Techno-stressors and Productivity among University Students

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Abstract
The researcher's interest in the implication of technology among digital users has mushroomed in the last few decades. Due to the COVID-19 pandemic hitting globally, all sectors, including education, must indeed shift their systems, procedures, and operations to online platforms, especially in teaching and learning among educators and students all over the world. Technological stress is comprehensively reported in the literature, where the students likely experience technostress due to the demands of academic-based assignment requirements and expectations of the digitally enhanced learning process. This study investigated the relationship between technostress creators (Techno-uncertainty, Techno-complexity, Techno-invasion, Techno-overload, Techno-insecurity) and students' productivity. In addition, the researchers aimed to identify which technostress creators are the best predictors of students' productivity. The study was conducted at a public university in Sarawak, Malaysia, and collected 129 valid responses by utilizing a convenience sampling technique and an online self-administered survey. This study's findings provide a significant relationship between technostress creators and students' productivity. Furthermore, Techno-uncertainty, Techno-invasion, and Techno-insecurity predicted unique factors that affect the students' productivity in their learning. In conclusion, the findings may open an opportunity for the institutions to provide dynamic, friendly, and supportive learning systems, and strengthen trust relationships among students.
Keywords: Techno-stressors, Students' Productivity, Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, Techno-Insecurity

Introduction
The global pandemic, Covid-19 has undergone the whole world a kind of reset and driven Information and Communication Technology (ICT) to evolve and significantly impact digital users, especially in the higher education industry (Erdoğan, et al., 2022 & Jena, 2015).

Due to the pandemic, academic operations and approaches to teaching and learning have significantly impacted and led students to switch their learning patterns and adapt the learning methods virtually (Christian, Purwanto, & Wibowo, 2020). Currently, most higher education institutions are eager to modernize their educational operations and systems, specifically in teaching and learning approaches including Online Distance Learning (ODL), Blended Learning (BL), and many more.

Most students are dependent on the use of technology in their learning process, and this intensifies the computerized platform divide that was already endured before the COVID-19 pandemic (Beaunoyer et al., 2020). The unfortunate students who come from low-income families or first-generation households face the problem of obtaining and handling the right digital equipment such as computers, internet connection, and software (Wang & Tang, 2020). Due to these modernized approaches and demands in educational operations, the level of stress among learners becomes inclined and most researchers often overlook technological stress or better known as Technostress one of the factors that may affect students' performance (Abd Aziz & Abu Yazid, 2021). The management of higher education institutions placed high expectations on students' digital learning abilities (Abd Aziz et al., 2023). However, due to the advanced technology used in the learning process, students faced difficulties which lead the universities unable to identify the levels and types of stress suffered by them and affect their academic performance (Abd Aziz et al., 2023).

Technostress can be defined as an adaptive response among digital users that may perceive a situation as challenging or threatening (Dougall & Baum, 2003) which he/she is unable to manage with the organizational computerized usage demands in a correct manner (Tarafdar et. al., 2007). Fundamentally, Technostress occurred when students are exposed to a huge uncontrollable amount of information when they are constantly using digital devices (Abd Aziz et al., 2023). Thus, this might manifest stress or develops uncertain reactions with the signs in their cardio-circularity, psychological, and neurological levels among students (Brod, 1984). Anxiety, technology phobia, mental fatigue, sleep disturbances, direct/indirect pain, and weakened immunity are several symptoms that may address among digital users who experienced Technostress (Abd Aziz & Abu Yazid, 2021). Several studies (Kader et al., 2020) have reported that Technostress may negatively affect digital users' physical and mental health together with social engagement. In addition, the students also may experience declines in their productivity, academic performance, and dropouts (Upadhyaya & Vrinda, 2021).

Technostress has been found due to a few reasons (Tiwari, 2021). First, people are constantly connected to their work by phone, e-mail, and other means due to the strain of the job and the pervasiveness of modern technology, giving them the impression that they are "on call" all the time (Brod, 1984; Weil & Rosen, 1997; Mahapatra & Pillai, 2018). Second, several researchers (Fisher & Wesolkowski, 1999; Weil & Rosen, 1997) indicated that there is peer pressure to stay up with the most recent developments to prevent feeling left out. Moreover, technology is constantly evolving in the workplace, frequently in unpredictable ways, making it essential to upgrade frequently. Third, because technology is constantly evolving, the technology that is being replaced is frequently more complicated than the one that is being replaced, and the terminology used is also frequently intimidating Weil & Rosen (1997) (especially regarding Enterprise Resource Planning (ERP) systems, which causes fear and anxiety (DeMaagd, 1983; Zuboff, 1989). All these lead to unhappiness, which in turn has a detrimental impact on output and performance (Fisher & Wesolkowski, 1999). Fourth, because ICTs are pervasive, various channels of information input are created. This may lead

to information overload, which makes it challenging for employees to handle and use (Brillhart, 2004; Brod, 1984; Weil & Rosen, 1997; Mahapatra & Pillai, 2018).

The downside of ICT usage indicated that technostress has been explored in the past extensively by determining the impact of technostress on organizational behavior and psychological stress (Tarafdar et al., 2019). The study of Technostress has been vastly found to negative impact on productivity (Upadhyaya & Vrinda, 2021; Hung et al., 2015), performance (Upadhyaya & Vrinda, 2021; Tarafdar et al., 2015), satisfaction (Fuglseth & Sørebø, 2014; Kumar et al., 2013), and continuance commitment (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). Strain Ragu-Nathan et. al (2008), exhaustion Ayyagari et al (2011), job burnout (Mahapatra & Pati, 2018), and physiological health implications (Tams et. al., 2014) are the impact of technostress on psychological behavioral outcomes founded in few studies.

The study about Technostress in various fields has been conducted extensively (Abd Aziz & Abu Yazid, 2021). However, research in Technostress especially online learning among university students is still lacking specifically in Malaysian higher education institutions. (Abd Aziz & Abu Yazid, 2021; Upadhyaya & Vrinda, 2021). Most researchers applied the study of Technostress to the employees (Dunn & Kennedy, 2019). In this backdrop, the researchers used Technostress scales from Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan (2007) to determine the relationship between Techno-stressors and Students' Productivity and find out the best predictor/s of Techno-stressors toward Students' Productivity.

Research Objectives
The present study highlights the following
1. To determine the relationship between Techno-stressors (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) and Students' Productivity.
2. To figure out which Techno-stressors variables (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) is/are the best predictor/s of Students' Productivity?

Research Questions
The present study questions the following
1. What is the relationship between Techno-stressors (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) and Students' Productivity?
2. Which Techno-stressors variables (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) is/are the best predictor/s of Students' Productivity?

Literature Review
Technostress
Technostress can be defined as a modern adaptation disease caused by an individual who is failed to cope with digital devices, equipment, or any kind of part about advanced technologies properly and healthily (Brod, 1984). In addition, Brod (1984) classified Technostress into three major characteristics that may associate with Technostress:

1. Individual-level Phenomenon: An individual may be a normal person performing a daily routine, an employee who might employ by either a public or private institution, or even students with different study levels.
2. Directly or Indirectly by Information and Communication Technology: An individual may apply different work or routine approaches as mandated by the organization or institution.
3. Negative Experience: An individual may experience psychological or physiological damage such as exhaustion, fatigue, etc.

Tarafdar et. al (2007) proposed the concepts of technostress creators, associated with stress creation among ICT users developed by (Ragu-Nathan et. al., 2008). Some causes of Technostress were system performance (system breakdown, usability, and security-threats issues) and non-system performance (Perception of digital users in perceiving and using ICT in their routine activities) (Dahabiyeh et al., 2022; Nisafani et al., 2020). Thus, Tarafdar et. al. (2007) summarized stress in human-digital interaction is caused by the increasing amount of workload (Techno-Overload), interjects individual privacy (Techno-Invasion), job complex (Techno-Complexity), constantly evolving (Techno-Uncertainty) and threaten individual job security (Techno-Security).

Techno-Overload

The first techno-stressors is Techno-Overload which allowed ICT users to work promptly over a long period (Marchiori et al., 2019; Hauk et al., 2019; Ahmad & Amin, 2012; Booker, Rebman, & Kitchens, 2014) with overflooded information and notifications that may ICT users be given in a short time (Abd Aziz & Abu Yazid, 2021) and overwhelmed with the situation (Chen et al., 2019). This elaboration is supported by Tarafdar et. al. (2010) and Rolon (2014) with the false assumption of advanced technologies may simplify and assist users in completing tasks. In other words, this factor verifies the sense that digital users may become multitaskers and experience extra commitment to completing their work in less time (Abd Aziz, Aziz, & Abd Rahman, 2023). As a result, they might have a problem with memory issues, information and work overload, and anxiety (Ayyagari et al., 2011). In addition, work fatigue and pressure will be experienced and might affect their performance and other health problems (Olaniyi et al., 2014). In the university's situation, students may be forced to accomplish all their projects by using any form of technology that is appropriate to be utilized (Upadhyaya & Vrinda, 2021). The students also feel the pressure to complete all the assignments according to the deadlines, work overload, and self-doubting in the new ICTs (Rolón, 2014) and resulting in insufficient resting time (Abd Aziz et al., 2023). In this study, Techno-Overload is referred to a situation where the students need to switch their traditional learning approaches to automated learning methodologies which leads them to commit longer time and be swifter in learning digitally (Abd Aziz & Abu Yazid, 2021). Hence, we developed a hypothesis as pointed out below:

Hypothesis 1 (H1) - Techno-overload has a significant relationship with Students' Productivity.

Techno-Invasion

Technology invasion is defined as a situation where digital users have boundaries between work and personal matters and become indistinct due to the assumption that they were always available to be contacted and connected at any time (Hauk, Göritz, & Krumm,

2019; Tarafdar et al., 2010). As most university students during the pandemic were Online Distance Learning (ODL) and blurred by ICTs, they are expected to accomplish the assignments during the classes, but also they need to complete those during rest time and short-term break (Ayyagari et al., 2011). Thus, this depicts that the students need to be ready at all time and sacrifice their leisure time to complete all the assignments (Cao & Sun, 2018) which lead to low productivity (Ayyagari et. al., 2011; Tarafdar et. al., 2007). Techno-Invasion will "encourage" the employees to be available at all times when needed even on weekends pertaining to the work assignments assigned by their employer (Dahabiyeh, Najjar, & Wang, 2022). For example, during the pandemic, private university staff in Jakarta tended to be available all the time, replying to all the messages, joining all virtual meetings, and learning how to use the latest applications to work promptly (Farmania et al., 2022). In this study, Techno-Invasion can be referred to as a situation where the student's personal and learning life were get merged and conflicted because of the availability of digital technologies and constant participation during virtual learning (Abd Aziz & Abu Yazid, 2021). Hence, we proposed a hypothesis:

Hypothesis 2 (H2) - Techno-invasion has a significant relationship with Students' Productivity.

Techno-Complexity

Technology Complexity is the complexity of how the information can be operated and how technology can be communicated from one person to another, which may cause mental breakdown and declining confidence levels using those technologies (Farmania et al., 2022). When we talked about "complexity", this term comprehensively referred to the extent of digital users experiencing difficulties perceiving technology and uncontrollably handling it appropriately (Tarafdar et. al., 2020). Complex digital technologies may challenge the students' focus, and qualifications, control feelings, and have appropriate time in handling any complex tasks (Dragano & Lunau, 2020). As a consequence of Techno-Complexity, due to online learning, students should learn and adapt to the technologies which became more complex (Farmania, et. al., 2022) when they usually underestimate and force themselves to learn the technology which might lead to stress (Califf & Brooks, 2020; Zhao et al., 2020; Chandra et al., 2019; Tarafda et. al., 2005). In addition, role ambiguity and conflict (Rangarajan et al., 2005) may be associated with the complexity of the use of any technologies and may be developing interference appraisal of the demand (Webster, Beehr, & Love, 2011). One study conducted by Qi (2019) indicated that due to the advanced and complex technology-based learning applications during online learning, may rise stress among students and lead to a decline in students' academic performance. This situation happens due to a lack of formal training in handling official online learning sites provided by the institutions, feature in online applications that may be multifaceted, systems unfamiliarity, and non-mobile-compatible system that may not be functioning well with computers, laptops, or any computerized-related devices (Abd Aziz & Abu Yazid, 2021). Thus, in this study, Techno-Complexity can be defined as the complexity of ICT adopted by university students which may increase the difficulty among them since they are obliged to enhance their digital skills and understand the changes in technologies from time to time in completing their work assignments (Li & Wang, 2021). Hence, the following hypothesis is proposed:

Hypothesis 3 (H3) - Techno-complexity has a significant relationship with Students' Productivity.

Techno-Insecurity

Techno-Insecurity is a form of stressor mostly faced by students who have self-doubting about their digital skills and felt threatened with losing their momentum to complete the task successfully and insecure with someone who might be proficient in IT (Abd Aziz & Abu Yazid, 2021). Automation tasks and reforming the workforce are the impact of the digital revolution (Dahabiyeh et al., 2022). Currently, most higher education institutions implement more automation products as digital devices in the teaching process among educators which could improve the students' learning environment (Abd Aziz, et. al., 2023). The bright side is technology might enhance students' digital proficiency in educational society (Abd Aziz, et. al., 2023) and is in line with the university's goals which are to train young learners (students) for their future lives, careers, and marketability (Toven-Lindsey, 2017). As advanced digital technologies nowadays, may replace the approaches of the students handling their assignments and become technology-savvy students (De Cuyper et. al., 2012). However, not all students are expected to be "Technology-Savvy" (Dahabiyeh et al., 2022). For instance, when the students are unable to complete a task due to insecurity, they may lose motivation in accomplishing the task (Shropshire & Kadlec, 2012) and probably spend more time and resources on unproductive tasks or learning any unwarranted automation skills (Tarafdar et al., 2015). Nevertheless, those students who encounter insecurity may experience stress and pressure if it is not under control (Abd Aziz, et. al., 2023). In this study, we conclude Techno-Insecurity is a feeling of being defenseless and afraid of technology development which the students insecure with their on competencies and keep comparing themselves with other competent students who excel in computerized work (Farmania et al., 2022). Hence, we hypothesize as stated below

Hypothesis 4 (H4) - Techno-insecurity has a significant relationship with Students' Productivity.

Techno-Uncertainty

Techno-Uncertainty is referring to situations where the development of digital systems constantly changed leading digital users uncertain about the use of ICTs in the proper manner (Tarafdar et. al., 2007). In addition, Ma and Turel (2019) coined that helplessness feeling among ICT users unable to cope with digital changes. Due to the uncertain impact of ICTs systems before the users fully adopt and implement the technology, the ICT users may find difficulties to estimate their future workload (Turel & Gaudioso, 2018). Moreover, the evolution of digital solutions was rapidly changed or upgraded and demanded ICT users adapt to the latest version of the systems provided (Dahabiyeh et al., 2022) including software, hardware, applications, systems, or network (Ma & Turel, 2019; Marchiori et al., 2019). Qi (2019) indicated that the students have no issues using all the digital platforms since they are so-called "Digital Savvy", but, they might face problems in how performing the tasks since the number of assignments, projects, etc. might be uncertain. For instance, one study discovered that female students use all the technologies longer than male students (Ma & Turel, 2019) and proved the commitment level is unaffected (Ahmad & Amin, 2012). In this study, we refer Techno-Uncertainty as continuous upgrades or changes in teaching approaches among lecturers in Open Distance Learning (ODL) which may cause interference and uncertainty in students' concentration as they continue attempting to provide themselves with these approaches (Abd Aziz & Abu Yazid, 2021). Hence, the hypothesis as indicated below:

Hypothesis 5 (H5) - Techno-uncertainty has a significant relationship with Students' Productivity.

Technostress and Student Productivity

Some researchers Tarafdar, et. al (2007); Torkzadeh & Doll (1999) indicated that students' productivity is referred to task efficiency and improved work efficiency in the landscape of digital usage (Sethi et al., 2022). Students' Grade Point Average (GPA) also can be an indicator to measure students' productivity in academically (Hysenbegasi, Hass, & Rowland, 2005). Technostress may affect negatively students' productivity Hung et al (2011); Tarafdar, et. al (2007) and the quality of students' lives (Lee et al., 2016). Technostress also causes low student performance and productivity during online learning Zhao, et. al (2020); Ayyagari, et. al (2011); Tarafdar, et. al (2010) due to the usage of ICTs that may challenge or influence digital users and may experience anxiety, mental fatigue, insecurity, and a drop in their confidence level (Lee et al., 2016; Salanova et al., 2013). In contrast, a study by Molino et. al (2020) depicted a positive and significant relationship between technostress and workload and work-family conflict which may affect their performance among Italian. Additionally, technostress also will reduce job satisfaction and probably affect workers' productivity (Park & Cho, 2016). Based on the previous literature mentioned in this study, the research model is proposed as shown in Figure 1.

Research Model

Figure 1 illustrates the research model that details the relationship between independent variables (Technostress) and dependent variable (Students' Productivity), adopted from (Upadhyaya and Vrinda, 2021). The model includes five major Techno-stressors variables (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) and the dependent variable of Students' Productivity.

Figure 1: Research Model

Research Hypothesis

It is hypothesized that Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity lead to Technostress (Tarafdar et. al., 2007), which might cause significant influences on Students' Productivity (Upadhyaya & Vrinda, 2021; Tarafdar et. al., 2007; Torkzadeh & Doll, 1999).

Hypothesis 1 (H1) - Techno-overload has a significant relationship with Students' Productivity.
Hypothesis 2 (H2) - Techno-invasion has a significant relationship with Students' Productivity.
Hypothesis 3 (H3) - Techno-complexity has a significant relationship with Students' Productivity.

Hypothesis 4 (H4) - Techno-insecurity has a significant relationship with Students' Productivity.
Hypothesis 5 (H5) - Techno-uncertainty has a significant relationship with Students' Productivity.

Research Methodology

The research has been conducted in one public higher education institution in Sarawak, Malaysia. A total population of 350 students who are experienced online distance learning (ODL) has been chosen for this study. The study was conducted by using google forms and letting the students participate in the study. A non-probability sampling (convenience sampling technique) has been applied in this study due to the availability of the respondents. Tabachnick and Fidell (2007) indicate that a huge population can be reduced by using the sample size formula of $N = 50 + 8m$, in which N is the number of participants and m is the number of independent variables. The total number of five independent variables and the sample size was a minimum of 90 respondents participating in this study.

This study utilized a self-administered survey (online) method which was divided into three main sections. The first section was designed to obtain the overall respondents' demographic information including gender, age, and race. The second and third sections of the survey asked respondents to indicate their level of agreement or disagreement with each statement based on a five-point Likert scale ranging from 1 ("Strongly Disagree"), 2 ("Disagree"), 3 ("Neutral"), 4 ("Agree") and 5 ("Strongly Agree"). Techno-stressors among students were measured by using a 23-item scale proposed by Tarafdar et. al. (2007). Technostress dimensions included five-item scales of techno-overload (a situation where digital technology drives students to perform promptly), techno-complexity (a situation that makes student feels insufficient with their skill sets specifically in digital technology), and techno-insecurity (a situation where student compare other students having better technology knowledge that may threaten his/her academic performance); and four-item scales of techno-invasion (a situation where digital technology forces students to work beyond their regular class hours and invading their personal lives) and techno-uncertainty (a situation that creates uncertainty among students due to frequent changes and upgrades in digital technology). Lastly, student productivity was measured by using four-item scales adapted from (Tarafdar et. al., 2007).

The online survey was disseminated to 350 students and received 129 completed responses with a response rate of 36.7%. All the respondents were experiencing online distance learning (ODL). The respondents in this study belonged to the age group of 20 years old and below, with 79.1% of the students. Among the respondents, 78.3% of the students were female and the remaining were male, 21.7% of the students. This study has also shown mostly Malay students were involved with a percentage of 56.6%, followed by others (Bidayuh, Kenyah, Kadazan, and Melanau) with 22.5% and 20.9% of Iban students.

Table 1
Demographic Statistics

GENDER	Frequency	Percentage (%)
Male	28	21.7
Female	101	78.3
AGE	Frequency	Percentage (%)
Below 20 Years Old	102	79.1
21 – 30 Years Old	27	20.9
RACE	Frequency	Percentage (%)
Malay	73	56.6
Iban	27	20.9
Others	29	22.5

Findings

1) *Reliability*

The initial data screening in this study indicated the absence of any missing data in the responses received. The reliability of Techno-stressors and Student Productivity was determined before further analysis was conducted. Table xxx indicates the reliability and descriptive statistics of Techno-stressors and Student Productivity dimensions. The Cronbach Alpha outcome from all independent and dependent variables was found to be above the point of 0.7, where Techno-uncertainty has the highest Cronbach Alpha of .926 and Students' Productivity was .946. All outcomes of Cronbach Alpha points were above 0.7, indicating a positive and acceptable level of reliability and inter-item consistency for all scales (Sekaran & Bougie, 2016).

2) *Descriptive Statistics*

Table xxx also illustrates that from 129 respondents, all mean value for Techno-stressors was above 2.5 and Students' Productivity was above 3.0 of the mean value. According to Terano (2015), the range value of a mean above 2.50 was considered moderately acceptable. Techno-uncertainty shows the highest mean value of 2.785 and a standard deviation of .942, while Techno-insecurity has the lowest mean value of 2.524 and a standard deviation of .739. Students' productivity was categorized as acceptable items which are above the mean value of 3.0 (Terano, 2015) with a mean value of 3.107 and a standard deviation of 1.127.

3) *Skewness and Kurtosis Distribution*

In most research conducted, the mean or average value of the variables is mostly used in the study to measure the tendency (Abdul Aziz, Samuel, & Sundram, 2020). Skewness and Kurtosis statistics indicate the pattern of literacy test scores distribution (Allen, Bennett, & Heritage, 2019). Skewness and Kurtosis values should be within (+) (-) 3.00 which depicts that the data is normally distributed (Tabachnick & Fidell, 2007). In this study, both variables showed the data was normally distributed and all Skewness and Kurtosis value was below (+) (-) 3.00.

Table 2
Measurement Items Reliability and Descriptive Statistics

Construct	Number of items	Cronbach Alpha	Mean	Standard Deviation	Skewness	Kurtosis
Techno-overload	5	.889	2.629	.890	.050	-.526
Techno-invasion	4	.894	2.771	.976	.196	-.714
Techno-complexity	5	.891	2.662	.825	-.020	-.315
Techno-insecurity	5	.786	2.524	.739	.004	.219
Techno-uncertainty	4	.926	2.785	.942	.333	-.607
Students' Productivity	4	.946	3.107	1.127	-.142	-1.023

Table 3
Bivariate Pearson Correlation Evaluation

		Students' Productivity
Techno-Overload	Pearson Correlation	.763**
	Sig. (2-tailed)	.000
	N	129
Techno-Invasion	Pearson Correlation	.790**
	Sig. (2-tailed)	.000
	N	129
Techno-Complexity	Pearson Correlation	.652**
	Sig. (2-tailed)	.000
	N	129
Techno-Insecurity	Pearson Correlation	.701**
	Sig. (2-tailed)	.000
	N	129
Techno-Uncertainty	Pearson Correlation	.811**
	Sig. (2-tailed)	.000
	N	129

** Correlation is significant at the level 0.01 level (2-tailed)

4) Correlation

Bivariate Pearson Correlation is used to measure the strength of the relationship between independent variables (Techno-stressors) and dependent variables (Students' Productivity). According to Cohen (1988), the value of (+) (-) 0.50 – 1.00 is considered a positive/negative strong correlation between both variables. In this study, all Technostress variables have a strong correlation with Students' Productivity as stated in Table xx. In short, all hypotheses are accepted.

5) *Test of Hypothesis*

Hypothesis 1 (H1) - Techno-overload has a significant relationship with Students' Productivity.

Techno-overload has a positive and significant relationship of .763 (p <.001) on Students' Productivity.

Hypothesis 2 (H2) - Techno-invasion has a significant relationship with Students' Productivity.

Techno-invasion has a positive and significant relationship of .790 (p <.001) on Students' Productivity.

Hypothesis 3 (H3) - Techno-complexity has a significant relationship with Students' Productivity.

Techno-complexity has a positive and significant relationship of .652 (p <.001) on Students' Productivity.

Hypothesis 4 (H4) - Techno-insecurity has a significant relationship with Students' Productivity.

Techno-insecurity has a positive and significant relationship of .701 (p <.001) on Students' Productivity.

Hypothesis 5 (H5) - Techno-uncertainty has a significant relationship with Students' Productivity.

Techno-uncertainty has a positive and significant relationship of .811 (p <.001) on Students' Productivity.

6) *Regression*

   Multiple regression is an expansion of Bivariate Pearson Correlation and has been conducted to determine the best predictor/s of students' productivity. Table xxx indicated all the independent variables (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, Techno-Insecurity) have 73.4% of the variance (R square = 0.857) in Students' Productivity. The model is also highly significant as the F statistics is 67.871 (F>1) with a p-value of 0.000. Thus, the regression model is significant and there is a presence of a relationship between Technostress and Students' Productivity.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.857[a]	.734	.723	.59347

ANOVA[a]
Table 4
Model Summary and Anova Statistics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	119.525	5	23.905	67.871	.000[b]
	Residual	43.322	123	.352		
	Total	162.847	128			

a. Dependent Variable: Students' Productivity
b. Predictors: (Constant), Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, Techno-Insecurity

According to Table xxx, only three Technostress variables (Techno-Invasion, Techno-Insecurity, and Techno-Uncertainty) are made unique, statistically significant, and the best contribution to the Students' Productivity prediction. Techno-uncertainty has the largest beta coefficient (β .511, p=.000) and is summarized as the strongest and most distinctive contributor to describing the Students' Productivity. Techno-invasion (β .362, p=.000) and Techno-insecurity (β.256, p=.031) are also significant predictors of Students' Productivity.

Coefficients[a]
Table 5
Coefficients Statistics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.192	.191		1.005	.317
	Techno-Overload	.207	.135	.163	1.534	.128
	Techno-Invasion	.418	.103	.362	4.055	.000
	Techno-Complexity	.185	.114	.135	1.617	.108
	Techno-Insecurity	-.390	.178	.256	-2.186	.031
	Techno-Uncertainty	.612	.112	.511	5.483	.000

a. Dependent Variable: Students' Productivity

Discussions

The current study aimed to determine the relationship between Technostress factors (Techno-Uncertainty, Techno-Complexity, Techno-Invasion, Techno-Overload, and Techno-Insecurity) and Students' Productivity. Additionally, the study also investigated which Technostress factors is/are significant predictor/s of Students' Productivity. However, few studies have highlighted how the Technostress factors affected Students' Productivity, specifically among university students. Therefore, the result indicated all factors of Techno-stressors are significant to the Students' Productivity. However, only three Techno-Stressors (Techno-Invasion, Techno-Insecurity, and Techno-Uncertainty) become the best predictors of Students' Productivity.

Techno-uncertainty can be considered the clearest contributor to students' productivity with the largest beta coefficient (β .511, p=.000). The students agreed that the institution will always improve their services such as upgrading their computer networks (Ma & Turel, 2019;

Marchiori, Mainardes, & Rodrigues, 2019), constantly changing their computer software and hardware (Ma & Turel, 2019; Marchiori et al., 2019; Ahmad & Amin, 2012), and developed new approaches in learning process especially teaching-learning platforms (Upadhyaya & Vrinda, 2021), examinations and many more. These changes or upgrades are needed due to security and privacy concerns (Dahabiyeh et al., 2022). For example, several virtual learnings have been reported disrupted by outsiders specifically by Zoom virtual video conferencing displaying inappropriate images (Farrer, 2020). The teachers are required to change their online conferencing platforms into safer mediums (Dahabiyeh et al., 2022). In addition, uncertainty about the technologies also will discourage the students to participate the online learning due to the workload that they received with cramps and tight schedules (Qi, 2019). During Online Distance Learning (ODL), students experienced high techno-uncertainty due to ambiguous work assignment (Wang & Shu, 2008).

Techno-invasion become one vital role in students' productivity in this study (β .362, p=.000). Digital technology invaded and consumed precious time among university students till they had minimal time spent with their families. In addition, university students may sacrifice their time in completing their work assignments and online learning. Due to these elaborations, this factor will create stress among the students and a lack of social engagement, especially with their families. Furthermore, ICTs may develop boundaries between family and work, and increase work-life conflicts (Yun et al., 2012). Several findings indicated that if online work assignments use to blur the discrepancy between work and personal life, it may make the inference and conflicts with families uncontrollable (Vayre & Vonthron, 2019; Carlson et. al., 2018). This condition also invades students' private lives and high energy and time-consuming which may result in negative stress (psychological distress), academic performance Cavanaugh et. al (2000), and health (Burke, 1993). Another study from Farmania et al (2022) indicated that Indonesian staff from one private university in Jakarta spent their time working such as replying those messages and emails, joining any virtual video conferencing during non-working hours, and at the same time learn how to operate new applications that can accomplish the task swiftly.

Technology insecurity is also one of the contributors to the students' productivity in this study (β.256, p=.031). The feelings of being threatened using ICTs and those who are digitally literate, uncomfortable enhancing digital skills or even sharing knowledge with classmates and vice versa, lead to productivity among university students. The students who are having trouble with technology will lose their motivation to accomplish the assignments Shropshire & Kadlec (2012) and spend time and resources on ineffective tasks and learning digital skills (Tarafdar et. al., 2005). Even though these students can be considered digitally savvy, they also experience difficulties coping with advanced upgrades and changes in ICTs (Qi, 2019). In addition, due to Online Distance Learning (ODL), students should understand, explore, and learn how to operate several new software and applications that may trigger them self-doubting due to ICTs complexity (Farmania et al., 2022). Some of them also reported resistance to learning new digital skills in order they are not easily replaced by the technologies (Maier et al., 2019). Komala and Meena (2017) reported students who experienced insecurity with technologies had a direct impact on their satisfaction level. Graduates nowadays indeed must be proficient in ICTs which will affect their technological innovation and continuous advancement (Brynjolfsson & McAfee, 2014).

Conclusions

In conclusion, this study determines the relationship between Techno-stressors and Students' Productivity and finds out the best predictors of Techno-stressors on Students' Productivity. It can be concluded that technostress creators have a significant relationship with students' productivity. Only Techno-Uncertainty, Techno-Invasion, and Techno-Insecurity are unique predictors of students' productivity.

There are several limitations have been discovered in this study such as (1) this research is limited to undergraduate students of public universities in Sarawak, Malaysia only; (2) this study discusses technostress creators without technostress inhibitors; and (3) this research may obtain data through online survey due to movement control order (MCO).

The researchers also provide a few recommendations which can be an added value in future research. The researchers may be considering the possibility of different substances in students' culture and support systems, especially institutions' operations operated in their online learning implementation. In addition, further research needs to be conducted from the different perspectives of students from other universities can be a great idea to compare the variety of perspectives among students related to technostress factors. Furthermore, the researchers can investigate control variables (gender, age, seniority, programs, etc.) in describing students' behaviors related to technostress factors (creators and inhibitors). Thus, conducting interviews and focus group discussions among students would be a great opportunity to encourage different perspectives of technostress and interpret the actual experiences of online learning stress among students.

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