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Managing Teachers' Technostress for Improved Classroom Control and Pupils' Learning Outcomes

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Abstract

The increasing digitalisation of primary education has created new opportunities for instructional improvement while also exposing teachers to technology-related pressures that may weaken classroom control and pupils' learning. This study examined the relationships among teachers' technostress management, classroom control, and pupils' learning outcomes in Lagos State public primary schools, Nigeria. A correlational survey design was adopted. The study targeted 384 teachers, of whom 380 returned usable questionnaires, representing a response rate of 98.9%. Data were collected using the Teachers' Technostress Management Questionnaire and the Teachers' Classroom Control Questionnaire, together with pupils' academic-performance records. Descriptive statistics, Pearson product-moment correlation, and multiple regression were employed. Teachers reported high mean levels of techno-overload management ($M = 3.72$, $SD = 0.84$), techno-invasion management ($M = 3.65$, $SD = 0.79$), techno-complexity management ($M = 3.81$, $SD = 0.76$), overall technostress management ($M = 3.73$, $SD = 0.80$), and classroom control ($M = 3.64$, $SD = 0.85$). Technostress management showed a strong positive relationship with pupils' academic performance ($r = .853$, $p < .001$) and classroom control ($r = .817$, $p < .001$), while classroom control was positively related to pupils' performance ($r = .731$, $p < .001$). Jointly, technostress management and classroom control explained 66.7% of the variance in pupils' academic performance ($R = .817$, $R^2 = .667$, adjusted $R^2 = .664$; $F(2, 377) = 378.62$, $p < .001$). Technostress management ($\beta = .462$, $t = 4.95$, $p < .001$) and classroom control ($\beta = .438$, $t = 4.78$, $p < .001$) both made significant contributions. The study concludes that teachers' capacity to cope with digital demands is not merely a well-being

issue but an instructional resource that supports classroom order, engagement, and achievement. Practical digital training, technical support, manageable workloads, clear work–life boundaries, and integrated classroom-management development are recommended.

Keywords: technostress management; classroom control; learning outcomes; educational technology; public primary schools; Lagos State.

1. Introduction

Digital technologies increasingly shape lesson preparation, assessment, communication, record keeping, professional development, and classroom instruction. In primary education, devices, online platforms, digital attendance systems, electronic reporting tools, multimedia resources, and learning-management applications can broaden access to content and make teaching more interactive. National policy in Nigeria also recognises information and communication technology as an important component of educational quality and administrative efficiency [9]. Lagos State has consequently implemented technology-enabled reforms, including digital monitoring and teacher-support initiatives, to strengthen basic education [17, 16].

Technology integration, however, does not automatically produce better teaching. Its benefits depend on the alignment between technological demands, teachers' competence, organisational support, available infrastructure, and the realities of the classroom. Where teachers are expected to use unfamiliar or unreliable systems without sufficient training, time, electricity, connectivity, or technical assistance, technology may become a source of strain rather than support. This phenomenon is commonly described as technostress [31, 19].

Technostress includes psychological, emotional, behavioural, and physiological reactions to technological demands that exceed an individual's perceived coping resources. It can manifest as anxiety, frustration, fatigue, reduced concentration, resistance to technology, emotional exhaustion, and declining job satisfaction [12, 3]. Teachers may be required to work faster, remain reachable after official hours, learn repeatedly changing systems, and complete both digital and paper-based tasks. Such demands are especially consequential in public primary schools, where teachers must simultaneously supervise young children, maintain order, manage large classes, differentiate instruction, and complete administrative duties.

The main dimensions of technostress commonly identified in the literature are techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty [31]. Techno-overload occurs when technology increases the amount or pace of work. Techno-invasion arises when work-related digital communication enters teachers' personal time. Techno-complexity reflects difficulty in understanding or using digital systems. Techno-insecurity concerns fear of losing professional relevance because of inadequate technological competence, while techno-uncertainty arises from continuous updates and changes in platforms. Each dimension may reduce teachers' sense of control if adequate coping mechanisms and organisational safeguards are absent.

Classroom control is one area that may be affected directly by technostress. It includes the

rules, routines, organisational practices, monitoring strategies, instructional pacing, behavioural responses, and time-management processes used to create a stable environment for learning [15, 5]. Effective classroom control is not synonymous with punishment; rather, it combines preventive and responsive practices that maintain engagement, reduce disruption, and protect instructional time. Teachers who are emotionally exhausted or cognitively overloaded may struggle to monitor pupils, respond calmly, sustain lesson flow, and apply rules consistently. Conversely, teachers who manage technology-related demands effectively may have greater emotional and cognitive capacity for classroom organisation.

Pupils' learning outcomes depend on multiple interacting factors, including teacher quality, classroom climate, school leadership, facilities, home background, and access to learning resources. Evidence from Lagos State indicates that management quality, instructional resources, and socioeconomic conditions are associated with pupil achievement [34, 17]. Within this broader system, teacher well-being and classroom organisation remain central because they shape the daily experiences through which pupils encounter the curriculum.

Although studies have examined technostress, teacher performance, and technology adoption, fewer studies have jointly analysed teachers' technostress management, classroom control, and pupils' learning outcomes in public primary schools. Much of the available literature focuses on universities, secondary schools, or general workplace settings [22, 3]. The present study addresses this gap by examining whether teachers' ability to manage technostress is associated with stronger classroom control and improved pupil performance in Lagos State public primary schools.

1.1. Context of Digital Reform in Primary Education

Digital reform in basic education should be understood as a socio-technical change rather than a simple substitution of screens for conventional materials. The usefulness of a platform depends on the fit among the tool, the curriculum, teachers' pedagogical knowledge, pupils' developmental needs, school leadership, and infrastructure. The technology-acceptance tradition emphasises perceived usefulness and ease of use as important conditions for sustained adoption [4, 33]. In schools, however, adoption is also shaped by teachers' beliefs, access to resources, and the extent to which digital tools support rather than interrupt established instructional goals [6, 32].

The Lagos State context makes this issue especially important. Public primary-school teachers work in a system that serves a large and diverse pupil population across urban, peri-urban, and less densely populated communities. Digital attendance, electronic reporting, online professional learning, and technology-supported instruction can improve monitoring and access to resources, but unequal electricity supply, connectivity, device availability, and technical support can turn routine tasks into recurring stressors. Consequently, the same technological initiative may operate as a resource in one school and as an additional job demand in another. This interpretation is consistent with the Job Demands–Resources model, which proposes that demanding work conditions are less harmful when employees possess adequate personal and

organisational resources [1].

1.2. Technostress as an Educational Management Issue

The term technostress was initially used to describe difficulty in adapting to computer technology [2]. Later research conceptualised it more precisely as stress produced by information and communication technologies through overload, invasion, complexity, insecurity, and uncertainty [30, 28]. These stress creators are not restricted to technical problems. They also include accelerated work pace, expectations of constant availability, frequent software changes, concerns about competence, and ambiguity about performance requirements. Systematic reviews have linked technostress with psychological strain, fatigue, burnout, and impaired occupational functioning [19, 29].

For teachers, technostress has a distinctive pedagogical dimension. A failed device or confusing platform does not only inconvenience the user; it can interrupt lesson flow, draw attention away from pupils, consume instructional time, and create visible uncertainty in front of a class. Teachers must therefore regulate their own emotional responses while troubleshooting technology and maintaining pupil engagement. K–12 evidence indicates that techno-stressors can contribute to burnout and intentions to leave, whereas literacy facilitation and support can buffer adverse effects [3]. Accordingly, technostress management is relevant to teacher retention, professional confidence, classroom climate, and learning quality.

1.3. Classroom Control and the Protection of Learning Time

Classroom control refers to the coordinated use of preventive, instructional, relational, and corrective practices that sustain an orderly and supportive environment. Foundational work emphasises teacher awareness, smooth transitions, momentum, and the ability to manage groups rather than responding only after disruption occurs [15]. Contemporary scholarship similarly treats classroom management as a system of routines, expectations, relationships, engagement strategies, monitoring, and proportionate responses to behaviour [7, 5].

The educational importance of classroom control lies in its protection of learning time. Disruptions, unclear routines, and inconsistent responses reduce the time available for explanation, guided practice, feedback, and individual support. Meta-analytic evidence indicates that classroom-management interventions can improve behavioural, motivational, and academic outcomes [14]. Teacher–pupil interactions are also central to pupils' engagement and development, especially at the primary level where children depend heavily on adult organisation and emotional support [27, 13]. Thus, classroom control is not merely a disciplinary outcome; it is a mechanism through which teacher capacity is translated into pupils' opportunities to learn.

1.4. Conceptual Linkage among the Study Variables

The study assumes that technostress management can influence pupils' learning outcomes through two complementary pathways. First, effective coping may have a direct instructional

benefit by preserving teachers' concentration, confidence, lesson preparation, and willingness to use suitable digital resources. Second, it may have an indirect classroom-process benefit by enabling teachers to maintain routines, monitor pupils, respond calmly to disruptions, and protect lesson time. Classroom control is therefore treated both as an important outcome of technostress management and as an independent predictor of pupils' academic performance.

This linkage does not imply that technology-related coping is the only determinant of achievement. Pupils' prior knowledge, attendance, language background, family resources, school leadership, teacher subject knowledge, class size, and instructional materials also matter [34, 11]. The purpose of the present analysis is narrower: to determine whether meaningful relationships remain observable among technostress management, classroom control, and performance within the sampled Lagos State public primary schools.

1.5. Statement of the Problem

The introduction of digital platforms into public primary schools has increased expectations for electronic reporting, technology-supported teaching, online training, digital communication, and data submission. These expectations may improve efficiency, but they also create additional workload, require continuous learning, and expose teachers to technical failure and after-hours demands. In schools where infrastructure and support are limited, teachers may experience pressure that affects their confidence, well-being, and classroom effectiveness.

Unmanaged technostress can undermine teachers' patience, attention, consistency, and capacity to maintain classroom routines. This is particularly problematic in primary schools because young pupils require continuous supervision, emotional support, clear behavioural expectations, and highly structured instruction. When teachers struggle to cope with technological demands, the resulting fatigue and frustration may reduce instructional quality and weaken pupils' engagement. Despite the importance of this issue, there remains limited empirical evidence on how technostress management and classroom control jointly predict pupils' learning outcomes in Lagos State public primary schools.

1.6. Purpose and Objectives

The purpose of the study was to examine the relationships among teachers' technostress management, classroom control, and pupils' academic performance in Lagos State public primary schools. Specifically, the study sought to:

i. determine the relationship between techno-overload management and pupils' academic performance;

ii. examine the relationship between techno-invasion management and pupils' academic performance;

iii. determine the relationship between techno-complexity management and pupils' academic performance;

iv. examine the relationship between overall technostress management and pupils' academic performance;

v. determine the relationship between classroom control and pupils' academic performance;

vi. examine the relationship between technostress management and classroom control; and

vii. determine the joint and relative contributions of technostress management and classroom control to pupils' academic performance.

2. Literature Review

2.1. Concept of Technostress

Technostress describes the strain that develops when individuals are unable to cope effectively with the demands, complexity, speed, or intrusiveness of information and communication technologies [31, 19]. The concept highlights a paradox: technologies designed to make work easier may create additional tasks, new expectations, interruptions, and uncertainty. Technostress is therefore not caused by technology alone, but by the interaction between technology, the user, job demands, and organisational conditions.

In education, technostress can emerge during lesson preparation, digital assessment, online communication, platform-based reporting, virtual professional development, and classroom use of technological devices. Teachers may be expected to acquire new digital skills rapidly while continuing their normal teaching and administrative duties. When technological demands exceed perceived competence or available support, teachers may experience anxiety, exhaustion, avoidance, and reduced professional efficacy [12, 22].

A systematic review of technostress research identifies techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty as recurring stress creators [31]. These dimensions are interrelated. A complex platform may increase the time needed to complete work, thereby producing overload. Frequent updates may create uncertainty, while poor performance with new systems may generate insecurity. Continuous messages and online deadlines may then invade personal time, reducing opportunities for recovery.

2.2. Teachers' Technostress Management

Technostress management refers to the individual and organisational practices used to prevent, reduce, or cope with technology-related strain. At the individual level, relevant strategies include continuous digital learning, realistic planning, time management, emotional regulation, problem-focused coping, peer consultation, and deliberate work–life boundaries [20, 12]. Teachers with stronger technological self-efficacy are more likely to interpret digital demands as manageable challenges rather than threats.

At the organisational level, technostress can be reduced through practical training, responsive technical support, clear implementation procedures, realistic deadlines, user-friendly platforms,

adequate infrastructure, and supportive leadership. Organisational support is particularly important because individual coping cannot compensate indefinitely for unreliable systems, excessive workload, or poorly designed policy implementation. Studies indicate that perceived organisational support can buffer the negative effects of technostress on performance and commitment [22, 23].

The Job Demands–Resources perspective also helps explain why technostress management matters. Digital workload, complexity, and constant availability function as job demands, while training, autonomy, technical assistance, and collegial support function as resources [1]. When resources are sufficient, teachers are more likely to remain engaged and effective. When demands consistently exceed resources, exhaustion and reduced performance become more likely.

2.3. Classroom Control

Classroom control refers to the deliberate organisation of behaviour, space, routines, time, and instruction to maintain a productive learning environment. Kounin's work emphasised teacher awareness, lesson momentum, smooth transitions, and group focus as foundations of effective classroom management [15]. Contemporary frameworks similarly distinguish preventive strategies, such as clear expectations and engaging lessons, from responsive strategies used after disruption occurs [5, 25].

Effective classroom control improves time on task, reduces behavioural disruption, and supports positive teacher–pupil relationships. It includes classroom organisation, consistent rules, effective use of instructional time, monitoring, feedback, reinforcement, and appropriate responses to misbehaviour. Classroom-management research shows that teacher practices are improved when professional development is structured, sustained, and linked to observable classroom behaviour [26].

Technostress may influence classroom control through several pathways. Cognitive overload can reduce teachers' ability to monitor multiple classroom events. Emotional exhaustion may produce irritability or inconsistent reactions. Technology failure during instruction can disrupt lesson flow, reduce pupils' attention, and create opportunities for misbehaviour. Conversely, teachers who feel competent and supported in using technology may integrate digital tools more smoothly and retain greater control over instructional pacing and pupil engagement.

2.4. Pupils' Learning Outcomes

Learning outcomes refer to measurable changes in pupils' knowledge, skills, attitudes, and academic performance. At the primary-school level, learning outcomes are shaped by instructional quality, teacher competence, classroom climate, school resources, family background, and pupils' self-regulation. A well-managed classroom increases opportunities for learning because less time is lost to disruption and more attention can be directed toward instruction and feedback [8, 24].

In Lagos State, educational performance is affected by differences in school resources, management quality, language background, and socioeconomic conditions. Comparative evidence

has shown that school-management strength, including target setting, teacher management, and planning, is strongly associated with literacy and numeracy performance [34]. Technology-enabled reforms have also contributed to monitoring and instructional improvement, but their success depends heavily on teacher readiness and support [17].

2.5. Theoretical Framework

The study was anchored in the Transactional Theory of Stress and Coping and Classroom Control Theory. Lazarus and Folkman's Transactional Theory explains stress as a dynamic transaction between environmental demands and an individual's appraisal of available coping resources [20]. Primary appraisal concerns whether a situation is irrelevant, beneficial, challenging, or threatening. Secondary appraisal concerns whether the individual possesses sufficient knowledge, time, support, and coping options. Applied to educational technology, teachers experience greater technostress when digital demands are appraised as exceeding their competence and resources.

Glasser's Choice Theory provides a complementary perspective on classroom control by emphasising internal motivation, responsibility, relationships, and supportive learning environments rather than reliance on external coercion [10]. The theory suggests that teachers are more effective when they create conditions in which pupils can make responsible choices and experience belonging, competence, and autonomy.

Together, the theories support a pathway in which technological demands are filtered through teachers' appraisal and coping resources. Effective coping protects emotional stability and professional functioning, which in turn strengthens classroom organisation and pupils' learning opportunities. The conceptual relationship can be represented as:

$$\begin{aligned}\text{Technological demands} &\rightarrow \text{Technostress appraisal and management} \\ &\rightarrow \text{Classroom control} \rightarrow \text{Pupils' learning outcomes.}\end{aligned}$$

2.6. Empirical Review

Research consistently shows that technostress can reduce teacher well-being and performance when technological demands are high and support is weak. Jena [12] found that coping strategies and technological competence are important in ICT-enabled classrooms. Califf and Brooks [3] reported that techno-stressors among K–12 teachers were associated with burnout and turnover intentions, while literacy facilitation acted as a protective resource. Li and Wang [22] similarly showed that organisational support and technostress inhibitors influence work performance.

Studies of classroom management indicate that structured routines, teacher awareness, smooth instructional transitions, and consistent behavioural responses are linked to more productive learning environments [15, 5]. Mitchell, Hirn, and Lewis [26] demonstrated that classroom-management practices can be strengthened through systematic support and teacher development. Fraser [8] also emphasised the relationship between classroom environment and academic achievement.

The literature therefore supports separate associations between technostress and teacher performance, and between classroom control and learning outcomes. However, fewer studies have examined whether technostress management contributes to learning both directly and through classroom control in Nigerian public primary schools. This study extends the literature by analysing these constructs jointly using data from Lagos State.

3. Methodology

3.1. Research Design

The study adopted a descriptive survey of correlational design. The descriptive component was used to summarise teachers' reported technostress-management practices, classroom-control practices, and the pattern of pupils' academic performance. The correlational component examined the direction and magnitude of relationships among the variables without experimental manipulation. This design was appropriate because the study sought evidence of association and prediction under naturally occurring school conditions rather than evidence from a controlled intervention.

3.2. Study Area and Population

The study was conducted in Lagos State, Nigeria. The state public primary-school system comprised 1,020 schools, 9,854 teachers, and 303,028 pupils across the 20 Local Government Education Authorities at the time represented by the source data [18]. The schools were distributed across five educational divisions: Ikeja, Lagos Island, Badagry, Epe, and Ikorodu. Table 1 summarises the population framework used in the thesis.

Table 1: Public primary-school population by educational division

Division	Schools	Teachers	Pupils
Ikeja	405	4,088	114,292
Lagos Island	212	1,709	52,811
Badagry	222	1,810	73,169
Epe	115	1,093	29,540
Ikorodu	66	1,154	33,216
Total	1,020	9,854	303,028

The population structure shows substantial variation in school and pupil concentration across the divisions. Including schools across the state was therefore important for representing different administrative and infrastructural conditions under which teachers encounter educational technologies.

3.3. Sample Size and Sampling Procedure

The source study used the Taro Yamane approach at a 5% margin of error to obtain a target sample of approximately 384 teachers from the population of 9,854 teachers. A target of 400 Primary Six pupils was similarly derived from the pupil population. Sampling combined simple random selection with disproportionate allocation across the Local Government Education Authorities. Primary Six pupils were selected because they were in the terminal primary-school class and had results in the Lagos State Common Entrance Examination for the 2024/2025 academic session.

A total of 384 teacher questionnaires were distributed and 380 usable copies were returned, yielding a 98.9% response rate. The statistical analyses in the article therefore use $N = 380$. The very high response rate strengthens coverage of the selected sample, although it does not by itself remove possible measurement or selection bias.

3.4. Research Instruments

Three instruments were used. The Teachers' Technostress Management Questionnaire (TTMQ) measured practices relating to techno-overload, techno-invasion, techno-complexity, and overall management of technology-related stress. The Teachers' Classroom Control Questionnaire (TCCQ) measured classroom organisation, time management, monitoring, consistency, and related control practices. Each questionnaire contained 15 items and used a four-point response format: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

A Records Observation Format (ROF) was used to obtain Primary Six pupils' Common Entrance Examination results for the 2024/2025 academic session. Use of a record format reduced dependence on teachers' perceptions for the outcome variable and provided a separate indicator of learning outcomes. English Language and Mathematics results were central to the academic-performance record.

3.5. Validity and Reliability

The questionnaires were reviewed by the research supervisor and experts in educational management, measurement, and evaluation. Their comments were used to revise item wording, content coverage, and alignment with the objectives, thereby supporting face and content validity. The Common Entrance Examination records were treated as externally moderated school records under the Lagos State basic-education system.

Test–retest reliability was examined by administering the instruments to 100 respondents twice at an interval of two weeks. Pearson product–moment correlations produced reliability coefficients of .74 for the TTMQ, .71 for the TCCQ, and .76 for the record format. These coefficients were regarded as adequate for the study. Reliability at this level indicates acceptable score stability, while also suggesting that measurement error should be acknowledged when interpreting the observed relationships.

3.6. Data-Collection Procedure

The researcher worked with 20 trained research assistants. Introductory and approval letters were obtained through the appropriate university and Lagos State basic-education authorities. The team visited sampled schools, administered the questionnaires, and collected the completed copies. Academic-performance information was obtained from approved school records through headteachers and Local Government Education Authority structures. Same-day retrieval was used where feasible to maximise the return rate and reduce loss of instruments.

3.7. Ethical Considerations

Participation was voluntary, and respondents were informed that the information supplied was for academic research. Personal identifiers were not included in the reported analyses, and findings were presented in aggregate form. Access to pupils' result records was sought through the relevant school authorities. The study protected privacy by avoiding disclosure of individual teachers, pupils, and schools.

3.8. Operationalisation of Variables

Technostress management was operationalised as the extent to which teachers reported strategies for controlling workload generated by technology, limiting intrusion of work-related technology into personal time, and coping with difficult digital tools. Classroom control was operationalised through classroom organisation, time management, behavioural monitoring, and consistency of instructional routines. Pupils' learning outcomes were represented by academic-performance records, particularly English Language and Mathematics results.

3.9. Data-Analysis Strategy

Descriptive statistics included frequencies, percentages, means, and standard deviations. Pearson product–moment correlation was used to test the six bivariate hypotheses. Multiple regression was used to estimate the joint and relative contributions of technostress management and classroom control to pupils' academic performance. All hypotheses were evaluated at the .05 significance level with SPSS version 26.

In interpreting the findings, statistical significance was considered together with effect magnitude. Correlation coefficients were treated as indicators of association rather than proof of causality. The regression coefficient of determination was interpreted as the proportion of observed variance explained by the predictors within the fitted model. The article does not reconstruct respondent-level data; figures visualise only the aggregate values reported in the thesis.

4. Results

4.1. Response Rate and Demographic Characteristics

Of the 384 questionnaires distributed, 380 were usable. Female teachers constituted 60.0% of respondents and male teachers 40.0%. The largest experience category was 11–20 years (32.6%), followed by 21–30 years (28.4%). Most respondents held B.Ed., B.Sc., B.A., or PGDE qualifications (66.1%), while 26.8% held postgraduate qualifications.

Table 2: Selected demographic characteristics of respondents ($N = 380$)

Category	Frequency	Percentage
Male	150	40.0
Female	228	60.0
Teaching experience: 1–10 years	90	23.7
Teaching experience: 11–20 years	124	32.6
Teaching experience: 21–30 years	108	28.4
Teaching experience: 31–35 years	58	15.3
NCE	27	7.1
B.Ed./B.Sc./B.A./PGDE	251	66.1
M.A./M.Sc./M.Ed.	102	26.8

The distribution indicates that the participants represented a broad range of professional experience. More than three quarters had over ten years of teaching experience, suggesting that the respondents were familiar with both traditional classroom practices and the expanding use of technology in public primary education.

4.2. Descriptive Statistics

Table 3 presents the descriptive statistics. All mean scores exceeded 3.5 on the four-point scale. Techno-complexity management recorded the highest mean ($M = 3.81$), followed by overall technostress management ($M = 3.73$) and techno-overload management ($M = 3.72$). Overall classroom control had a mean of 3.64.

Table 3: Descriptive statistics for principal study variables

Variable	Mean	Standard deviation	Interpretation
Techno-overload management	3.72	0.84	High
Techno-invasion management	3.65	0.79	High
Techno-complexity management	3.81	0.76	High
Overall technostress management	3.73	0.80	High
Classroom organisation	3.58	0.88	High
Time management	3.69	0.81	High
Overall classroom control	3.64	0.85	High

The relatively small spread in the mean scores shows that the different dimensions were all prominent within the study context. The highest mean for techno-complexity management suggests that teachers frequently needed strategies for dealing with difficult systems and unfamiliar digital tasks. The lower, though still high, classroom-organisation mean indicates that maintaining physical and instructional order may remain challenging even where teachers report strong coping practices.

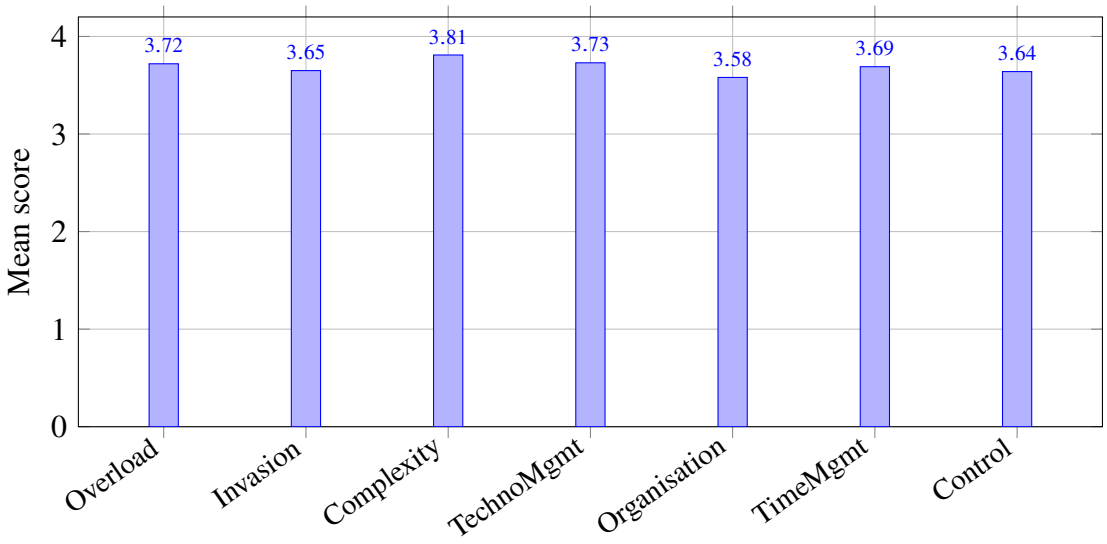

Figure 1: Mean scores for technostress-management and classroom-control variables.

4.3. Correlation Analysis

Table 4 shows that all reported relationships were positive and statistically significant at $p < .001$. Techno-overload management had the strongest dimension-level association with pupils' academic performance ($r = .871$). Overall technostress management correlated strongly with performance ($r = .853$), while classroom control was also strongly related to performance ($r = .731$). Technostress management and classroom control were strongly related ($r = .817$).

Table 4: Pearson correlations among selected study variables

Relationship	r	p	Decision
Techno-overload management – pupil performance	.871	$< .001$	Significant
Techno-invasion management – pupil performance	.761	$< .001$	Significant
Techno-complexity management – pupil performance	.782	$< .001$	Significant
Overall technostress management – pupil performance	.853	$< .001$	Significant
Classroom control – pupil performance	.731	$< .001$	Significant
Technostress management – classroom control	.817	$< .001$	Significant

The strong positive coefficient for techno-overload management indicates that teachers who better controlled the volume and pace of digital work tended to be associated with higher pupil

performance. The relationship for techno-invasion suggests that maintaining boundaries around work-related technology may also protect instructional effectiveness. The techno-complexity result indicates that confidence and competence in handling difficult systems are relevant to classroom outcomes.

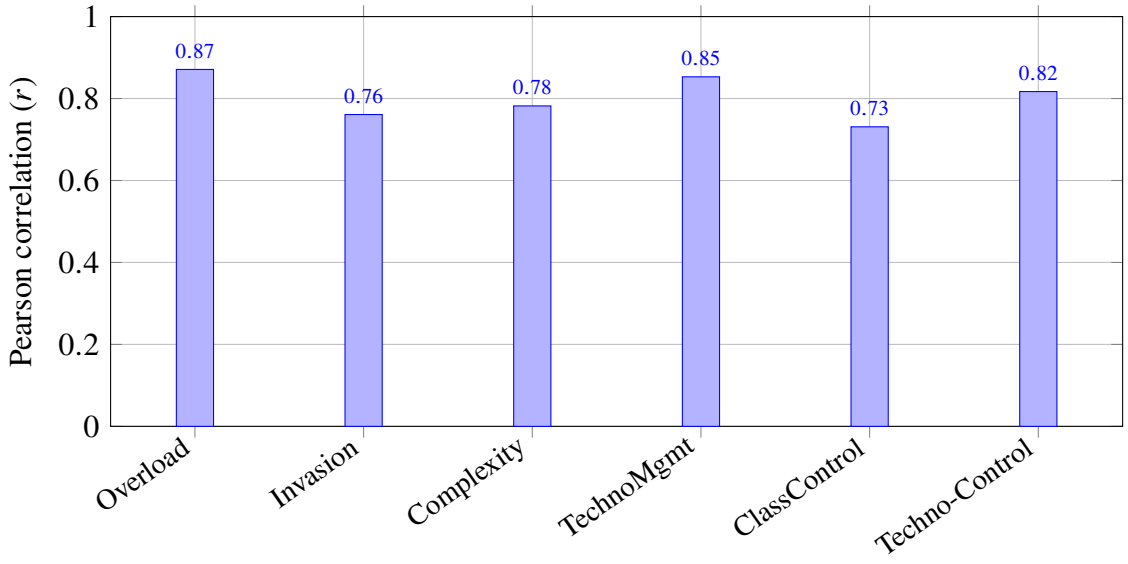

Figure 2: Magnitude of the reported bivariate relationships. The first five bars relate to pupils' performance; the final bar relates technostress management to classroom control.

4.4. Multiple Regression Analysis

Technostress management and classroom control jointly produced a multiple correlation of $R = .817$. The model explained 66.7% of the variance in pupils' academic performance, with an adjusted R^2 of .664. The overall regression was statistically significant, $F(2, 377) = 378.62$, $p < .001$.

Table 5: Multiple-regression model summary and analysis of variance

R	R^2	Adjusted R^2	SEE	$F(2, 377)$	p
.817	.667	.664	.412	378.62	$< .001$

Both predictors made significant positive contributions. Technostress management had a slightly larger standardised coefficient ($\beta = .462$) than classroom control ($\beta = .438$). The estimated model was:

$$\widehat{Y} = 1.245 + 0.421X_1 + 0.378X_2,$$

where Y represents pupils' academic performance, X_1 represents teachers' technostress management, and X_2 represents classroom control.

Table 6: Regression coefficients predicting pupils' academic performance

Predictor	B	SE	β	t	p
Constant	1.245	.312	–	3.99	$< .001$
Technostress management	.421	.085	.462	4.95	$< .001$
Classroom control	.378	.079	.438	4.78	$< .001$

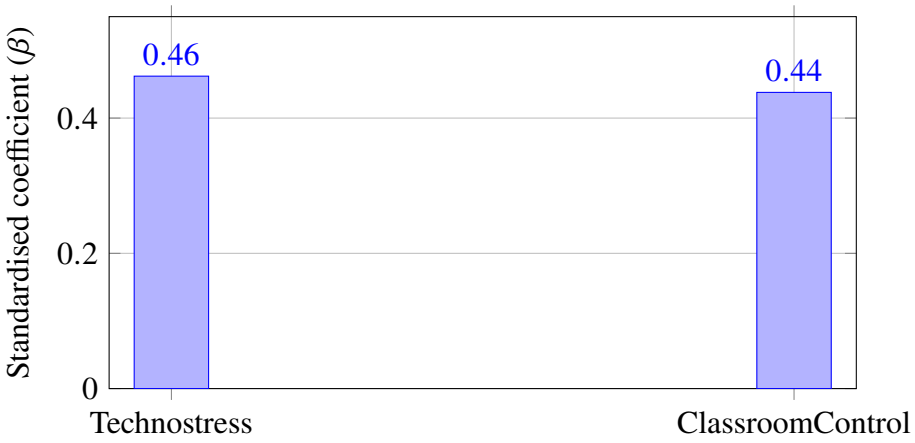

Figure 3: Relative standardised contributions of technostress management and classroom control.

4.5. Summary of Hypothesis Decisions

Table 7: Summary of findings and hypothesis decisions

Hypothesis	Relationship tested	Statistic	Decision
H_{01}	Techno-overload management and pupil performance	$r = .871$	Rejected
H_{02}	Techno-invasion management and pupil performance	$r = .761$	Rejected
H_{03}	Techno-complexity management and pupil performance	$r = .782$	Rejected
H_{04}	Overall technostress management and pupil performance	$r = .853$	Rejected
H_{05}	Classroom control and pupil performance	$r = .731$	Rejected
H_{06}	Technostress management and classroom control	$r = .817$	Rejected
H_{07}	Joint prediction of pupil performance	$R^2 = .667$	Rejected

5. Expanded Interpretation of Findings

Before discussing each hypothesis, two features of the results deserve emphasis. First, the consistently high mean scores indicate that teachers reported active efforts to manage digital demands and maintain classroom control. These scores should not be interpreted as proof that technostress was absent. Rather, they suggest that coping and management practices were frequently used in a context where technological pressure was present. Second, the correlations were large. Large coefficients may reflect genuine connections among teacher coping, classroom

processes, and performance, but they can also be influenced by shared school conditions, aggregation, and omitted variables. The findings are therefore educationally important but should remain framed as associations.

The descriptive result for techno-complexity management ($M = 3.81$) was the highest of the technostress dimensions. This suggests that learning to use difficult systems, seeking assistance, and developing confidence were especially prominent. The finding is consistent with technology-adoption research showing that perceived ease of use and competence affect continued engagement with systems [4, 33]. It also supports the distinction between first-order barriers, such as devices and connectivity, and second-order barriers, such as beliefs, confidence, and pedagogical fit [6]. Effective professional development should therefore move beyond one-off demonstrations and provide repeated practice, coaching, troubleshooting, and opportunities to apply tools to authentic classroom tasks [32].

The high classroom-control scores indicate that respondents reported substantial use of organisation and time-management practices. Nevertheless, classroom organisation had a slightly lower mean than time management. This difference is plausible in crowded or resource-constrained classrooms where teachers may regulate lesson time more easily than they can alter physical space, pupil density, or equipment arrangements. Classroom control must therefore be interpreted as a shared product of teacher skill and school conditions rather than as an exclusively individual responsibility [7, 5].

6. Discussion

6.1. Technostress Management and Pupils' Learning Outcomes

The results show a strong positive relationship between overall technostress management and pupils' academic performance. This means that teachers who reported greater capacity to cope with digital demands also tended to work in contexts where pupils achieved better outcomes. The finding supports the Transactional Theory of Stress and Coping, which proposes that the effects of a demand depend on how it is appraised and on the resources available to manage it [20]. Technology may therefore be beneficial when teachers possess adequate skills, time, confidence, and support, but harmful when demands exceed those resources.

The result is consistent with studies showing that technostress influences teacher performance, burnout, and professional commitment [3, 22, 23]. It also supports the view that digital literacy facilitation, technical support, and organisational resources reduce the negative consequences of technology-related pressure. In practical terms, teachers who can manage stress are more likely to prepare lessons effectively, respond to pupils patiently, sustain attention, and use digital tools without allowing technical problems to dominate instructional time.

6.2. Techno-Overload and Pupils' Performance

Techno-overload management produced the strongest correlation with pupils' performance. This result suggests that the volume and pace of technology-related work may be particularly important in public primary schools. Teachers often combine classroom teaching with electronic record keeping, online reporting, digital communication, and professional-development tasks. When these duties are poorly coordinated, they can reduce the time available for lesson planning, marking, feedback, and individual pupil support.

The finding aligns with the Job Demands–Resources model, which predicts that sustained demands without adequate resources lead to exhaustion and reduced effectiveness [1]. Reducing duplicate reporting, providing realistic deadlines, and ensuring that new digital procedures replace rather than merely add to existing manual tasks may therefore improve both teacher well-being and pupil learning.

6.3. Techno-Invasion and Pupils' Performance

The significant relationship between techno-invasion management and pupil performance highlights the importance of work–life boundaries. Constant messages, after-hours reporting, and expectations of immediate online availability may prevent teachers from recovering physically and emotionally. Insufficient recovery can increase fatigue and reduce attention during classroom instruction. The result is compatible with technostress research that identifies continuous connectivity as a major stress creator [31, 19].

Schools should therefore establish reasonable communication periods and avoid routine demands outside official working hours. Protecting teachers' personal time is not simply an employment-welfare issue; it may preserve the energy and concentration required for effective teaching the next day.

6.4. Techno-Complexity and Pupils' Performance

Techno-complexity management was also strongly related to pupils' performance. Teachers who understand digital systems and can troubleshoot common problems are less likely to lose instructional time or experience embarrassment and anxiety when technology fails. Jena [12] emphasised that competence and coping strategies are central to managing technostress in ICT-enabled classrooms. Practical, differentiated training is therefore more useful than brief, one-off workshops that introduce tools without sufficient guided practice.

The result also suggests that technology selection matters. Educational authorities should consider usability, reliability, language clarity, device compatibility, and the amount of training required before mandating a platform. Complex systems that are poorly matched to users' skills may undermine rather than improve instructional efficiency.

6.5. Technostress Management and Classroom Control

The strong positive relationship between technostress management and classroom control supports the proposed connection between teacher coping and classroom functioning. Teachers who are less overwhelmed can monitor pupils more effectively, maintain routines, respond calmly to disruptions, and manage lesson transitions. These practices are central to Kounin's conception of effective classroom management [15] and to contemporary classroom-control frameworks [5, 25].

Technology failure can easily interrupt lesson momentum. A teacher who lacks confidence may focus excessively on the device while pupil attention deteriorates. By contrast, a teacher with adequate digital competence and contingency plans can maintain instructional flow even when technical problems occur. Technostress management may therefore operate as a protective resource for classroom stability.

6.6. Classroom Control and Pupils' Learning Outcomes

Classroom control showed a strong positive relationship with pupils' academic performance and remained significant in the regression model. This result confirms that organised classrooms, clear routines, effective time use, behavioural monitoring, and consistent expectations create more opportunities for learning. The finding agrees with research linking classroom environment and management practices with achievement [8, 26].

The result is particularly relevant in primary education, where pupils are still developing self-regulation and require frequent guidance. Consistent routines reduce uncertainty, while positive reinforcement and clear expectations help pupils focus on academic tasks. Effective classroom control also protects teaching time and allows teachers to provide feedback and individual assistance.

6.7. Joint Contribution of Technostress Management and Classroom Control

The regression model explained 66.7% of the variance in pupils' academic performance, indicating that technostress management and classroom control jointly represent substantial teacher-level correlates of learning outcomes. Both predictors were significant, although technostress management made a slightly larger standardised contribution. This suggests that teacher coping with digital demands may affect learning directly through instructional effectiveness and indirectly through classroom-management processes.

The high explained variance should nevertheless be interpreted cautiously. The study was correlational, and the model does not establish causation. Other factors such as prior achievement, family socioeconomic status, school resources, class size, leadership quality, teacher subject knowledge, and attendance may also influence pupils' performance [34]. Future studies should test mediation and moderation models using longitudinal data.

7. Additional Statistical Interpretation

7.1. Magnitude and Practical Meaning of the Correlations

Squaring each correlation provides an approximate indication of shared variance in a bivariate relationship. Techno-overload management and pupil performance shared about 75.9% of variance ($.871^2$), overall technostress management and performance shared about 72.8%, and classroom control and performance shared about 53.4%. These values are descriptive and should not be interpreted as causal effects because the variables were not experimentally manipulated and several relationships may reflect common school-level influences.

Table 8: Approximate shared variance for the reported bivariate relationships

Relationship	r	r^2 (%)
Techno-overload management – performance	.871	75.9
Techno-invasion management – performance	.761	57.9
Techno-complexity management – performance	.782	61.2
Overall technostress management – performance	.853	72.8
Classroom control – performance	.731	53.4
Technostress management – classroom control	.817	66.7

The pattern shows that no single dimension should be viewed in isolation. Managing workload, boundaries, and complexity appears to form a connected set of professional capacities. Their association with classroom control also supports an integrated intervention model in which digital competence, workload design, emotional regulation, and classroom-management development are addressed together.

7.2. Unexplained Variance and Model Boundaries

The multiple-regression model explained 66.7% of observed variance, leaving 33.3% outside the fitted predictors. That remaining portion may include prior attainment, socioeconomic background, attendance, teacher experience, subject knowledge, class size, school leadership, instructional materials, language background, and measurement error. Research on educational achievement consistently shows that learning is produced by multiple interacting pupil, teacher, classroom, family, and school factors [11, 34]. The regression should therefore be interpreted as evidence that the two teacher-level variables are important, not that they are exhaustive.

7.3. Conceptual Pathway Suggested by the Results

The strong relationship between technostress management and classroom control ($r = .817$), combined with significant prediction of performance by both variables, is consistent with a possible pathway in which coping supports classroom processes that in turn support achievement.

The present data do not provide a formal mediation test, so this remains a theoretically grounded interpretation rather than a demonstrated causal mechanism. Future studies should use longitudinal or multilevel structural-equation models to evaluate temporal ordering and indirect effects.

8. Educational and Policy Implications

The findings indicate that digital reform should be treated as a human and organisational change process rather than merely the purchase of devices or introduction of platforms. Teachers require sufficient time to learn new systems, opportunities for guided practice, accessible technical support, and clear explanations of how technologies improve instruction. Policies that mandate technology without providing these resources may increase stress and reduce the intended educational benefits.

Teacher-development programmes should integrate digital competence with classroom-management practice. Training should include how to maintain pupil engagement during technology-supported lessons, how to prepare alternatives when systems fail, how to organise digital tasks, and how to protect instructional time. School leaders should monitor signs of overload and avoid unnecessary duplication of digital and paper processes.

At the policy level, education authorities should evaluate the usability and workload implications of digital systems before large-scale implementation. Reliable electricity, internet connectivity, device maintenance, and technical personnel are necessary conditions for sustainable technology integration. Monitoring systems should be supportive and improvement-oriented rather than punitive.

9. Conclusion

The study demonstrates that managing teachers' technostress is closely connected to classroom control and pupils' learning outcomes in Lagos State public primary schools. Teachers who cope effectively with techno-overload, techno-invasion, and techno-complexity are better positioned to preserve attention, emotional stability, instructional time, and classroom order. Classroom control also makes an independent contribution to pupils' performance by supporting engagement, consistency, and productive use of learning time.

Technostress management should therefore be recognised as an essential professional capacity within technology-enabled education. Effective technology integration requires a balance between technological expectations and teachers' skills, time, infrastructure, and support. Digital reforms are most likely to improve learning when they reduce unnecessary workload, strengthen teacher confidence, protect work–life boundaries, and reinforce sound classroom-management practices.

10. Recommendations

1. Lagos State education authorities should provide continuous, hands-on ICT training differentiated according to teachers' competence levels.
2. Schools should establish accessible technical-support systems and appoint trained personnel or peer mentors to assist teachers.
3. Digital reporting requirements should be streamlined to eliminate unnecessary duplication of electronic and paper tasks.
4. School leaders should set realistic deadlines and limit routine technology-related communication outside official working hours.
5. Teacher-development programmes should integrate technostress coping, classroom organisation, time management, pupil engagement, and contingency planning for technology failure.
6. Educational platforms should be evaluated for usability, reliability, device compatibility, and workload implications before adoption.
7. Government should improve electricity supply, internet connectivity, device availability, and maintenance support in public primary schools.
8. Future studies should employ longitudinal, experimental, or mixed-method designs and should test whether classroom control mediates the relationship between technostress management and pupil achievement.

Limitations of the Study

The study used a correlational design and relied partly on self-reported teacher responses; therefore, causal conclusions cannot be drawn. Common-method bias and social-desirability effects may have influenced the questionnaire responses. The study was limited to public primary schools in Lagos State and may not generalise fully to private schools or other states. The graphical presentations in this article visualise aggregate statistics reported in the source study and do not represent reconstructed individual-level observations. In addition, the regression model did not include all possible school, teacher, family, and pupil-level determinants of academic performance.

Suggestions for Further Research

Future research should collect longitudinal data to determine whether changes in technostress management precede changes in classroom control and achievement. Structural-equation modelling could be used to test classroom control as a mediator, while multilevel modelling

could distinguish teacher-level and school-level effects. Qualitative interviews and classroom observations would also provide deeper insight into how teachers experience digital demands and how coping strategies operate during actual lessons.

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Conflict of Interest

The author declares no conflict of interest.

Data Availability

The aggregate data supporting the findings are reported in the article. Access to underlying school records is subject to the permissions and confidentiality requirements of the relevant education authorities.

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