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Technostress and Teacher Performance: The Moderating Role of Work Tenure in Islamic Elementary Schools

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Abstract

This study investigates the impact of technostress on teacher performance by considering work tenure as a moderating variable. The research is grounded in the Job Demands–Resources (JD-R) model, which explains how work demands such as technology-related stress influence employee performance, moderated by individual resources like work tenure. Using a quantitative approach, data were collected through questionnaires from 120 teachers at Islamic Elementary Schools (Madrasah Ibtidaiyah Muhammadiyah) in North Klaten, Indonesia. The analysis was conducted using Moderated Regression Analysis (MRA) to test the direct and moderating effects. The findings reveal that technostress negatively and significantly affects teacher performance, indicating that excessive technological demands can reduce work effectiveness. Moreover, work tenure moderates this relationship; teachers with longer tenure experience less negative impact from technostress compared to those with shorter tenure. These results contribute to understanding how digital transformation in education affects human performance, especially in Islamic-based institutions. The study provides implications for school management to develop stress management programs and adaptive digital training to enhance teacher well-being and performance.

Keywords: technostress, teacher performance, work tenure, JD-R model, education technology

1. Introduction

The advancement of information and communication technology (ICT) has significantly transformed the educational landscape. Teachers are now required to integrate digital tools into teaching and administrative activities, which, on one hand, enhances efficiency and innovation, but on the other hand, introduces new psychological pressures. In the educational context, these pressures are often referred to as technostress, which describes the tension experienced by individuals who struggle to adapt to technological demands in their work environment (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). This phenomenon is increasingly relevant in Islamic

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elementary schools, where teachers must balance pedagogical, administrative, and religious responsibilities amid ongoing digitalization (Mohamad Haniff et al., 2022).

The rapid adoption of technology in education brings both benefits and challenges. Digital platforms allow teachers to manage learning materials, student assessments, and communication more efficiently (Delgado et al., 2015). However, continuous technological changes, complex systems, and the expectation to stay connected have also created new stressors (Anjasari, 2024). Teachers may experience feelings of fatigue, anxiety, and frustration when they are unable to cope with these technological demands (Suryanto & Sasi, 2018). Consequently, technostress can reduce motivation, focus, and work effectiveness, which ultimately affects teacher performance (Ayyagari et al., 2011).

The issue of technostress in education deserves further examination because it influences both teacher well-being and institutional productivity. In Islamic elementary schools, this challenge becomes more complex due to the need to integrate digital systems with religious-based curricula. Studies by (Rapanta et al., 2021) and (Rodriguez-Barboza, 2023) emphasize that the effectiveness of technology integration depends largely on the teacher's psychological readiness. However, there is limited empirical evidence that explores technostress among elementary school teachers, particularly within Islamic education contexts. This study seeks to fill that gap by analyzing how technostress affects teacher performance and whether work tenure mitigates or intensifies this relationship.

Previous research identifies five main dimensions of technostress: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty (Tarafdar et al., 2007). These dimensions have been shown to negatively impact performance, satisfaction, and well-being across various professions (Ibrahim & Yusoff, 2015; Solís et al., 2023). In the teaching profession, technostress may emerge from an overload of online administrative tasks, the invasion of personal time due to constant connectivity, or difficulties mastering digital learning platforms (Suhardiman & Saragih, 2022).

This research adopts the Job Demands–Resources (JD-R) Model (Bakker & Demerouti, 2007; Demerouti et al., 2001) as its theoretical foundation. The model posits that excessive job demands, such as the continuous need to adapt to new technology, can deplete an individual's energy and reduce performance, while job resources like work tenure serve as buffers that help individuals manage those demands. In this study, work tenure is considered a personal resource that can influence how technostress affects teacher performance. Teachers with longer tenure may develop more effective coping strategies, while those with shorter tenure may face higher psychological strain (Shirom et al., 2008; Tims et al., 2013).

This study introduces three key novelties to the existing literature. First, while most technostress research focuses on corporate sectors or higher education (Li & Wang, 2021; Tarafdar et al., 2007), this study provides rare empirical evidence from Islamic Elementary Schools (Madrasah Ibtidaiyah). This context is unique as it involves the intersection of rapid digital transformation

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demands and religious-based educational values. Second, prior studies have shown inconsistent results regarding the impact of demographic factors on stress (Prestridge, 2012; Shirom et al., 2008). This research addresses this gap by positioning work tenure as a specific moderating variable within the Job Demands-Resources (JD-R) model to explain how professional experience buffers digital strain. Third, it comprehensively examines five dimensions of technostress simultaneously to identify specific stressors affecting teachers in developing regions.

Based on the theoretical foundation and empirical findings from prior studies, this research aims to examine the relationship between technostress and teacher performance, as well as to analyze the moderating effect of work tenure in this relationship. The following hypotheses are proposed:

- H1: Technostress negatively affects teacher performance.
- H2: Work tenure moderates the effect of technostress on teacher performance, such that the negative relationship becomes weaker for teachers with longer tenure.

The conceptual framework describing the relationship between these variables is presented in Figure 1.

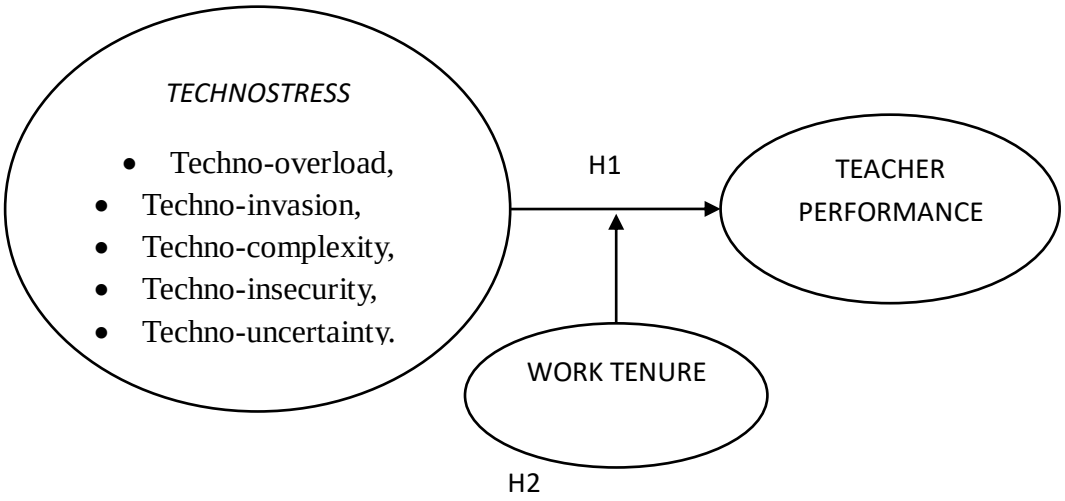

Figure 1. Conceptual Framework of the Study.

Theoretically, this study extends the JD-R model by applying it to the context of Islamic elementary education, where digital transformation coexists with religious and cultural expectations. Practically, the findings are expected to help school administrators design interventions that reduce technostress, such as digital literacy training, workload management, and stress management programs. In doing so, schools can enhance teacher adaptability, well-being, and performance in the face of rapid technological change.

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2. Method

This study employed a quantitative research approach to examine the relationship between technostress and teacher performance by considering work tenure as a moderating variable. The method was designed to provide a systematic, objective, and replicable process to evaluate how digital-related stress influences teaching effectiveness among Islamic elementary school teachers in North Klaten District, Indonesia. The research framework followed the guidelines of the Job Demands–Resources (JD-R) Model (Demerouti et al., 2001), which connects job demands (technostress) and job resources (work tenure) with work outcomes (teacher performance).

2.1 Participants and Sampling Procedures

The participants in this study were teachers employed at Madrasah Ibtidaiyah Muhammadiyah (MIM) schools located in the North Klaten District, Central Java, Indonesia. Based on data obtained from the Kelompok Kerja Madrasah Ibtidaiyah (KKMI) V Klaten in 2025, the total population consisted of 120 teachers.

The selection of Madrasah Ibtidaiyah Muhammadiyah (MIM) in North Klaten as the research locus was driven by two strategic justifications. First, these schools are currently undergoing a significant transition towards digitalization, implementing e-learning platforms and online administrative systems, which has created observable psychological pressure among teachers. This provides a relevant setting to observe real-time technostress phenomena in a developing educational context. Second, the teacher population in this district presents a balanced demographic distribution between junior and senior teachers, making it an ideal setting to empirically test the moderating role of work tenure on performance.

Respondents varied in age, gender, and work tenure, allowing meaningful comparison across work tenure categories. To capture these differences, teachers were grouped into three work tenure categories, namely:

- Low tenure: less than 5 years,
- Medium tenure: 5 to 15 years, and
- High tenure: more than 15 years.

This classification followed approaches commonly used in organizational and educational research (Alheet et al., 2021; Fritz & Ibrahim, 2010; Nguyen Hai et al., 2022), which distinguish tenure based on career development stages and professional maturity levels.

All participants provided informed consent, and ethical research standards were maintained in accordance with the academic research code of Universitas Sebelas Maret. No financial incentives were offered, and confidentiality of participant information was ensured throughout the data collection and analysis process.

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2.2 Variables and Measurement

This study used three main variables: technostress (independent variable), teacher performance (dependent variable), and work tenure (moderating variable). Each variable was measured using an established instrument adapted from prior studies and validated through expert judgment and statistical testing.

2.2.1 Independent Variable – Technostress

Technostress was conceptualized as a psychological strain experienced by individuals when they find it difficult to adapt to technology-related job demands (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). The construct was measured through five dimensions:

- Techno-overload : feeling pressured by excessive technological tasks
- Techno-invasion : experiencing work-life boundary intrusion due to technology
- Techno-complexity : difficulty understanding and mastering digital tools
- Techno-insecurity : fear of job replacement by more technologically adept individuals
- Techno-uncertainty: stress from frequent technological changes

The instrument consisted of 20 items adapted from (Tarafdar et al., 2007), using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated higher levels of technostress.

2.2.2 Dependent Variable – Teacher Performance

Teacher performance was defined as the effectiveness of teachers in planning, delivering, and evaluating the learning process (Robbins et al., 2018). The measurement included indicators such as lesson planning, classroom management, teaching delivery, and learning assessment. The variable was measured using 20 items developed from previous studies on teacher performance evaluation, also using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

2.2.3 Moderating Variable – Work Tenure

Work tenure in this study functions as a moderating variable. It represents the period a teacher has worked in educational institutions, reflecting accumulated experience and skill. Following Human Capital Theory (Becker, 1964), longer tenure indicates higher work adaptation and expertise. The classification used in this research, based on (Alheet et al., 2021; Fritz & Ibrahim, 2010; Nguyen Hai et al., 2022), divides tenure into:

- Low tenure: less than 5 years
- Medium tenure: 5 to 15 years
- High tenure: more than 15 years

This categorization allows analysis of how different experience levels influence the relationship between technostress and performance.

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2.3 Instrumentation

The data were collected using a structured questionnaire divided into three main parts:

- Demographic information (gender, age, and work tenure)
- Technostress scale consisting of 20 items adapted from (Tarafdar et al., 2007)
- Teacher performance scale consisting of 20 items adapted from (Robbins et al., 2018)

The validity and reliability of the instruments were established using the data collected from the 120 respondents. Construct validity was assessed using Principal Component Analysis (PCA), indicated by the Kaiser-Meyer-Olkin (KMO) value of 0.924 and a significant Bartlett's Test of Sphericity ($p < 0.001$). Furthermore, all items showed factor loadings above 0.70. Reliability was confirmed using Cronbach's Alpha, with coefficients for all variables exceeding the 0.70 threshold, indicating high internal consistency.

2.4 Data Analysis

Data analysis was performed using SPSS version 26. The analytical procedures included:

- Descriptive statistics, to describe respondents' characteristics and the mean values of each variable.
- Instrument quality testing, to examine validity and reliability of the measurement tools.
- Classical assumption testing, including normality, linearity, and multicollinearity tests to ensure the regression model met statistical assumptions.
- Multiple linear regression analysis, to test the direct effect of technostress on teacher performance.
- Moderation analysis, to test the moderating effect of work tenure on the relationship between technostress and teacher performance.

The moderation analysis was conducted by including an interaction term between technostress and work tenure. The significance level was set at 0.05. The interpretation of results was based on regression coefficients, t-values, and significance levels. This process ensured that the research findings were statistically valid and reliable.

3. Results

This section presents the findings from data analysis using descriptive statistics, instrument quality testing, and hypothesis testing. The data collected from 120 respondents were processed with SPSS version 26. The analysis aimed to determine the direct effect of technostress on teacher performance and the moderating role of work tenure.

3.1 Recruitment

Data collection was conducted in April 2025. Questionnaires were distributed directly to teachers of Madrasah Ibtidaiyah Muhammadiyah (MIM) in North Klaten District, Central Java, Indonesia. A total of 120 questionnaires were distributed and all were returned completely filled out, resulting in a 100 percent response rate. No missing data were found.

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3.2 Statistics and Data Analysis

Table 1 presents the demographic characteristics of the respondents, including gender, age, and work tenure. The majority of respondents were female teachers, representing 65 percent of the total sample. In terms of work tenure, 30 percent of teachers had low tenure (<5 years), 45 percent had medium tenure (5–15 years), and 25 percent had high tenure (>15 years).

Table 1. Demographic Characteristics of Respondents

Characteristic	**Category**	**Frequency**	**Percentage**
Gender	Male	38	31.7
	Female	82	68.3
Total		120	100.0
Age	< 25 years	20	16.7
	25-35 years	50	41.7
	36-45 years	21	17.5
	> 45 years	29	24.2
Total		120	100.0
Work Tenure	< 5 years	51	42.5
	5-15 years	35	29.2
	> 15 years	34	28.3
Total		120	100.0

3.3 Instrument Validity and Reliability

Before hypothesis testing, all measurement instruments were examined for construct validity and reliability. The results of the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity confirmed that the data were suitable for factor analysis. As shown in Table 1, both variables exceeded the recommended threshold of KMO > 0.5 and had significant Bartlett's Test values ($p < 0.05$), indicating that the items were valid and interrelated.

Table 2. KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.924
Bartlett's Test of Sphericity	Approx. Chi-Square	5120.467
	df	780
	Sig.	.000

Reliability testing using Cronbach's Alpha showed values greater than 0.60 for all variables, demonstrating that each measurement instrument had high internal consistency.

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Table 3. Reliability Test Results

Variable	Cronbach's Alpha	Result
Technostress	0.979	Reliable
Work Tenure	0.968	Reliable

3.4 Descriptive Statistics

Descriptive statistics were used to describe the characteristics of the research variables, including Technostress (X) and Teacher Performance (Y). Based on SPSS output, the technostress variable had a mean score of 56.97, while teacher performance showed a mean score of 76.96.

This indicates that, on average, teachers in Madrasah Ibtidaiyah Muhammadiyah (MIM) North Klaten experienced moderate levels of technostress but maintained a relatively high level of performance. The standard deviation values also suggest acceptable data variability across the sample.

Table 4. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Technostress	120	21	97	56.97	15.558
Work Tenure	120	40	99	76.96	11.671
Valid N	120				

3.5 Hypothesis Testing

Hypothesis testing was conducted using regression analysis to examine direct effects and Moderated Regression Analysis (MRA) to test interaction effects.

Table 5. Results of Direct Effect and Moderation Hypothesis Testing

Model	Variable	B	beta	t-value	Sig t	Result
Model 1	(Constant)	85.208				
	Technostress	-0.145	-0.193	-2.137	0.035	Significant
	R square	0.037				
Model 2	(Constant)	104.851				
	Technostress	-0.517	-0.689	-3.150	0.002	Significant
	Work Tenure	-10.631	-0.759	-2.221	0.028	Significant
	Technostress* Work Tenure	0.200	1.005	2.462	0.015	Significant
	F-value	3,719				
	Sig F	0.013				
	R square	0.064				
	Dependent Variable		: Teacher Performance			

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The analysis of Model 1 indicates that technostress has a significant negative effect on teacher performance (β = -0.145, p = 0.035). The negative coefficient implies that the higher the level of technostress, the lower the teacher's performance. Thus, Hypothesis 1 (H1) is supported.
In Model 2, the interaction variable between technostress and tenure shows a significant positive effect (β = 0.200, p = 0.015). This proves that tenure moderates the relationship between technostress and teacher performance. The increase in this interaction value clarifies that the impact of technostress on performance varies depending on the length of the teacher's work tenure.

It is important to note that the R-square value obtained in this study is 0.064, indicating that technostress and work tenure explain 6.4% of the variance in teacher performance. While the influence is statistically significant, the remaining 93.6% of the variance is explained by other factors not included in this model. This suggests that teacher performance in Islamic elementary schools is a complex construct influenced by multiple variables beyond technological pressure, such as organizational support, digital literacy, leadership style, and work motivation. Future research should consider incorporating these variables to build a more comprehensive model. Thus, Hypothesis 2 (H2) is supported.

4. Discussion

This study aimed to examine the effect of technostress on teacher performance and to determine the moderating role of work tenure among teachers in Madrasah Ibtidaiyah Muhammadiyah (MIM) schools in North Klaten District. The findings provided strong empirical support for both hypotheses proposed in this study.

4.1 Interpretation of Main Findings

The results of the regression analysis showed that technostress had a significant negative effect on teacher performance. This finding confirms that higher levels of technological stress reduce the effectiveness and productivity of teachers. In line with (Tarafdar et al., 2010) and (Li & Wang, 2021) technostress arises when the demands of digital technologies exceed individual coping capacities, resulting in fatigue, decreased motivation, and reduced job performance. The results also align with (Ayyagari et al., 2011), who emphasized that technological overload and complexity often diminish employees' task efficiency and work satisfaction.

From a theoretical perspective, these findings are consistent with the Job Demands–Resources (JD-R) model proposed by (Bakker & Demerouti, 2007). According to this model, technostress functions as a job demand that requires cognitive and emotional energy, while personal attributes such as tenure or experience serve as job resources that buffer the negative effects of such demands. In this study, the observed negative relationship between technostress and teacher performance empirically supports this theoretical assumption.

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4.2 Moderating Effect of Work Tenure

The moderating role of work tenure was found to be significant, indicating that teachers with longer work tenure experience lower levels of technostress and demonstrate higher performance compared to their counterparts with shorter work tenure. This finding is supported by previous studies such as (Alheet et al., 2021; Fritz & Ibrahim, 2010; Nguyen Hai et al., 2022), who found that work tenure reflects accumulated knowledge, coping skills, and psychological resilience that allow individuals to manage technological challenges more effectively.

Teachers with high tenure (>15 years) likely have stronger adaptation mechanisms, greater self-efficacy, and a more stable work rhythm, all of which reduce the psychological strain associated with technology use. Conversely, teachers with low tenure (<5 years) may experience greater technostress because they are still developing digital competence and balancing multiple job demands. Thus, tenure serves as a psychological shield that enhances adaptive capacity in digital learning environments.

This finding provides empirical support for Human Capital Theory (Becker, 1964), which posits that experience and skill accumulation over time enhance individual capability and job performance. It also highlights the importance of recognizing experience as a strategic organizational asset in education.

4.3 Comparison with Previous Research

The results of this study are consistent with the findings of (Tarafdar et al., 2010) and (Bourlakis et al., 2023), who identified a negative link between technostress and performance in work environments. Additionally, (Mohamad Haniff et al., 2022) highlighted that technostress significantly impacts teaching effectiveness. However, the moderating role of tenure found here adds a unique contribution, particularly in the context of Islamic elementary schools in Indonesia, where prior studies are still limited.

Unlike studies in corporate or industrial settings, this research emphasizes the human aspect of technostress in education. It demonstrates that the emotional and cognitive strain caused by technology integration can be mitigated through professional experience and adequate support systems.

4.4 Theoretical and Practical Implications

Theoretically, this study contributes to the novelty of the Job Demands-Resources (JD-R) model by explicitly validating work tenure as a critical personal resource. Unlike previous studies that treated tenure merely as a control variable, this research confirms that tenure significantly moderates the technostress-performance relationship. This finding offers a new perspective on the "Technostress Inhibitors" theory, suggesting that accumulated professional experience acts as a natural inhibitor against technological pressure in the context of elementary education.

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Practically, the findings suggest that school administrators should provide targeted digital literacy training and stress management programs, especially for teachers with lower tenure. Mentoring systems that pair senior and junior teachers could be particularly effective in reducing technostress. Furthermore, management should ensure that technological integration in schools is accompanied by adequate institutional support and workload regulation to prevent digital fatigue.

4.5 Limitations and Future Research Directions

Although this study provides valuable insights, several limitations should be acknowledged.
First, the study was conducted within a single district, which may limit the generalizability of the results to other educational settings or regions. Future studies could involve broader samples across multiple provinces or different educational levels.

Second, the study used a cross-sectional design, which captures relationships at one point in time. Longitudinal studies could better reveal how technostress and performance evolve over time.

Third, the data relied on self-reported questionnaires, which may introduce bias or subjective interpretations. Incorporating qualitative methods or observational data could provide richer insights into the underlying mechanisms of technostress.

Future research might also explore additional moderating or mediating variables such as digital competence, emotional intelligence, or organizational support, which may further explain how teachers cope with technology-related stress.

4.6 Conclusion

In summary, this study confirms that technostress negatively affects teacher performance in Islamic elementary schools, and that work tenure significantly moderates this relationship. Teachers with longer work experience exhibit greater resilience and adaptability in responding to technological demands, leading to better performance outcomes.

These findings emphasize the importance of managing technostress through professional development, peer mentoring, and supportive digital policies. By aligning technological initiatives with human capacity, educational institutions can create healthier digital work environments and sustain teacher performance amid ongoing technological transformation.

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