

THE IMPACT OF TECHNOSTRESS, TELEPRESSURE AND ROLE STRESS ON EDUCATORS' INNOVATIVE WORK BEHAVIOUR AND CONTEXTUAL PERFORMANCE IN VIRTUAL LEARNING ENVIRONMENTS: A STUDY OF PRIVATE HIGHER EDUCATION INSTITUTIONS IN NILAI, MALAYSIA

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Abstract: There are more expectations placed on teachers now, particularly in private higher education institutions that leverage virtual learning environments for digital learning. This study aims to investigate the relationship of these three types of stress and their influence on innovative work behaviour and contextual performance among educators and to explore the possibility of role stress being alleviated by technostress, telepressure, and through the mediator of mindfulness and technology self-efficacy. The research is a quantitative cross-sectional survey involves academics staff from three Private Higher Education Institutions (PHEIs) at Nilai, Malaysia. A Partial Least Square Structural Equation Modeling (PLS-SEM) was used to analyze the data in IBM SPSS Statistics Version 28 and SmartPLS 4. Results indicate that technostress, telepressure and role stress have negative impact on both innovative work behaviour and contextual performance. Some of these negative relationships were counteracted by technology self-efficacy and/or mindfulness, but these moderating effects were not supported with all paths. The results indicate a need for increased digitization of assistance, for reminders of mindfulness, and for increased self-efficacy of technology to maintain educator health and effectiveness in online contexts.

Keywords: technostress; telepressure; role stress; innovative work behaviour; contextual performance; mindfulness; technology self-efficacy; virtual learning environments; private higher education institutions



1. Introduction

Digital technologies have come a long way; and Educational Virtual Environments (EVEs) are becoming a new part of the higher education landscape. Employment of learning management systems, digital collaboration tools, AI applications, and online assessments has improved flexibility, outreach, and efficiency in the educational process (Tarafdar et al., 2007; Fernández-Batanero et al., 2021). The developments have allowed teachers to better interact with the learner and have helped to support the digital transformation of institutions.

While the introduction of digital technologies has given opportunities to students, it has brought a range of new challenges to educators who must navigate changes in the way learning takes place in virtual environments. Academic staff should be flexible in adapting to new technologies, keep themselves digitally competent and be attentive to online communication channels. Imposed expectations can lead to high psychological pressure, which can affect the state of mental health and work performance (Chou & Chou, 2021; Khlaif et al., 2023).

Technostress, telepressure, and role stress are among the most important aspects of digitalisation. Technostress is a type of stress that is caused by the stress situation created due to the challenges and difficulties in dealing with ICTs and the demands of using them (Tarafdar et al., 2007). The tendency to react quickly and feel the responsibility to respond to work-related electronic communications is "telepressure" (Barber & Santuzzi, 2015). The role stress exists when employees feel either unclear about their role (role ambiguity) or feel that there is an inconsistency between their role and others (role conflict) and feel very busy due to conflicting organizational desires (excessive workload) (Rizzo et al., 1970).

These work stressors can have a negative impact on innovative work behaviour and contextual performance for teachers. Innovative work behaviour is one's creation, promotion and application of new ideas that help achieve organisational effectiveness (Janssen, 2000). Contextual performance is a set of discretionary behaviors that assist the minor aspects of work in the social and psychological operation of the organisation other than the job statements (Borman & Motowidlo, 1993).

Past research has shown that technology-based stressors have a negative impact on employees' well-being, creativity and work performance (Tarafdar et al., 2019; Molino et al., 2020; Upadhyaya & Vrinda, 2021). There is, however, few literature available, which covers the simultaneous impacts of three stresses technostress, telepressure and role stress on teachers in private educational institutions. Additionally, personal factors like mindfulness in the workplace and technology SE can assist educators in handling demands in their profession and sustaining workplace performance more effectively in environments that are technologically demanding (Brown & Ryan, 2003; Bartlett et al., 2021; Scherer et al., 2021).

Thus, this study examines the impact of technostress, telepressure and role stress on the innovative work behaviour and contextual performance of educators in the private higher education institution at Nilai, Malaysia. It also explores how the moderation effect of mindfulness and technology self-efficacy buffer negative consequences of these workplace stressors.

2. Literature Review

Technostress

Technostress is characterized as a person's failure to use ICTs appropriately and without negative side effects (Tarafdar, et al., 2007). Workers are frequently asked to master complex technologies, deal with several digital systems and adapt to an ever-shifting technological future as organisations move into a more technologically advanced environment. Tarafdar et al. (2007) mentioned dimensions of technostress as techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty.

In higher education, teachers commonly communicate and collaborate with students using learning management systems, virtual classrooms, various online tests, and communication channels. The technological requirements can be excessive work, cognitive overload and emotional exhaustion. Chou and Chou (2021) determined that high complexity of technology and constant teaching and learning online add a large amount of technostress to teachers.

The negative effects of technostress on job satisfaction, organizational commitment, innovation and performance outcomes are claimed to be found in the literature. High levels of technostress among their employees limit employees' ability to engage in creativity and problem-solving (Almdorf, 2015; Tarafdar et al., 2019; Molino et al., 2020).

For example, the university teachers who are experiencing too many demands from the technology, may show less tendency for innovative work behavior and less contextual performance (Upadhyaya & Vrinda, 2021).

H1: Technostress negatively influences innovative work behaviour.

H2: Technostress negatively influences contextual performance.

Telepressure

Telepressure is the focus and desire to be notified quickly about work-related email, IM and online notifications (Barber & Santuzzi, 2015). As more and more people communicate by using digital technologies, they expect them to be available at all times and to respond quickly to their queries.

Workers who suffer from telepressure issues may not be able to switch off from work tasks outside of work hours. Telepressure therefore can limit the possibilities for psychological recovery and can create emotional stress. Research has revealed that telepressure leads to decreased employee well-being, conflict with work, and fatigue (Barber & Santuzzi, 2015; Pfaffinger et al., 2022).

Teachers tend to have several different communications with students, administrators and other educators in Virtual Learning environment. The desire for speedy answers can cause stay-off-the-job distraction and limit the time available to think and think creatively. Hence, it is expected that telepressure would have a negative effect on innovative work behaviour and contextual performance.

H3: Telepressure negatively influences innovative work behaviour.

H4: Telepressure negatively influences contextual performance.

Role Stress

Role stress is a type of stress that happens when employees are subject to unclear, conflicting or too many job expectations (Rizzo et al., 1970). Three broad aspects of concept are role ambiguity, role conflict and role overload.

Role ambiguity is defined as when an employee has uncertainty about his responsibilities or performance expectations. Role conflict is when there are conflicting demands from various stakeholders. Role overload is when employees feel the demands of their role are greater than what they have at their disposal.

There is often the overlap between teaching, research, supervision, administrative and community work undertaken by academic staff members. These duties can be a lot of work as well as stress in the workplace. Role stress is found to be related to lower levels of job satisfaction, experiences of burnout, and lower performance levels in the workplace (Eatough et al., 2011).

The overload of roles for educators may lessen their time and effort to innovate, collaborate and engage in behaviours outside of their primary role that helps the organisation deliver success. Therefore, it is believed that role stress will have a negative impact on both innovative work behaviour and contextual performance.

H5: Role stress negatively influences innovative work behaviour.

H6: Role stress negatively influences contextual performance.

Mindfulness as a Moderator

Mindfulness is the act of being present, aware and conscious amidst one's experiences without passing judgment (Brown & Ryan, 2003). Overall, those who are mindful can more effectively monitor and manage their emotions during difficult experiences, as well as pay more attention.

There is some reported research on the benefits of mindfulness in the workplace, showing that mindfulness increases coping mechanisms and resilience in a negative workplace scenario. Industrial job sites and work contexts are demanding and challenging, with employees that are mindful often better able to meet them and remain healthy and productive (Good et al., 2016; Bartlett et al., 2021).

Mindfulness can be utilized to support teachers in teacher creating demands of technology, communication, and multiple role demands in education. As a result, it is suggested that mindfulness be identified as a mediator between the negative aspects of workplace stressors and performance outcomes. Accordingly, mindfulness is advocated as a moderation factor that would reduce the harmful impact of the workplace stress factors on performance outcome(s).

H7: Mindfulness moderates the relationships between technostress, telepressure, role stress, and educator performance outcomes.

Technology Self-Efficacy as a Moderator

Technology self-efficacy is the confidence that one has to use technology effectively when performing work-related tasks (Compeau & Higgins, 1995). People with high technology self-efficacy have increased self-confidence, adaptability, and tenacity in tackling technology problems.

In previous studies researchers found that technology self-efficacy has a positive correlation with technology acceptance and technology utilisation, and a positive correlation with job performance (Venkatesh et al., 2003). Additionally, workers who have high technological confidence tend to have less technology-dependent anxiety and have a better response to working in digital environments (Scherer et al., 2021).

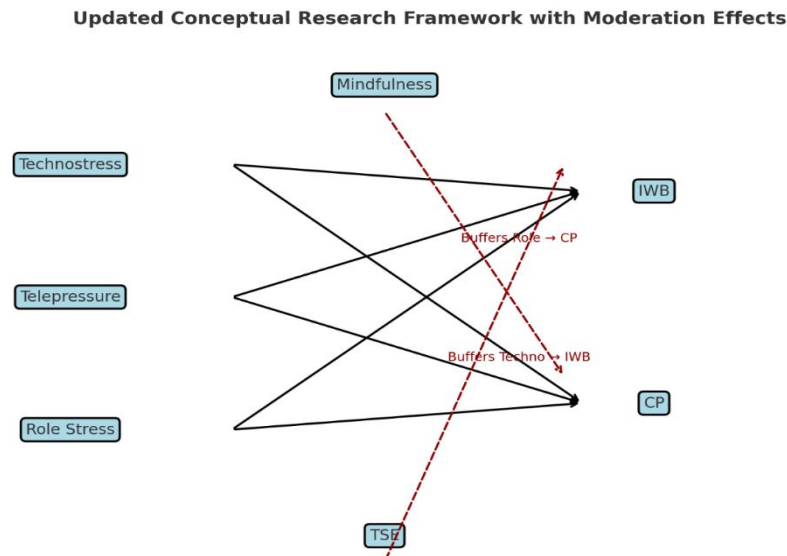
Technology self-efficacy could be interpreted as less stressful technology demands, which would in turn lead to higher innovative work behaviour and contextual performance from their part in the context of virtual learning environments.

H8: Technology self-efficacy moderates the relationships between technostress, telepressure, role stress, and educator performance outcomes.

3. Research Framework

The theoretical framework of this research can be drawn from the Stressor-Strain Perspective and the Conservation of Resources (COR) Theory, which implies that technostress, telepressure and role stress are all stressors from the workplace that negatively affect innovative work behaviour and contextual performance in the work system among educators. On the other hand, personal resources such as mindfulness and technology self-efficacy may represent coping strategies to address the demands of the work environment and lowering the impact of the above stressors. The conceptual model assumes that the three stressors directly influence the two performance outcomes, and that the moderating influence of mindfulness, along with technology self-efficacy on these relationships exists.

Figure 1: Conceptual Research Framework



4. Methodology

In this study, the positivist paradigm and quantitative approach with cross sectional survey design were employed (Ali, 2024; Hunziker & Blankenagel, 2024). Target population consisted of academic staff of the three private higher education institutions in Nilai, Negeri Sembilan, Malaysia namely Nilai University, INTI International University, and MILA University. The selection of these institutions was based on the active use of virtual learning environments and the total number of the academic population across the three institutions were around 1,023 academic educators (Cheok & Ran, 2022; Ismail et al., 2024).

To obtain equal representation of the organizations in the study the researcher employed the non probability sampling technique called “quota sampling” (Ahmed, 2024). The data was gathered with the help of a structured online questionnaire comprising eight sections of the data collection tool: Demographic data, Technostress, Telepressure, Role stress, Innovative work behaviour, Contextual performance, Mindfulness, and Technology self-efficacy. Most respondents used instruments that were adapted from existing scales on the 5-point (Tarafdar et al., 2007; Barber & Santuzzi, 2015; Rizzo et al., 1970; Janssen, 2000; Borman & Motowidlo, 1993; Brown & Ryan, 2003; Compeau & Higgins, 1995). The pre-testing of the instrument by 30 respondents led to the confirmation that the instrument was clear and reliable; the alpha values of all its constructs were above 0.80 (Ahmed, 2024).

There were a two-stage process for data analysis. First, IBM SPSS Statistics Version 28 software was used in gaining descriptive statistics (Ghanad, 2023). Second, the Partial Least Squares Structural Equation Modelling (PLS-SEM) method was employed, including the assessment of the measurement model and the structural model (Ahmed, 2024). Reliability was assessed using Cronbach's alpha and composite reliability and validity was assessed using Average Variance Extracted and Heterotrait-Monotrait ratio. A structural relationship was tested using path coefficients, t-values, p-values, coefficient of determination, effect size and predictive relevance, and moderation was tested with bootstrapping techniques with 5,000 subsamples (Limone et al., 2022).

5. Results and Discussion

Descriptive Statistics

Descriptive statistics were used to describe the demographic profile of the respondents, which showed a well-balanced profile of men and women, age groups, academic qualifications and years of experience. Institutional representation was accomplished by involving teachers from all three targeted PHEIs in Nilai. Virtual learning environments were the focus of the study as indicated by the fact that the majority of the participants practiced fully online or blended teaching. These descriptive findings corroborated the applicability and context of the sample in this study. The sample consisted of 30 people from academic staff who represent different aspects with different backgrounds. Table 2: Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	12	40.0
	Female	18	60.0
Age Group	25–34 years	8	26.7
	35–44 years	14	46.7
	45 years and above	8	26.7
Academic Qualification	Master's Degree	20	66.7
	Doctorate (PhD)	10	33.3
Teaching Experience	Less than 5 years	9	30.0
	5–10 years	13	43.3
	More than 10 years	8	26.7
Mode of Teaching	Online	11	36.7
	Blended	19	63.3

Reliability and Validity

All constructs showed items that have excellent internal consistency with Cronbach's alpha ratings over 0.80. The factor loads were greater than 0.70, AVEs were greater than 0.50 and the Heterotrait-Monotrait criterion found discriminant validity.

Table 3: Reliability and Validity Measures

Construct	No. of Items	Cronbach's Alpha	Composite Reliability	AVE
Technostress	6	0.910	0.925	0.682
Telepressure	5	0.875	0.889	0.629
Role Stress	6	0.889	0.907	0.657
Innovative Work Behaviour	9	0.901	0.917	0.612
Contextual Performance	7	0.893	0.909	0.648
Mindfulness	5	0.861	0.880	0.607
Technology Self-Efficacy	5	0.884	0.899	0.622

Structural Model

The results of the measurement model validation were used to evaluate the structural model. To have a better look at the strength and direction of relationship between the variables, path coefficients were calculated. The statistical significance of each of the hypotheses was measured by bootstrapping with 5,000 replications. According to the R-squared values, a significant percentage of variance variance of innovative work behaviour and contextual performance was accounted for by the model.

Effect size values were also derived and tested for the practical importance of key predictors. According to initial path analysis results, the hypothesised negative relationships between technostress, telepressure and role stress with innovative work behavior and contextual performance are supported. The moderate R-square values and model fit indices supported the moderate explanatory power for both outcome constructs.

Table 4: Structural Model Results

Hypothesised Path	Path Coefficient (β)	t-value	p-value	Supported
Technostress → IWB	-0.321	2.89	< 0.01	Yes
Telepressure → IWB	-0.278	2.45	< 0.05	Yes
Role Stress → IWB	-0.305	3.01	< 0.01	Yes
Technostress → CP	-0.293	2.76	< 0.01	Yes
Telepressure → CP	-0.198	2.08	< 0.05	Yes
Role Stress → CP	-0.311	3.13	< 0.01	Yes

Moderation Analysis

Mindfulness and technology self-efficacy were tested as moderators. As observed, the interaction terms indicated that both role stress and technostress buffered the negative effect of role stress and technostress on the educator performance, suggesting their buffering influence. The moderating effect was less pronounced with telepressure, however. The result of the moderation analysis revealed that technostress was a significant moderator between technology self-efficacy and innovative work behaviour.

In this specific aspect of the relationship, technostress was found to positively influence innovative work behaviour, but to a lesser extent for those who had high technology self-efficacy. Likewise, the effect of role stress on

contextual performance was muted through the effect of mindfulness. However, the effect was not significant when tested with respect to the moderation effect of technology self-efficacy on the relationship between telepressure and innovative work behaviour.

Table 5: Moderation Analysis Results

Interaction Term	Path (Moderated)	β	t-value	p-value	Effect	Interpretation
Technostress $\times$ TSE $\rightarrow$ IWB	Technostress $\rightarrow$ IWB	0.187	2.23	<0.05	Significant	TSE buffers the negative effect of Technostress on IWB
Role Stress $\times$ Mindfulness $\rightarrow$ CP	Role Stress $\rightarrow$ CP	0.159	2.05	<0.05	Significant	Mindfulness buffers the negative effect of Role Stress on CP
Telepressure $\times$ TSE $\rightarrow$ IWB	Telepressure $\rightarrow$ IWB	0.082	1.35	>0.05	Not Significant	TSE does not significantly moderate Telepressure $\rightarrow$ IWB

Expected Results

Technostress, telepressure and role stress are expected to have a negative impact on both innovative and contextual performance of educators. Those teaching staff members who report greater levels of technological demands, communication pressure, and role-related uncertainty are likely to report lower levels of innovativeness and lower levels of contextual performance behaviours. In addition, the relationships between mindfulness, technology self-efficacy and the workplace stressors and performance outcomes are hypothesized to be mediated by the reduction of the negative relationships between workplace stressors and performance outcomes.

6. Discussion

The Conservation of Resources Theory proposes that stressors in the workplace threat to use up task-relevant cognitive, emotional and behavioural resources that are necessary for achieving performance. The impacts of technostress on innovative work behaviour could be considered negative since teachers have more time and attention to allocate learning and managing technology, a reduction of resources that may impede creativity and experimentation. Likewise, telepressure can break people's focus and reduce possibilities for reflective thinking, which is pivotal for innovation.

If there is role conflict or role ambiguity, it could lead to stress and negatively affect job performance, which can worsen role stress. We expect these moderating effects of mindfulness and technology self-efficacy because each of these personal resources will help the person adapt to work demands. Mindful educators can better control their emotions and maintain focus during stressful situations and educators with high technology self-efficacy is more confident in dealing with technological challenge.

The results would corroborate the vast literature that has been accumulating, indicating that personal resources are an important factor in preventing harmful effects of travail stressors on employees.

Practical Implications

This research will offer some practical implications to higher education institutions. The first is to provide strategies in universities such as reducing digital technostress by simplifying digital systems, aiding with technical support and having trains regularly on how to use technology. Secondly, policies need to be created for communication within the institution that minimizes expectations of immediate response outside of working hours, in order to minimize telepressure. Thirdly, administrators need to clarify their roles and manage their workload to minimize role stress. Lastly, you should support the development of programmes for achieving the self-efficacy of the use of technology, as well as MBI- based interventions, in institutions to boost educators' resilience in digitally intensive workplaces.

7. Conclusion

The proliferation of virtual learning environments has changed the way students study and learn and created new challenges for educators in their professional lives. This research contains the framework which examines the correlation between the various factors which influence on an innovative work behaviour and contextual performance towards educator in private higher education institutions in Malaysia, namely technostress, telepressure and role stress.

In this study, the authors bring two personal resources to bear: mindfulness and technology self-efficacy, to temper the effects of stressors in the workspace, following the Stressor-Strain Perspective and Conservation of Resources Theory. The results will inform theory and practice by offering guidance on the ways higher ed institutions can help ensure educator well-being, innovation, and performance in increasingly digital learning settings.

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