The Impact of Technostressors on the Job Productivity of Senior Secondary Teachers in Nigeria

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Abstract: The digital economy desires students to acquire skills other than the usual academic skills which can be facilitated by integrating technologies into their educational practice. However, ICT integration comes with technostress. Hence, this study investigated the impact of some selected technostress creators on the job productivity of senior secondary school teachers in Education District VI of Lagos State, Nigeria. The study adopted descriptive survey research design with 123 teachers selected through purposive sampling techniques from 104 senior secondary schools in Education District VI. Data were collected using Technostress Creators Assessment Questionnaire (TCAPQ) and Job Productivity Rating Scale (JPRS). TCAPQ has reliability coefficients of 0.75 while JPRS has reliability coefficient of 0.76. Data obtained were analysed using multiple regression and t-test at 0.05 level of significance. The results indicated that the selected techno-creators significantly impacted teachers' job productivity. The study concluded that techno-complexity was the most potent of the three selected dimensions of technostress that impacted the teachers' job productivity followed by techno-insecurity and then techno-uncertainty. The findings also revealed no gender difference in the impact of technostress on senior secondary school teachers. It was recommended that coping strategies should be part of teachers' training on the integration of ICT into educational practice.

Keywords: Technostress, Techno-Uncertainty, Techno-Insecurity, Techno-Complexity, Job Productivity

1. INTRODUCTION

The 21st century digital economy requires students to learn other basic skills apart from the core curriculum. These include communication, collaboration, creativity, and critical thinking, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills. The skills are central to effective participation in the technology-driven globalized society (Stauffer, 2020). Thus, teachers need to change their method of teaching to the type that will facilitate learners' acquisition of these skills. One method capable of achieving this is the integration of information and communication technologies (ICT) into teaching and learning procedure.

Recognising the power of technology integration for quality learning, the Federal Government of Nigeria (2014) through the National Policy on Education states that technologies will be integrated into all tiers of education by providing appropriate facilities and enabling environment for their implementation. This is to boost the productivity of the teachers in terms of contribution to the goals of education and to enable students acquire necessary skills for productive societal participation. According to Anikweze and Kanu (2018), "ICT in education is a vendor of high efficiency, high productivity and high educational outcomes, including the quality of cognitive creative and innovative thinking." The adoption and integration of ICT into teaching and learning activities provides a platform for students as well as teachers to work better to achieve modern educational purposes (Budhai & Taddei, 2015; Lawrence & Tar, 2018).

However, the integration of technology into teaching and learning is not devoid of a charge. Teachers need to learn certain skills to enable them adopt or adapt the technologies for use in teaching and learning endeavours. These efforts, apart from being time consuming, add to the teachers' workloads and modify their work schedules. Munoz, Penalba, Sanchez and Santos (2016) observed that teachers need to regularly update their ICT skills for effective integration of technologies because they are not usually trained to deal with problems emanating from such education practice. Gebhardt, Thomson, Ainley and Hillman (2019) asserted that effectiveness of integration

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of ICTs into teaching and learning depends largely on teachers' readiness and also a function of their confidence and knowledge in using the technologies as well as their beliefs of the importance of such technologies towards improving the quality if their jobs. Hararap and Effiyanti (2015) stated that integration of ICT grows teachers' workloads and further compounds the challenges of techno-phobic teachers and eventually leads to psychological stress. This kind of stress arising from an individual's inability to cope with the integration and use of computer technologies is called technostress.

Technostress is a general feeling of anxiety and negative impact and thoughts, behaviours, attitudes and body when a person is expected to adopt and adapt technologies in workplaces (Tagurum, Okonoda, Miner, Bello & Tagurum, 2017). Hung, Chen and Lin (2014) also viewed it as a technology management problem that employees face in their work environment. This means that technostress is the fear expressed by users with phobia for use of technologies due to the efforts and skills required for effective integration of such technologies. Ahmad, Amin and Ismail (2012); Salanova, Llorens and Cifre (2013) reported that competent and frequent ICT users experience a higher level of technostress than the occasional users. Some of the symptoms of technostress are conflicts, aggression and decline social interactions among teachers and between the teachers and the students with attendant low job productivity (Syvanen, Makieniemi, Syrja, Heikkila-Tammi &Viteli, 2016). Harahap and Effiyanti (2015) reported that effects of technostress could be mitigated by enhancing teachers' belief through the use of ICT in their educational practice. High level of teachers' belief towards computer technologies has capability to reduce the level of technostress emanating from increased workload and job insecurity induced by lack of computer skills.

Technostress is not limited to the non-education sector. Lei (2010); Coklar, Efilti, Sahin and Ackay (2016) noted that technostress is an important problem for teaching profession as a result of integration of the ICTs. Teachers too experience technostress due to integration of technologies into teaching, learning and administrative processes (Roblyer & Doering, 2013). Also, the new focus of education which demands the development and nurturing of some 21st century skills such as critical thinking, collaboration, creativity and problem solving skills and the nature of technology (technical support, inability to use, vision of the school, and social pressure) also contribute to technostress among teachers (Coklar, *et al.,* 2016).

Several classes of technostress creators have been identified in literature but this study adopted the five creators of technostress studied by Li and Wang (2020) due to their wide popularity and relevance when technologies are integrated to advance the quality of learning. These are techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty. Techno-overload is a situation where users are forced to work more with high-speed and in an extended time; techno-invasion is when users feel that they can be contacted without minding their personal engagement which does not delineate their work and personal life; techno-complexity arises when the users feel that their skills are insufficient due to the difficulty related to technologies. As a result, they are strained to use up time and effort to study and understand the diverse features of ICT; Techno-insecurity manifest when ICT users feel threatened that they will lose their job by replacing with people who are better in ICT compare to them; and Techno-uncertainty which happens when the ICT users feel hesitant and disturbed since ICT into teaching is endlessly shifting and need upgrading. Meanwhile, this study focused on technostress creators such as techno-complexity, techno-insecurity and techno-uncertainty on the productivity of the senior secondary school teachers in Lagos State, Nigeria. This is because these dimensions of technostress have been established in literature to have significant impact on users of technologies (Li & Wang, 2020).

A. Statement of the Problem

Technology integration into teaching and learning process comes with a lot of benefits which makes so many states in Nigeria invest resources to improve the quality of learning. Lagos State Government as the country's largest and most economically dominant city, with the aid of World Bank, established the Lagos Eko Education project to provide infrastructural and instructional facilities to schools including the establishment of ICT centres to boost the standard and quality of teaching and learning (Akpan & Ita, 2015). There is also regular training of teachers on the use of ICTs. For instance, In January, 2020, the Lagos State Teaching Service Commission, the regulatory body for teachers in the state, in collaboration with Webican Systems Limited, trained 2000 secondary school teachers on the use of ICTs as tools for teaching students to achieve optimal performance (Lagos State Government, 2020). Acquisition of ICT skills and eventual integration into the classroom come with technostress. Thus, this study investigated the impact of the technostress on the job productivity of the senior secondary teachers in the Education District VI of Lagos State. The study also examined the impact of technostress by gender.

B. Purpose of Research

This study investigated the impact of technostress on the job productivity of senior secondary teachers in Lagos State.

Specifically, the study determined:
  i. The impact of three technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity on the productivity of senior secondary school teachers.
  ii. The impact of technostress on senior secondary school teachers by gender.

C. Hypotheses

The study was guided by the following three hypotheses tested at 0.05 level of significance.

H_01: There is no significant impact of three technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity) on the job productivity of senior secondary school teachers in Education District VI of Lagos State.

H_02: There is no significant impact of each of the technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity) on the job productivity of senior secondary school teachers in Education District VI of Lagos State.

H_03: There is no significant gender difference in the impact of technostress on senior secondary school teachers in Education District VI of Lagos State.

2. LITERATURE REVIEW

A. Theoretical framework

This study is guided by the Technology Acceptance Model (TAM) proposed by Davis in 1989. The model is an effective framework for the understanding of users' adoption and eventual use of emerging technologies in the work environment. The model believes that person's intention to use and actual use of technologies are determined by his perception of technologies' usefulness to his jobs (perceived benefits of the technology) and how easy they are to manipulate (perceived ease of use). This suggests that teachers who found technologies beneficial to their jobs and easy to use would adopt and integrate such technologies into their jobs. Portz, Bayliss, Bull, Boxer, Bekelman, Gleason, & Czaja (2019) posited that users are more likely to adopt a new technology that meets criteria such as usability, usefulness, desirability and credibility. TAM also believes that perceptions and usefulness as well as ease of use is mediated by external variables such as individual differences, system characteristics, social influence and facilitating conditions.

B. Empirical Review

Several studies have reported the influence of technostress on job performance of the users in different organizations. Tarafdar, Pullins and Ragu-Nathan (2015) investigated the effects of conditions that create technostress on the technology-enabled innovation, technology-enabled performance and overall performance. The study further explored the role of technology self-efficacy and organisational mechanisms that prevented technostress and technology competence as possible solutions to the technostress creators. The results showed a negative association between technostress creators and teachers' job performance. That is, technostress reduced job performance of the teachers. Additional results illustrated that when teachers acquired skills that improved their use of technologies, they experienced less technostress. This may be as a result of achievement of more competence in the use of technologies. Similarly, Tagurum *et al.* (2017) assessed the effects of technostress on the job performance of the academic staff of University of Jos, Nigeria. The results revealed that technostress significantly reduced their job performance with the commonest symptoms manifesting as neck-ache and blurred vision. The study also identified technology-based training and effective time management as ways to mitigate the technostress effects.

Along the same trend, Li and Wang (2020) investigated the relationship among specific technostress inhibitors (literacy facilitation, technical support provision and involvement facilitation) and creators (techno-overload, techno-insecurity, techno-complexity, techno-uncertainty) and their impacts on university teachers' work performance. The results established that techno-complexity and techno-insecurity have significant negative effect on work performance. However, techno-overload was found to improve work performance. This may be because the use of technology makes completion of tasks to be faster leading to completion of several tasks within a given period. The study also discovered that involvement facilitation in particular and technical support provision could significantly reduce the effects of techno-overload, techno-complexity and techno insecurity but not techno-uncertainty. The study further showed that literacy facilitation has the ability to prompt the growth of technostress creators in individuals. This points to the fact that training users on the skills of integration may mitigate the level of technostress. Also, Marchiori, Mainardes and Rodrigues (2018) examined the role of individual differences in the level of stress experienced by user of ICTs. The study also identified and measured factors that create technostress: techno-uncertainty, techno-invasion,

techno-overload and techno-complexity. The study reported that the effects of technostress showed as disorders in the workers and losses in organizations manifesting as fatigue, dissatisfaction, anxiety and reduced productivity. These findings lend credence to the fact that technostress reduced productivity of technology users.

In a related fashion, Louma, Penttinen and Rinta-Kahila (2020) investigated enforced presenteeism, a source of technostress as a result of spontaneous exposure of individuals to stimuli from electronic connectivity systems. Technostress was studied in bank employees' before and after implementing a presenteeism-enabling ICT. The study showed that before the implementation, employees manifested high levels of technostress due to work overload, invasion of privacy, and information overload. However, the workers displayed reduced technostress when they were allowed to take control of their jobs and were given freedom to act within the organization.

The levels of technostress experienced by individuals have been linked to their gender. This may be attributed to the levels of usage of ICT by males and females. According to Coklar *et al.* (2016), gender is a significant factor that determines the level of the technostress experienced by teachers. The female teachers experience technical and connection problems that require technical supports whereas male teachers have individual reasons ranging from financial problems, time wasting to understanding foreign language of the software that powers the technologies. The study also reported that the level of technostress experienced by male teachers was more than the experience of the female teachers. Chen (2015) in a study conducted using a sample of Chinese knowledge workers also reported that technostress varied across gender. It was found that male respondents demonstrated a significantly higher level of technostress than female employees. This finding is similar to that Ragu-Nathan, Tarafdar, Ragu-Nathan, and Tu (2008) using United States workers. The study of Jena (2015) also reported gender difference in the technostress levels of employees. This author attributed the stress to female employees' occasional use of technology and male employees' stress due to excessive use consequent upon the belief that technology was male-oriented. However, the study of Wiseman, Al-Akbar, Davidson (2017) reported that female teachers used technology in the classroom more frequently than their male counterparts. Marchiori et al. (2018) established that women experienced higher levels of tecno-complexity and techno-uncertainty, while men experienced greater effects from techno-overload and techno-invasion. These reports imply that male and female users of technologies experience different levels of technostress. However, Bonnah (2015) and Coklar et al. (2016) reported no gender difference in the impact of technostress experienced by technology users.

3. METHODOLOGY

The study employed descriptive survey research design because no variable was manipulated. The participants in the study only responded to the items in the questionnaire and rating scales. The population from which individuals were selected consisted of three thousand eight hundred and twenty (3,820) teachers in the 104 public senior secondary schools in the three zones (Ikeja, Imushin, and Oshodi/Isolo) of the Education District VI, Lagos State. This Education District was randomly selected from the six Education Districts available in Lagos State.

The study participants comprised one hundred and twenty-three (123) teachers from the Education District VI purposively selected based on the criteria that they had attended ICT trainings organized by the State government and had been integrating technologies into their teaching and learning processes. The selection was such that forty-one teachers represented each of the zones.

A. Instrumentation

Data were collected using Technostress Creators Assessment Questionnaire (TCAPQ) and Teacher Job Productivity Rating Scale (JPSR). The TCAPQ is a 40-item instrument with 4-point likert scale of Strongly Agree, Agree, Disagree and Strongly Disagree adapted from the study of Tarafdar, Tu and Ragu-Nathan (2007). It contained sections A and B. Section A obtained demographic information of the respondents while section B had 30 items with ten (10) items each used to elicit responses on each of three dimensions of technostress (techno-complexity, techno-insecurity and techno-complexity) considered in this study.

The face and content validities of the TCAPQ was ensured by giving it to experts in ICT, and teachers who had also been trained on ICT and had implemented it in the classroom but from other education districts of the state for comments and suggestions. Their comments and suggestions were used to arrive at the final instrument. Reliability of the instruments was determined by administering it on randomly selected 20 senior secondary school teachers selected from an education district that was not part of the study. The Cronbach Alpha reliability method yielded a coefficient of 0.75. The total score in each section represents the respondent's observation about that particular technostress creator while the total score in the three sections represents the respondents' observation about the three technostress creators.

The JPRS was a researchers-developed instrument and had 20 items used to collect information on the job productivity of the selected teachers. To ascertain the face and content validities of the JPRS, it was given to experts in Educational Management and senior teachers in secondary schools on the adequacy of the instrument to measure teachers' job productivity. The comments and suggestions made were used to modify the instrument. Thereafter, the instrument was given to two senior teachers to rate ten same teachers each. The inter-rater reliability method yielded a coefficient of 0.76.

B. Method of Data Collection

The researchers visited the authorities of the schools in the Education District VI and requested a list of teachers that had been trained on the use of ICTs by the state government. In addition, assistance from the authorities was sought to rate the job productivity of the selected teachers. One hundred and thirty-five who had attended training and had integrated technologies to teaching and learning activities were given the TCAPQ in hard copy to fill. The researchers waited to collect the questionnares which all the respondents filled and returned The Vice-Principals of the schools of the selected teachers also rated their job productivity through the JPRS and handed over the rating to the researchers.

C. Method of Data Analysis

The data collected were analysed using descriptive statistics of frequency counts and inferential statistics of multiple regression and t-test analysis. The hypotheses generated were tested at 0.05 level of significance.

4. RESULTS

A. Descriptive Analysis

Table 1: Description of respondents by Gender

Gender	Frequency	Percentage (%)
Male	57	46
Female	66	54
Total	123	100

Table 1 shows that 57 (46%) of the respondents were male teachers while 66 (54%) were female teachers. This implies that the majority of the respondents were female teachers.

H₀1: There is no significant impact of the technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity) on the job productivity of the senior secondary school teachers in Education District VI of Lagos State.

Table 2. Impact of technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity) on the productivity of senior secondary schools

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig
Regression	3886.243	3	1295.414		
Residual	6921.432	119	58.163	22.272	0.000
Total	10807.675	122			

R =0.600; R^2 = 0.360; Adjusted R^2 = .343; Std Error = 7.626

Table 2 shows significant impact of the techno-stress creators on job productivity of senior secondary school teachers ($F_{(3,119)}$ = 22.272, p<0.05). This indicated that the three technostress creators significantly impact the job productivity of senior secondary school teachers in Education District VI of Lagos State. The result also revealed that the techno-stress creators accounted for 36% of the variance in the teachers' job productivity. This means that the three technostress creators accounted for 36% of variables that reduces teachers' job productivity. Therefore, the null hypothesis which states that there is no significant impact of the three technostress creators (techno-complexity, techno-insecurity and techno-invasion) on the job productivity of the senior secondary school teachers in Education District VI of Lagos State is rejected.

The results of further analysis to determine the impact of each of the technostress creators on the teachers' job productivity are as presented in table 3.

Table 3. Impact of each technostress creators on the productivity of senior secondary school teachers in Education District VI of Lagos State

Model		Coefficients			t	Sig.
		Unstandardized		Standardized		
		B	Std. Error	Beta		
1	(Constant)	-11.793	7.916		-1.490	0.139
	Techno-complexity	0.732	0.119	0.459	6.131	0.000
	Techno-insecurity	0.287	0.100	0.230	2.878	0.005
	Techno-uncertainty	0.374	0.098	0.309	3.800	0.000

Evidence from Table 3 shows that techno-complexity had a significant impact on teachers' job productivity (t (119) = 6.131, p < .05). Also, the finding showed a significant impact of techno-insecurity on teachers' job productivity (t (119) = 2.88, p = .05), and techno-uncertainty on teachers' job productivity (t (119) = 3.80, p < .05). Therefore, the hypothesis which stated that each technostress creator (techno-uncertainty, techno-complexity, and techno-insecurity) had no significant impact on the job productivity of senior secondary school teachers was rejected. Meanwhile, from the magnitude of the t-statistics, the impact of techno-complexity was the highest (t (119) = 6.13), followed by the techno-uncertainty (t (119) = 3.80), and then techno-insecurity (t (119) = 2.88).

From the B values, the regression equation can be written thus: Teacher Job Productivity = -11.79 + .73 (techno-complexity) + .29 (techno-insecurity) + .37 (techno-uncertainty).

Table 4. Gender difference in the technostress experience by the senior secondary school teachers in Education District VI

Gender	N	Mean	S.D.	Df	T	Sig.
Male	57	54.32	9.564	121	2.122	0.895
Female	66	50.76	9.028			

Table 4 revealed a non-significant outcome (t (121) = 2.122, P > 0.05). This implies that the mean technostress score of male teachers did not differ significantly from the mean technostress score of their female counterparts. Therefore, the hypothesis which states that there is no significant gender difference in the impact of technostress on senior secondary school teachers in Education District VI of Lagos State was retained.

5. DISCUSSION

The study found significant impact of technostress creators (techno-uncertainty, techno-complexity, and techno-insecurity) on the job productivity of senior secondary school teachers. The teachers' job productivity was significantly reduced based on the influence of the technostress creators. This may be due to the inability of the teachers to cope with the ever-evolving needs to acquire skills necessary to integrate technologies and the feeling that they might be disengaged from the jobs more ICT-competent teachers. This finding corroborates that of Tarafdar *et al.* (2015) which revealed association between technostress creators and teachers' job performance. That is, technostress negatively impacted job performance of the teachers. It also concurs with the findings of Tagurum *et al.* (2017) that technostress significantly affected university teachers' job performance.

In addition, the findings revealed that all the technostress creators investigated in this study significantly impacted teachers' job productivity. This suggests that each of the technostress creators significantly reduce the teachers' job productivity. The negative impact is highest due to techno-complexity. This means that the higher the techno-complexity the less the teacher job productivity will be. This is expected because effective integration requires the teachers to regularly update their skills due to regular emergence of new technologies to replace existing ones. Teachers might have perceived that they do not have adequate skills to adapt the frequently

changing technologies to improve their productivity and therefore need to devote more resources to study and understand the diverse features and usage of the technologies. This may appear to be an additional burden considering the fact that they may not be able to cope with the requirement for regular update of skills and thus experience lower job productivity. Techno-insecurity may be due to the teachers' perceived anxiety that their jobs may be terminated and may be replaced with other teachers who can cope with the adaptation of technology if they are unable to learn how to effectively learn to adapt the technologies to advance their own quality of learning. This fear also has the capability to lower their job productivity. Further, the finding on the impact of techno-uncertainty on the job productivity of the teacher might be as a result of teachers' fear that they may not be able to cope with constant update of their knowledge and skills due to the ever-evolving nature of technologies. This finding aligns with that of Li and Wang (2020) which established that techno-complexity and techno-insecurity have significant negative effects on work performance. It also echoes the findings of Marchiori *et al.* (2018) that technostress creators related to the observed disorders in workers and losses in organizations manifesting as fatigue, dissatisfaction, anxiety and reduced productivity.

Further, the study revealed no significant difference between the technostress experienced by male and female senior secondary teachers. This may be due to the fact that both male and female teachers were subjected to the same of form of ICT training and both were perceived to be stressed in a similar manner. Another plausible reason is that they both perceived technologies as a necessity if they must remain relevant on their jobs. This finding supports that of Bonnah (2015); Coklar, *et al.* (2016) that no significant difference existed in the technostress level of males and females. However, the findings showed that male teachers experienced the impact of technostress more than their female counterparts. This may be as a result of more frequent use of technologies by male teachers who may hold the belief that technology is a male-oriented area. Meanwhile, the study of Jena (2015) reported that males see technologies use as male-dominated which results into intensive usage and the more the usage the more the level of technostress. This finding is in line with that of Coklar, *et al.* (2016) that the level of technostress experienced by male teachers was more than what the female teachers experienced.

CONCLUSION AND RECOMMENDATIONS

The study investigated the impact of techno-uncertainty, techno-complexity and techno-insecurity on the job productivity of senior secondary school teachers in Education District VI of Lagos State, Nigeria. The finding revealed that technostress creators had significant impact

on the senior secondary school teachers' job productivity. It also established that each of the selected technostress creators had significant impact on senior secondary school. They reduced the teachers' job productivity with the techno-complexity as the technostress creators with most potent negative impact, followed by techno-insecurity and then techno-uncertainty. The study also revealed no significant gender difference in the impact of technostress creators on senior secondary school teachers.

From the perspective of the Technology Acceptance Model which guided this study, it is concluded that teachers perceived technostress may be as a result of not finding the technology easy to use or probably majority of them did not see the benefits of the technologies in advancing the quality of their jobs. Some may still believe in the traditional ways of teaching and learning. Since the study established that the technostress creators reduced the job productivity of the senior secondary school teachers in Lagos and there is need to stem the tides. Consequently, it is recommended not only the involvement of teachers in the decision regarding the design and implementation of ICTs into teaching and learning but the inclusion of appropriate coping strategies into the teachers' training on ICTs use. Also, there should be regular training of teachers on the use of emerging technologies so as to ease their difficulty in integrating such technologies for educational purpose. In addition, there should be workshops for the teachers on the benefits of ICTs in education and the needs for them to align with the global trend. This may prepare the teachers for the reality that ICTs are meant to improve the quality of teaching and learning and to cause stress that could make their job more tedious. Importantly, Government should put in place train-the-trainers programmes in the schools to enable teachers who had attended the trainings to teach those who had no such opportunities.

Further, in the light of the findings of this study, it is suggested that qualitative research should be conducted to collate the challenges of senior secondary teachers in Lagos State on adoption and integration of ICT into teaching and learning. Study should also be conducted on the impact of each of the technostress creators by gender.

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