compared with younger colleagues. Digital self-efficacy tends to be lower among digital immigrants (Iraola-Real & Vasquez, 2022). Research shows that age is positively related to the level of technostress, indicating that older educators and workers can experience greater stress from technology use due to perceived complexity and lower digital confidence (Cazan et al., 2024).

In higher education, traditional pedagogical expertise developed over many years is often grounded in face-to-face interaction and established routines, so the rapid shift to digital platforms can disrupt this expertise and require lecturers not only to learn new tools but also to reconceptualize their teaching practices. Although older adults are fully capable of learning new technologies, research emphasizes that they may benefit from different instructional pacing, enhanced support structures, and training that aligns with adult learning principles to reduce technology-related stress and improve their psychological well-being (Wang & Yao, 2025).

This study will develop digital literacy and self-efficacy development strategies for technostress coping that is designed for older lecturers in the higher education institutions.

METHODOLOGY

This study uses desk research and literature review method to develop strategies to develop digital literacy and self-efficacy for technostress. Google Scholar is used as the source for finding the relevant literatures. The focus of the desk research and literature review is to find various strategies to develop digital literacy and self-efficacy for technostress coping in general and then formulate strategies that appropriate for older lecturers in higher education institutions.

RESULTS AND DISCUSSION

Building digital literacy and technological self-efficacy development strategies require understanding digital literacy in academic work and adult learning. The following sections will discuss these aspects and then build development strategies based on these aspects.

1. Understanding Digital Literacy for Academic Work

Digital literacy for lecturers in higher education institutions encompasses multiple interconnected competencies (Basilotta-Gómez-Pablos et al., 2022; Berber et al., 2023; Martínez-Bravo et al., 2022; Masenya, 2021) that can be summarized into the following categories: a. Digital Technical Skills; b. Digital Content creation; c. File management; d. Digital Troubleshooting; e. Pedagogical Technology Integration; f. Online teaching strategies; g. Assessment design; h. Feedback provision; i. Student engagement; j. Information Literacy; k. Digital Resource evaluation; l. Digital research; m. Citation management; n. Copyright and fair use; o. Communication Literacy; p. Professional communication; q. Netiquette; r. Synchronous vs. asynchronous; s. Boundary management; t. Privacy and Security Literacy; u. Data protection; v. Secure practices.

As mentioned in the previous paragraph, the digital literacy skills required for academic work are generally basic in nature and relatively easy to acquire. However, for older lecturers, who are often considered digital migrants, these skills may be more challenging to learn. This difficulty arises because such skills were not commonly used during their formative years, and therefore they may have limited prior exposure to them. Consequently, many older lecturers have insufficient understanding of important issues such as data protection and secure digital practices. For example, some lecturers are not fully aware that private information should not be collected from respondents when administering questionnaires. Furthermore, if the collection of such data is unavoidable, they may not recognize the importance of refraining from uploading sensitive information to open-access data platforms.

2. Digital Literacy Development Strategies

Older lecturers, as professionals who began their careers before the widespread use of digital technologies, can be considered digital immigrants. Consequently, their digital literacy needs differ in important ways from those of younger, digital native colleagues. Unlike younger academics who may develop basic digital skills informally through continuous exposure, older lecturers often require explicit instruction in underlying digital concepts and structures to support their academic work (Tømte et al., 2015). This includes clear explanations of how digital platforms work, such as how users navigate menus and access information, recognizing common interface features, understanding how different digital tools are connected to one another, and developing basic concepts that help lecturers relate technology to their academic tasks.

Effective digital literacy development for older lecturers should connect between their established pedagogical expertise and the demands of digital teaching and research. Instructional strategies that frame technology as supportive of familiar teaching goals, identify digital analogues to traditional academic practices, and adapt well-established pedagogical methods for online environments are more likely to be successful (Bennett et al., 2008). Recognizing older educators' existing strengths and showing how these can be transferred to digital contexts helps to make learning relevant and meaningful.

Professional development must also address both competence and confidence simultaneously. Research indicates that older learners may experience anxiety about technology use, which can impede their willingness to engage with new tools (Tømte et al., 2015). Therefore, effective programs should acknowledge and support these affective needs by providing emotional encouragement, celebrating early successes, countering negative self-perceptions, and building self-efficacy through guided practice, structured feedback, and hands-on experiences that align with lecturers' real academic tasks.

Adult learning principles emphasize the importance of immediate applicability and contextualized learning. Training should be organized around authentic academic tasks, such as designing online assessments, managing learning platforms, or using digital tools to support student engagement. It should be delivered just in time before lecturers need to apply these skills (Bennett et al., 2008). Authentic activities based on actual course materials, rather than abstract demonstrations, enhance motivation and retention, making professional development both efficient and relevant.

In summary, digital literacy development for older lecturers in higher education requires explicit conceptual instruction, pedagogical contextualization, emotional and confidence-building support, and task-oriented adult learning design. Such a multifaceted approach aligns with contemporary research on teacher digital competence and professional learning, reducing barriers and supporting sustained engagement with digital technologies in academic settings (Tømte et al., 2015).

3. Applying Adult Learning Principles to Digital Literacy Development

Adult learning theory, particularly andragogy, emphasizes learner autonomy, relevance, and the use of prior experience. These principles are highly relevant to digital literacy development, especially for adult educators. One key principle is self-directed learning (SDL), which should be frequently applied to support the development of lifelong learning skills. SDL enables adult learners to take responsibility for identifying their learning needs, selecting appropriate resources, and evaluating their progress, all of which are essential in rapidly changing digital environments (Charokar & Dulloo, 2022).

Supporting autonomy and learner choice is central to effective SDL implementation. One practical strategy is the use of Personal Development Plans (PDPs). Through PDPs, learners can conduct self-assessments of their current digital skills, identify priorities, and set personal learning goals that align with their teaching responsibilities. Learners are also encouraged to choose learning pathways and resources that suit their needs and to progress at their own pace, while still being supported by suggested timelines and guidance. This approach allows flexibility while maintaining direction and relevance (Greenan, 2016).

Another important strategy is the provision of curated resource libraries. These libraries consist of carefully selected tutorials, guides, and instructional videos organized by topic. Offering resources in multiple formats, such as text, video, and interactive materials accommodates different learning preferences. Peer ratings and recommendations can further support learners in selecting appropriate materials, while just-in-time access allows learners to obtain support when specific digital skills are required in their teaching practice (Van Woezik et al., 2019).

Self-paced learning modules also play a significant role in adult digital literacy development. Asynchronous modules allow learners to control the timing and pace of their learning, enabling them to skip content they already understand and focus on areas where improvement is needed. Opportunities for review and repetition support mastery, while progress-tracking features help maintain motivation and engagement over time (Silamut & Sovajassatakul, 2021).

In addition, andragogy emphasizes the importance of experience-based learning, where learners build new knowledge by reflecting on and applying their prior professional experiences. This approach values adult learners' existing expertise and helps them integrate digital skills into familiar academic practices (Gilmore & Anderson, 2011). Closely related to this is problem-centered learning, which focuses on real and immediate challenges rather than abstract content. By addressing authentic teaching and professional problems, digital literacy learning becomes more meaningful, practical, and transferable to everyday academic work.

4. Self-Efficacy Development Strategies

Developing technological self-efficacy is essential for adult learners, particularly educators who must engage with digital tools in professional contexts. According to Bandura's social cognitive theory, self-efficacy beliefs are shaped through four primary sources of efficacy information: mastery experiences, vicarious learning, verbal persuasion, and physiological and emotional states (Waddington, 2023). These sources provide a theoretical foundation for instructional strategies that intentionally build confidence in technology use.

Mastery experiences are considered the most powerful influence on self-efficacy because successful performance reinforces beliefs in one's capabilities (Waddington, 2023). In digital literacy development, this can be supported by scaffolded learning pathways, where learners begin with simple tasks, such as posting an announcement in a learning management system and gradually progress to more complex skills, with clear success criteria and regular feedback. Providing online microlearning modules and low-stakes practice environments allows learners to gain repeated experiences of success, which strengthens confidence and reduces anxiety. It has been shown that digital self-efficacy tends to increase after participating in digital-related courses or online learning activities (Lee & Chun, 2025).

Vicarious learning occurs when learners observe peers or models successfully performing tasks, which helps them internalize the belief that they, too, can succeed. Research has found that general self-efficacy influences how individuals interpret vicarious experience information and that exposure to others' successes in online learning environments can support confidence in completing similar tasks (Getenet et al., 2024). Designing learning activities where lecturers observe demonstrations by colleagues, participate in peer-led workshops, or engage in communities of practice helps normalize struggles and provides realistic models of success.

Verbal persuasion, through constructive feedback and encouragement, has been shown to enhance learners' belief in their technological capabilities. Supportive instructional feedback that emphasizes effort, improvement, and strategy strengthens self-efficacy and motivates continued engagement with technology. Studies in web-based learning suggest that learner perceptions of feedback and instructional support relate positively to self-efficacy and engagement with educational technologies (Getenet et al., 2024).

Finally, managing physiological and emotional states in using technology is a critical but often overlooked source of self-efficacy development. Learners who interpret physiological arousal as a normal part of engaging with challenging tasks are more likely to persist and build confidence. Strategies such as stress management training, framing challenge responses positively, and pairing technology learning with enjoyable experiences help reduce negative emotional barriers and foster more positive associations with learning. Research on self-efficacy in online learning contexts indicates that emotional and affective responses mediate how learners engage with technology and influence their confidence in using digital tools (Getenet et al., 2024). Furthermore, research suggests that training programs that combine technical skills development with strategies to manage stress can help reduce the negative effects of technostress (Mahboob & Khan, 2016). Individuals' technological self-efficacy can buffer or alter the relationship between technostress, burnout, and performance (Yener, 2021).

In summary, a comprehensive self-efficacy development framework for digital literacy should integrate structured opportunities for mastery, observational learning through vicarious experiences, supportive feedback practices, and explicit attention to emotional regulation. Such an approach aligns with social cognitive theory and is supported by empirical evidence showing that self-efficacy beliefs are significantly related to learners' motivation, engagement, and performance in technology-enhanced educational environments.

CONCLUSION

This paper has developed a set of digital literacy and self-efficacy development strategies intended to support older lecturers in the higher education institutions in coping with technostress arising from the increasing digitalization of academic activities. The proposed strategies were formulated based on an extensive review of relevant literature on technostress, technostress coping mechanisms, and principles of adult learning. Digital literacy and technological self-efficacy plays an important role in reducing technostress and facilitating more effective adaptation to digital transformation in higher education. Therefore, higher education institutions are encouraged to adopt and implement the strategies developed in this paper as part of their professional development and capacity-building programs. It is expected that the application of these strategies can assist older lecturers in enhancing their ability to adapt to digital technologies, while simultaneously

maintaining teaching performance, academic productivity, and personal well-being in the era of digitalized higher education.

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