International Academic Institute for Science and Technology

International Academic Journal of Science and Engineering
Vol. 13, No. 3, 2026, pp. 408-416.

ISSN 2454-3896

International Academic Journal of Science and Engineering

www.iaiest.com

Adaptation and Validation of a Shortened Version of the Technostress Scale in Peruvian University Students

Erick Chávez Flores [a*], Jessica Paola Palacios Garay [b], Manuel Jesus Arista Huaco [c], Elzi Cristina Arauco Mandujano [d]

[a] Professor, Department of Education, Universidad Nacional Mayor de San Marcos, Lima, Perú.*
E-mail: echavezf@unmsm.edu.pe, Orcid: https://orcid.org/0000-0002-3413-3923
[b] Professor, Department of Education, Universidad Nacional Mayor de San Marcos, Lima, Perú.
E-mail: jpalaciosg@unmsm.edu.pe, Orcid: https://orcid.org/0000-0002-2315-1683
[c] Professor, Department of Education, Universidad Nacional Mayor de San Marcos, Lima, Perú.
E-mail: maristah@unmsm.edu.pe, Orcid: https://orcid.org/0000-0002-1639-5372
[d] Professor, Department of Education, Universidad Nacional de Educación Enrique Guzmán y Valle, Lima, Perú.
E-mail: earauco@une.edu.pe, Orcid: https://orcid.org/0000-0002-7362-4338

Abstract

The fast-paced adoption of Information and Communication Technologies (ICTs) in education has brought many changes to the way learning environments are created, providing flexibility of access to learning sources while, at the same time, posing some behavioral and psychological problems for the learners. Frequent use of the technology-based platforms in the educational process can cause mental strain, problems related to adaptation to technologies and ICTs-related stress, which may affect the learning process and engagement in the use of digital technologies. This paper presents and justifies a measurement framework for assessing ICT-induced technostress in the context of university education to reveal psychological obstacles faced by students studying within the technology-supported learning environment. A non-experimental, quantitative, cross-sectional study was carried out involving 306 undergraduate students from Peruvian universities using the modified Technostress Scale. The framework evaluates five important dimensions of using digital technologies: fatigue, skepticism, addiction, anxiety, and inefficiency. CFA and SEM analysis tools have been used to establish the validity, reliability, and performance of the proposed conceptual framework. The results show that there is high internal consistency through the values of McDonald's Omega ($\omega \geq 0.70$), good factor loadings ($\lambda \geq 0.50$), and great model fit performance with the values of CFI = 0.986, TLI = 0.975, SRMR = 0.026, and RMSEA = 0.058. The validated framework offers empirical knowledge about the psychological determinants that affect ICT adoption among university students and makes an important contribution to human-centered information systems research by providing a reliable way of identifying ICT barriers.

Keywords: Technostress, Information and Communication Technology, Human-Computer Interaction, Digital Learning Systems, Structural Equation Modeling, Technology Adoption, User Experience.

DOI: 10.71086/IAJSE/V13I3/IAJSE13124
Received: 20 June, 2026/Revised: 23 July 2026/Accepted: 26 August 2026/Published: 15 September 2026

Introduction

Fast ICT development has brought significant transformation into higher education systems with the appearance of electronic learning environments, online collaborative spaces, cloud-based educational services and technology-aided educational activities (Alotaibi, 2025; Noboa et al., 2024). While this transformation made knowledge provision more accessible, flexible and efficient, it was accompanied by a number of new problems such as adaptation difficulties, technological complexity, information overload and ongoing changes (Fu et al., 2025). In technology-aided learning environments, information systems' performance is not only based on technological features but also on users' skills to engage with digital technologies.

Under the framework of human-oriented information systems, user experience and psychological reactions play an important role in technology adoption. Although contemporary educational technologies bring many advantages to learners, too much reliance on digital technologies may cause some difficulties for users. Such difficulties as inability to cope with multiple digital applications, adapt to constant changes in technologies, comprehend complicated interfaces and interact effectively with technology-aided educational systems are typical for learners (Gebhardt et al., 2025). These challenges may reduce technology acceptance, decrease engagement, and negatively influence the overall quality of digital learning experiences.

One of the key human-factor problems related to the use of ICTs is technostress, which is defined as psychological stress caused by the inability of people to cope with technological pressure (Manzanero et al., 2024). As opposed to general stress, technostress arises as a result of constant interaction between people and technology. It can be caused by factors such as technology overload, complexity, uncertainty, hyperconnectivity, and dependence on technology (Keshavarz et al., 2025). In the field of education, the problem of technostress has become increasingly relevant since modern learners must constantly interact with LMS, virtual classes, testing systems, and digital communication means (Daud, 2025; Routray & Khandelwal, 2024).

The recent development in the sphere of digital education has made it necessary to understand the psychology-related problems connected with the usage of ICTs Maican et al., (2025). Even though ICT-based learning environments are helpful in making learning accessible to students, their inability to cope with technology may result in negative experience of using technologies (Maier et al., 2022). Thus, the evaluation of technostress becomes an integral part of designing adaptive information systems (Ficapal-Cusí et al., 2025; Verde-Avalos et al., 2025).

The prior studies on technostress have predominantly concentrated on studying technostress from the perspectives of psychology, behavior, and education (Yang et al., 2025). Prior literature has studied technostress based on identification of stress dimensions, measurement of technology acceptance, and the impact of digital technologies on the well-being of users. Nonetheless, little research has been done regarding the study of technostress as a problem of information systems and human-computer interaction (Jain et al., 2025). Traditional technology acceptance models mostly assess the positive attributes like usefulness and ease of use, but they fail to comprehend the negative psychological reactions that occur during extended use of digital technologies (Wang & Beh, 2025).

Additionally, the current measurement instruments used for assessing technostress need very long questionnaires and hence unsuitable for quick assessment in learning environments supported by technology (Keshavarz et al., 2025). There is a need for an instrument which could easily assess the ICT stressors while ensuring high psychometric reliability (Ab Hamid et al., 2017). This framework will help educational institutes and system designers design adaptive digital environments taking into account the performance of the technology as well as the health of the users.

To solve these problems, this study introduces and validates an abbreviated ICT-induced Technostress Assessment Framework for university students. This framework assesses five important aspects of technology-based stress-fatigue, skepticism, addiction, anxiety, and inefficacy. Quantitative method of research is used here through Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM).

Research Questions

RQ1: What are the key dimensions of technostress due to ICT use that university students face when studying in technology-supported environments?

RQ2: How do the dimensions of fatigue, skepticism, addiction, anxiety, and inefficacy help assess technostress due to ICT usage by university students?

RQ3: Is the developed human-centered framework for assessing technostress due to ICT usage reliable and valid enough for measuring the problem?

RQ4: What are the structural connections between various technostress dimensions while interacting with technology-supported learning systems by university students?

RQ5: How can assessment of technostress help create technology-supported and user-centered digital learning environments?

The key contributions made by this research are as follows:

1. Construction of ICT-oriented technostress assessment model that will assist in assessing user difficulties in digital learning systems.
2. Establishing the reliability and validity of technology-based stress measures through CFA and SEM techniques.
3. Contributing human-centered perspective in the design of information systems to develop more user-oriented digital learning platforms.

This paper is organized in the following way: Section II contains relevant literature about ICT adoption, technostress, and human computer interaction. Section III is devoted to the description of the technostress assessment model and the methodology used in this research. The experimental findings and validation process are considered in Section IV. Finally, Section V concludes the study.

Related Work

ICT Adoption and Human-Centered Information Systems

With the advent of ICTs, the educational environment has been changed by means of digital learning environment, online collaboration tools, and technology-enabled academic system (Cataldo et al., 2023). But apart from technological effectiveness of these systems, it is important how users cope with these technologies and how they interact with it. Technology adoption models that are currently existing take into account only the positive factors such as usefulness and usability of technology. Nevertheless, there is no explanation about negative user experiences such as cognitive overload, anxiety, and decrease in self-confidence in the process of using technology. Hence, it is necessary to pay special attention to the users' psychological reactions in designing information systems.

Technostress in Digital Learning Environments

The term technostress represents the psychological distress faced by people when they find themselves unable to cope with the technological pressures they face. This problem results from various issues such as technology complexity, technology overload, uncertainty, and constant changes in digital technology (Maier et al., 2022; Pang & Wang, 2025). In the academic setting, the rising usage of online learning systems has created some problems for learners. While ICT enhances the ease of learning and increases access, technology adaptation challenges can negatively affect users' satisfaction levels and motivation. Therefore, it becomes essential to measure technostress.

Technostress Measurement Approaches

Reliability analysis, confirmatory factor analysis, and structural equation modeling have been used to develop instruments for assessing technostress in previous research studies (Fu et al., 2022). Nevertheless, many of the existing frameworks only consider the workplace context and cannot capture the experiences of students interacting with technology-based learning systems (Li, 2016). There is a need for shorter and validated assessment frameworks that will help in measuring ICT-induced stress in an effective manner (Cheung et al., 2024; Fu et al., 2022). Such frameworks would help in designing adaptive and usable information systems.

Research Gap

In previous research work, studies have concentrated primarily on studying technostress from psychological and educational angles without considering the aspects of technostress as a problem from the human factors point of view. Further, limited research work has been done in relation to the development of compact frameworks for assessing technostress in digital learning environments. Hence, this paper will develop and validate ICT-induced technostress assessment framework through CFA and SEM techniques among university students.

Methodology

Research Design and Study Context

In this study, a research methodology that is quantitative, non-experimental, and cross-sectional will be applied in order to create a technostress assessment framework that takes into consideration human factors in ICT-induced

technostress. The research will take place in higher education institutions situated in Lima, Peru, and it involves students who use ICT-based learning, communication, and academic tools.

The purpose of this study is to analyze the impact of interaction with ICT-based learning systems on students' psychological reactions and technology adaptation. According to the suggested framework, technostress is a problem associated with the human factor in information systems, where successful technology use is determined by technology and user factors.

Participants and Data Collection Procedure

The study population involved undergraduate students attending higher educational institutions in Lima, Peru. A purposive sampling method was employed where respondents with prior experience in using ICT tools for academic purposes were selected. The respondents sampled in the study were 306 undergraduate students, comprising 129 male respondents (42.2%) and 177 female respondents (57.8%). They belonged to the fields of accounting (38.89%), engineering (33.01%), and business administration (28.10%).

Information was gathered through the use of a structured questionnaire distributed using Google forms. The respondents were enlightened on the objectives of the study and the process of participation. The responses collected reflected students' experience with common academic technologies such as laptops, computers, smartphones, and tablets.

ICT-Induced Technostress Framework

The suggested framework measures the difficulties associated with the use of technologies encountered by the students while interacting with the digital learning system. The framework is based on five dimensions: fatigue, skepticism, addiction, anxiety, and inefficacy.

Fatigue is considered as exhaustion from using the digital technologies, skepticism implies the uncertainty about the efficiency of the technologies, addiction is the excessive use of digital technologies, anxiety is the emotional discomfort while using the technology, and inefficacy is the lowered confidence in the ability to work with ICT-based systems.

The general methodology includes the following steps: analysis of the ICT use, evaluation of technostress dimensions, validation of the measurement model, and determination of the interrelationships among the psychological factors associated with technology.

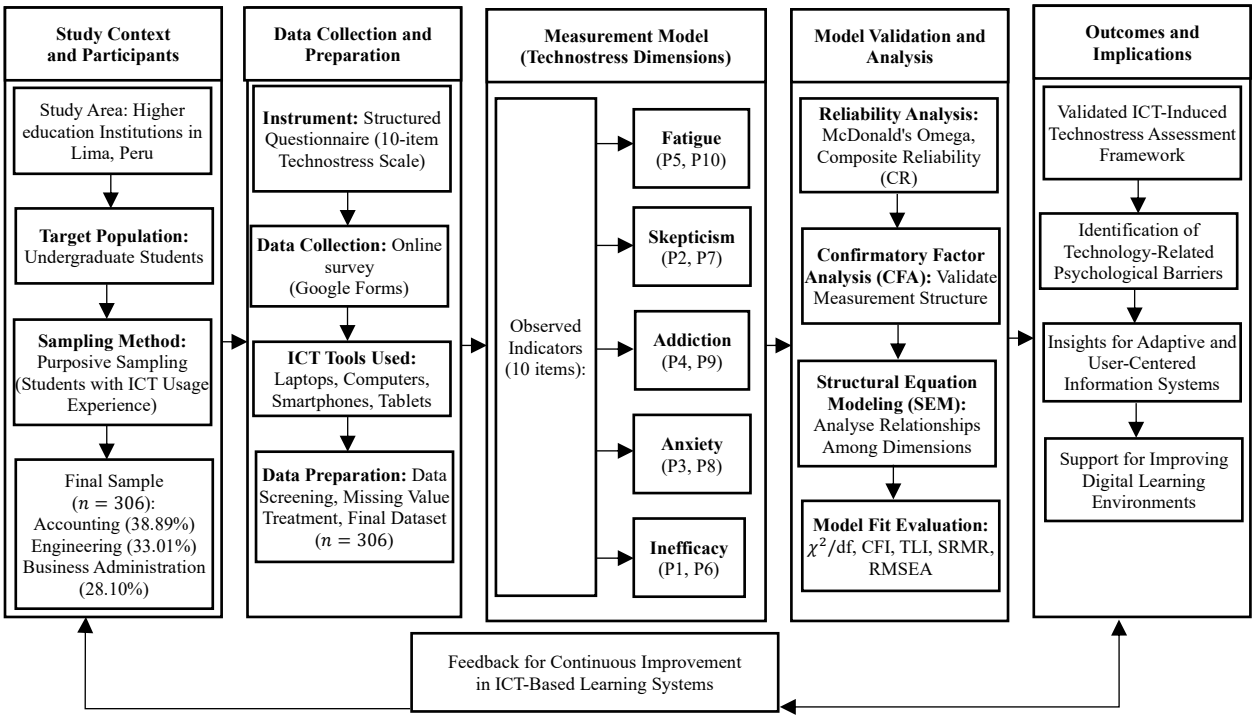

Fig. 1: Research Methodology Framework for ICT-Induced Technostress Assessment

Fig. 1 shows the general methodology framework that has been employed in this study to assess ICT-based technostress in technology-enhanced learning environments. The methodology framework starts with the identification of the research context, selection of participants, ICT use characteristics, and data collection.

Measurement Model and Statistical Analysis

The short-form Technostress Scale used in this study consists of 10 items grouped into five dimensions: fatigue, skepticism, addiction, anxiety, and inefficacy. Each construct was measured using two observed indicators evaluated through a Likert-scale questionnaire. The complete item descriptions and their corresponding dimensions are presented in table 1 to ensure transparency and reproducibility of the measurement framework.

Table 1: Technostress Scale Items and Dimension Mapping

Dimension	Indicator	Measurement Item
Inefficacy	P1	I feel ineffective when using digital technologies for academic activities.
Inefficacy	P6	I feel less confident about my ability to complete tasks using ICT tools.
Skepticism	P2	I doubt whether digital technologies improve my learning outcomes.
Skepticism	P7	I am uncertain about the effectiveness of technology-based learning systems.
Anxiety	P3	I feel uncomfortable when using technology for learning purposes.
Anxiety	P8	I feel tense or worried while interacting with digital technologies.
Addiction	P4	I have an internal impulse to use digital technologies frequently.
Addiction	P9	I feel anxious when I cannot access digital technologies.
Fatigue	P5	I feel exhausted after prolonged use of ICT tools.
Fatigue	P10	I feel tired after using digital technologies for academic activities.

The responses were collected using a five-point Likert scale ranging from strongly disagree to strongly agree. These observed indicators were used as reflective measures for their respective latent constructs in the Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) analyses.

Results

Participant Characteristics and ICT Usage Analysis

The survey used a total of 306 undergraduate students enrolled at higher learning institutions located in Lima, Peru. There were 129 male students (42.2%) and 177 female students (57.8%) who responded to the survey. The respondents consisted of three academic majors including accountancy (38.89%), engineering (33.01%) and business administration (28.10%).

From the ICT use profile, the students used laptops in most of their academic interactions (45.42%), followed by computers (28.43%), smart phones (21.57%) and tablets (4.58%). This shows that the students are very dependent on digital technology in their academic interactions hence the need to examine technology-related issues that may affect users.

Table 2: Demographic Characteristics and ICT Usage Profile of Participants

Category	Group	Frequency	Percentage (%)
Gender	Male	129	42.2
	Female	177	57.8
Academic Discipline	Accounting	119	38.89
	Engineering	101	33.01
	Business Administration	86	28.10
ICT Device Usage	Laptop/Notebook	139	45.42
	Computer	87	28.43
	Smartphone	66	21.57
	Tablet	14	4.58

Table 2 shows the demographic structure and use of ICT by the participants. The findings show that students from various educational backgrounds have frequent interactions with the digital technologies, thus forming an appropriate environment to assess technostress caused by ICT use.

Descriptive Analysis of ICT-Induced Technostress Factors

In order to measure the objective of determining the difficulties with the use of technology faced by students, descriptive analysis was conducted using ten measurement questions reflecting five dimensions of technostress: fatigue, skepticism, addiction, anxiety, and inefficacy.

According to the findings, there is a discrepancy in the experience of using digital technologies by students. The question with the highest mean value was related to the continuous use of technologies (M = 3.09, SD = 1.39), which implies a degree of reliance on ICT. The question with the lowest mean value was related to discomfort when using technologies for learning (M = 1.08, SD = 1.13).

Table 3: Descriptive Statistics of ICT-Induced Technostress Indicators

Item	Mean	SD	Skewness	Kurtosis
Ineffective at using technology	1.67	1.36	1.051	1.079
Less confident about technology contribution	1.64	1.20	0.399	-0.564
Technology causes discomfort	1.08	1.13	1.135	0.947
Internal impulse to use technology anytime	3.09	1.39	0.061	-0.162
Feel exhausted after ICT usage	2.36	1.25	0.209	-0.392
Unsure about completing tasks using ICT	2.03	1.27	0.371	-0.252
Doubt technology learning outcomes	1.87	1.15	0.532	-0.172
Feel tense while using technology	1.35	1.06	0.703	0.168
Anxiety without technology access	2.38	1.62	0.282	-0.728
Feel tired after technology usage	1.92	1.25	0.394	-0.023

Table 3 shows that there are varying degrees of ICT-related stress among students. Although digital technology is used for educational purposes, overreliance on them could result in exhaustion and anxiety.

Reliability Assessment of the Measurement Framework

For the validation of the ICT technostress model suggested above, internal consistency testing was conducted. Overall reliability was assessed through McDonald's omega, whereas composite reliability (CR) was used for each dimension separately.

The value of omega coefficient ($\omega = 0.783$) suggests acceptable reliability of the entire framework. Composite reliability coefficients ranged from 0.61 to 0.74, thus proving reliability of all five dimensions suggested above

Table 4: Reliability Evaluation of ICT-Induced Technostress Dimensions

Construct	Reliability Measure	Value
Overall Technostress Framework	McDonald's Omega	0.783
Fatigue	Composite Reliability	0.61
Anxiety	Composite Reliability	0.74
Inefficacy	Composite Reliability	0.70
Addiction	Composite Reliability	0.65
Skepticism	Composite Reliability	0.72

Table 4 verifies that the suggested measuring framework ensures sufficient reliability to measure challenges facing users within ICT-based learning environments. CR values for fatigue (0.61) and addiction (0.65) are marginally below the suggested threshold, but since the measures were operationalized using just two items, such CR scores can be expected to be lower. In light of the reasonable factor loading and the adequate reliability of the construct (McDonald's Omega = 0.783), these dimensions are retained. Further research will verify these constructs using more measures.

Confirmatory Factor Analysis and Model Evaluation

To fulfill the aim of validating the developed human-centered ICT assessment framework, analyses such as CFA and SEM were conducted. In total, three different models were analyzed in order to select the best-fit representation of technostress dimensions.

Model 1, consisting of five first-order dimensions, achieved the best performance with:

- $\chi^2/df = 2.032$
- CFI = 0.986
- TLI = 0.975

- SRMR = 0.026
- RMSEA = 0.058

This study indicates that a five-dimensional framework is appropriate for modeling technostress caused by ICTs amongst college students.

Table 5: Comparison of CFA Models for ICT-Induced Technostress Framework

Fit Index	Model 1	Model 2	Model 3
χ^2/df	2.032	4.193	1.816
CFI	0.986	0.949	0.966
TLI	0.975	0.923	0.939
SRMR	0.026	0.042	0.032
RMSEA	0.058	0.102	0.052

Table 5 shows other factor structures considered. Model 1 has shown a well-balanced performance among all the fit indices, and this clearly establishes that fatigue, skepticism, addiction, anxiety, and inefficacy are different ICT-induced technostress constructs.

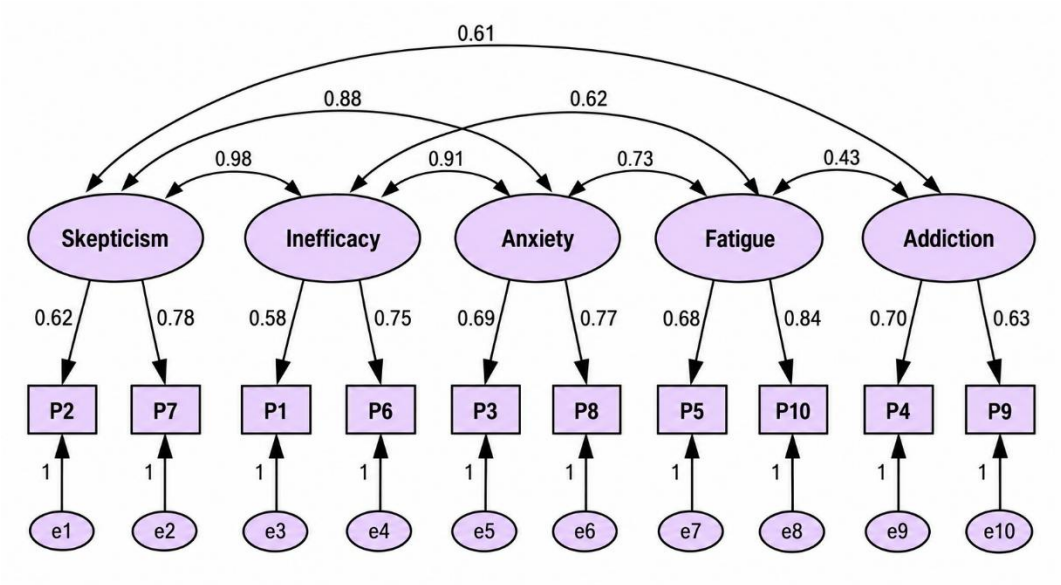

Fig. 2: Path Diagram of the Technostress Scale

The relationships between the five dimensions of technostress can be seen in fig. 2. It shows how technology-related uncertainty, lack of confidence, emotions, and dependence on technology interact in an electronic learning environment.

Structural Relationship Analysis

SEM findings highlighted the existence of significant relationships between the technostress dimensions. Skepticism was highly correlated with inefficacy (r = 0.98) and anxiety (r = 0.88), implying that skepticism regarding the effectiveness of technology affects the level of self-confidence of the students.

Inefficacy was highly correlated with anxiety (r = 0.91) and fatigue (r = 0.62). Additionally, there was a high correlation between anxiety and fatigue (r = 0.73) as well as between fatigue and addiction (r = 0.43).

Even though high correlations existed among some of the dimensions, it simply shows that there are strong relations existing between these constructs because they are highly associated psychologically, but not that they are conceptually overlapping. Nevertheless, it is recommended that future research on discriminant validity be carried out, especially through HTMT.

These correlations suggest that ICT-induced stress is not created by a single factor, but rather is the result of user interactions with technology.

Implications for ICT-Based Learning Systems

The validated model offers significant implications in terms of human-centered information system development. The results suggest that successful implementation of digital learning entails taking into account not only the capabilities of the digital technology but also the user's adaptation to the technology.

Educational organizations are able to use the suggested assessment technique to identify barriers associated with technology prior to implementing digital systems. Training, technical assistance, and user-friendly interface can decrease the level of anxiety and inefficacy of the users.

From an information systems standpoint, combining user psychological assessment with system usability analysis would be useful for designing sustainable digital learning environment.

Conclusion

The current study proposed and validated a human-centred ICT induced technostress measurement framework to assess problems related to ICT use in digital learning environments. The proposed ICT induced technostress measurement framework incorporated five aspects of technostress, namely, fatigue, skepticism, addiction, anxiety, and inefficacy. The reliability analysis of the model showed adequate internal consistency with McDonald's omega value of 0.783. Moreover, the proposed measurement framework was validated using Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM), with strong fit values (χ^2/df = 2.032, CFI = 0.986, TLI = 0.975, SRMR = 0.026, and RMSEA = 0.058). The results revealed that the measurement of ICT induced technostress could be achieved using the proposed five aspects. The findings emphasize that technostress is affected by interconnected user variables, such as uncertainty, lack of confidence, anxiety, and fatigue, resulting in difficulties in adapting to digital technology. Consequently, the measurement of technostress needs to be seen as an important part of information system evaluation, especially with respect to technologically enabled learning systems. In this regard, the suggested framework holds value for educational organizations and ICT systems developers by recognizing some user-related barriers, which could impact the acceptance and learning process in using technology. Through the incorporation of the technostress assessment within ICT system development, more adaptive and accessible digital learning environments can be created. The study is constrained by the specific target population of university students and the nature of the collected data as self-reporting. Further studies will verify the framework on different populations, include behavioral data from digital platforms, and assess artificial intelligence-based adaptive systems.

References

Ab Hamid, M. R., Sami, W., & Mohmad Sidek, M. H. (2017, September). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. In *Journal of physics: Conference series* (Vol. 890, No. 1, p. 012163). IOP Publishing. https://doi.org/10.1088/1742-6596/890/1/012163

Alotaibi, N. B. (2025). Exploring the impact of factors on mobile learning adoption and academic performance: A study of undergraduate students in Riyadh region universities, Kingdom of Saudi Arabia. *Education and Information Technologies*, *30*(8), 11185-11221. https://doi.org/10.1007/s10639-024-13232-7

Manzanero, E. P. B., Sandoval, A. G. P., & Mazariego, E. R. P. (2024). Validation of an instrument using exploratory factor analysis to measure technostress in university students. *Health Leadership and Quality of Life*, *3*, 1. https://doi.org/10.56294/hl2024.426

Cataldo, A., Bravo-Adasme, N., Araya, P., & Ormeño, V. (2023). Why university students are technostressed with remote classes: Study-Family conflict, satisfaction with university life, and academic performance. *Telematics and Informatics*, *80*, 101982. https://doi.org/10.1016/j.tele.2023.101982

Cheung, G. W., Cooper-Thomas, H. D., Lau, R. S., & Wang, L. C. (2024). Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations. *Asia pacific journal of management*, *41*(2), 745-783. https://doi.org/10.1007/s10490-023-09871-y

Daud, N. M. (2025). From innovation to stress: analyzing hybrid technology adoption and its role in technostress among students. *International Journal of Educational Technology in Higher Education*, *22*(1), 31. https://doi.org/10.1186/s41239-025-00529-x

Yang, D., Liu, J., Wang, H., Chen, P., Wang, C., & Metwally, A. H. S. (2025). Technostress among teachers: A systematic literature review and future research agenda. *Computers in Human Behavior*, *168*, 108619. https://doi.org/10.1016/j.chb.2025.108619

Ficapal-Cusí, P., Peñarroja, V., Enache-Zegheru, M., & Salazar-Concha, C. (2025). Employee technostress: Analyzing the influence of sociodemographic characteristics on techno-stressors and their consequences. *International Journal of Human–Computer Interaction*, *41*(2), 1309-1322. https://doi.org/10.1080/10447318.2024.2313926

Fu, Y., Wen, Z., & Wang, Y. (2022). A comparison of reliability estimation based on confirmatory factor analysis and exploratory structural equation models. *Educational and Psychological Measurement*, *82*(2), 205-224. https://doi.org/10.1177/00131644211008953

Fu, S., Yu, J. J., Gu, H., & Song, X. (2025). Unpacking dual effects of ambivalence toward technologies in online live streaming learning. *Information Technology & People*, *38*(2), 851-874. https://doi.org/10.1108/ITP-03-2023-0246

Gebhardt, J. S., Harth, V., Groneberg, D. A., & Mache, S. (2025, June). Digitalization in Dentistry: Dentists' Perceptions of Digital Stressors and Resources and Their Association with Digital Stress in Germany—A Qualitative Study. In *Healthcare* (Vol. 13, No. 12, p. 1453). MDPI. https://doi.org/10.3390/healthcare13121453

Wang, X., & Beh, L. S. (2025). Navigating new terrain: Diverse effects of social media on employee performance in China's social commerce sector. *IEEE Transactions on Professional Communication*, *68*(2), 209-227. https://doi.org/10.1109/TPC.2025.3564369

Jain, S., Varma, V., Vijay, T. S., & Cabral, C. (2025). Technostress influence on innovative work behaviour and the mitigating effect of leader-member exchange: A moderated mediation study in the Indian banking industry. *Acta Psychologica*, *255*, 104875. https://doi.org/10.1016/j.actpsy.2025.104875

Keshavarz, H., Saeidnia, H. R., & Wang, T. (2025). Navigating technostress: a deep dive into health practitioners' technological challenges in hospital settings. *BMC health services research*, *25*(1), 18. https://doi.org/10.1186/s12913-024-12196-1

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, *48*(3), 936-949. https://doi.org/10.3758/s13428-015-0619-7

Maican, C. I., Cazan, A. M., Cocoradă, E., Dovleac, L., Lixăndroiu, R. C., Maican, M. A., & Cocoradă, S. A. (2025). The role of contextual and individual factors in successful e-learning experiences during and after the pandemic–a two-year study. *Journal of Computers in Education*, *12*(2), 589-624. https://doi.org/10.1007/s40692-024-00323-0

Maier, C., Laumer, S., Thatcher, J. B., Wirth, J., & Weitzel, T. (2022). Trial-period technostress: A conceptual definition and mixed-methods investigation. *Information Systems Research*, *33*(2), 489-514. https://doi.org/10.1287/isre.2021.1047

Noboa, A., Morejón, E., & Tapia, F. (2024, July). Emotion Recognition Framework for Real-Time Occupational Health Analysis, Applying a Multimodal Method Based on Deep Learning. In *Multidisciplinary International Conference of Research Applied to Defense and Security* (pp. 345-356). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-96-0235-3_28

Pang, H., & Wang, Y. (2025). Deciphering dynamic effects of mobile app addiction, privacy concern and cognitive overload on subjective well-being and academic expectancy: The pivotal function of perceived technostress. *Technology in Society*, *81*, 102861. https://doi.org/10.1016/j.techsoc.2025.102861

Routray, R., & Khandelwal, K. (2024). Artificial intelligence (AI) adoption: do Generation Z students feel technostress in deploying AI for completing courses of study at universities? *Asian Education and Development Studies*, *13*(5), 534-545. https://doi.org/10.1108/AEDS-06-2024-0115

Verde-Avalos, E., Turpo-Chaparro, J. E., Palomino-Ccasa, J., Requena-Cabral, G., & Malca-Peralta, S. S. (2025). Validation of measurement scale for technostress in Peruvian university students. *Frontiers in Psychology*, *16*, 1503442. https://doi.org/10.3389/fpsyg.2025.1503442