Technology Proficiency and Academic Stress Level of Pre-service Teachers Under the New Normal

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Abstract. This study aimed to investigate the technology proficiency and academic stress level in the framework of pre-service teachers under the new normal. The descriptive-correlational research design was used to gather data from the respondents who were selected using purposive sampling to include 152 student teachers from the College of Education of Nueva Ecija University of Science and Technology. Two survey instruments were adapted in this study, the Technology Proficiency Self-Assessment Questionnaire for 21st Century Learning (TPSA C-21) and Perceptions of Academic Stress (PAS) scale, which were administered online as primary tools for data gathering. Pearson's r Product Moment Correlation was used as statistical analysis tool with 5% level of significance to determine the relationship of the variables. The correlational analysis revealed the significant relationships of the identified variables. Although the pre-service teachers demonstrate high level of technology proficiency, they also encounter stresses related to academic expectations, work and examinations because of such proficiency. The results of the analysis show that technology proficiency is significantly correlated to stresses related to academic expectations ($r = .164$, $p < .05$). Hence, pre-service teachers with high level of technology proficiency have experienced more stress related to academic expectations. Furthermore, the correlational analysis also reveals that there was a significant correlation between technology proficiency and stresses related to work and examinations ($r = .283$, $p < 0.01$). Therefore, pre-service teachers with high level of technology proficiency have experienced stresses that are related to work and examinations. It is recommended that further research be conducted to generate a more generalizable result.

Keywords: Technological Proficiency · Academic Stress · Pre-service Teachers · New Normal

1 Introduction

The United Nations (2020) reports that there is mounting evidence that better education outcomes can be achieved through increased usage of and access to technology and services. The use of technology has the greatest potential to contribute to the accomplishment of the Sustainable Development Goals by the year 2030 (Uddin, 2021), particularly

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when it comes to education. Educators, including those who are still in the pre-service level, have a lot to gain from the advancements in technology (OECD, 2016), such as their technological proficiency. Consequently, pre-service teachers who are technologically savvy are better equipped to identify and explore a wide variety of technological tools and devices that will yield the most fruits to teaching and learning contents (Saad & Sankaran, 2020).

In a traditional classroom setting, pre-service teachers will have the necessity to "acquire knowledge through experience, authority, deductive reasoning, inductive reasoning, and the scientific approach" (Maulina, Ladjagang, Nasrullah, Esteban, Hastianah, Herianah, 2021). However, the advent of the new normal has changed the landscape of traditional teaching and learning process. The adaptation that the education sector is making to tackle the pandemic is not simply a transfer to an online mode of instruction; rather, it is a system that delivers and makes effective use of technology (Tanghal & De Leon, 2022). Furthermore, the education sector is undergoing a profound change as a result of the advent of technology, causing noticeable shifts in both the way it is given and experienced (OECD, 2021). Hence, pre-service teachers are broadly affected by the pandemic because of the sudden change in learning environments. One glaring effect of COVID-19 outbreak on pre-service teachers was that half of their teaching practicums was done via distance education (Koşar, 2021). Under the new normal, technology in education contributes to a widening inequality among pre-service teachers not only in terms of gadgets but also in terms of technological proficiency (Esteban & Cruz, 2021).

With this revolution, it is inevitable that pre-service teachers may experience stress, specifically in their academic aspect. Stress was a common experience among university students, and the changes created by the new normal have reinforced students' stress levels (Goppert & Pfost, 2021). According to the transactional stress model of Lazarus and Folkman (1984), the interplay between a person and their surrounding environment is the source of stress. Therefore, the transformations in learning environments because of the new normal causes stress to pre-service teachers, to which 'they felt more challenged like an excessive burden waited on them' (Al Abiky, 2021), partly because of the absence of their readiness for the situation. One of the most widespread reasons for students' lack of readiness in their endeavours is the abrupt transformation of the learning environment, as well as the curriculum and pedagogical changes that have recently been implemented (Giani & Martin, 2021). In light of the pandemic, they have felt unprepared; however, they need to adopt with the emerging educational technologies for them to maximize their potentials (Laguitao, Cubalit, Teppang, Cruz, & Bautista, 2021).

Ultimately, this research assesses the technological proficiency and academic stress level of preservice teachers under the new normal. To give light to this phenomenon, this study specifically aims to: (1) describe the profile of the respondents; (2) assess the respondents' level of technology proficiency; (3) examine the respondents' level of academic stress; and (4) correlate technology proficiency and academic stress levels of pre-service teachers.

2 Methodology

2.1 Research Design

This research paper used descriptive-correlational research design. According to Vergara (2021), descriptive research gathers data and information to systematically describe a phenomenon, situation, or population. It also gives a reasonably clear overview of what is occurring at a given time. Furthermore, descriptive correlation design aims to discover relationships between variables and enabling present information to predict future events. Considering the given objectives of this study, descriptive-correlational suits appropriately.

2.2 Respondents of the Study

The respondents of the study were 152 student teachers, 64 male and 88 female, from the College of Education of Nueva Ecija University of Science and Technology. The researchers used purposive sampling wherein respondents must be enrolled in educational technology class. Purposive sampling is a method that focuses on very specific characteristics of the units or individuals chosen.

2.3 Instrument

This study used online survey questionnaire as primary tools for gathering data. Specifically, the Technology Proficiency Self-Assessment Questionnaire for 21st Century Learning (TPSA C-21) by Christensen & Knezek (2016) and Perceptions of Academic Stress (PAS) scale by Bedewy & Gabriel (2015). The adapted surveys were already subject to validity and reliability testing. The reported internal consistency of the TPSA C-21 ranged from .75 to .93 which can be considered as good. Moreover, PAS scale an 18-Likert type item scale that had an overall internal consistency reliability of 0.7.

2.4 Data Analysis

The researchers used various statistical tools to attain the objectives of this study. First, frequency count and percentage were used to describe the profile of the respondents. Second, mean and standard deviation were utilized to describe the level of technology proficiency and academic stress of pre-service teachers. Five-point Likert scale was used with its corresponding verbal description below:

Interval	Technology Proficiency	Academic Stress
4.20–5.00	Expert	Very High
3.40–4.19	Proficient	High
2.60–3.39	Competent	Moderate

1.80–2.59	Advance Beginner	Low
1.00–1.79	Novice	Very Low

Finally, Pearson's r Product Moment Correlation was used to determine if there was a significant relationship between technology proficiency and academic stress of the respondents. Note, the researchers used MS Excel 2019 and SPSS v21 for the data analysis.

2.5 Ethical Considerations

In the data gathering procedure, the researchers took into considerations several ethical aspects. The researchers explained first the purpose of the present study, then sought permission and consent of the respondents. The respondents participated voluntarily and were given the rights to withdraw from the study at any stage if they wished to do so. Moreover, it was explained that the data and information collected would be processed with utmost confidentiality in accordance with Philippines' Data Privacy Act of 2012.

3 Results and Discussions

3.1 Profile of the Respondents

The Table 1 describes the profile of the pre-service teachers in the lens of the following variables: sex, technological devices, daily internet usage, and internet speed.

Sex
Based on the results, most pre-service teachers are female, 88 (57.89%), corresponding to the findings of Esteban & Cruz (2021) where teacher education institutions are mostly dominated by females. This conclusion is not only true for Philippine teacher education institutions. It is also supported by data that the teaching profession is highly gendered and that women dominate the field like in other countries such as European countries like Bulgaria, Estonia, Latvia, and Lithuania (Tašner, Mihelič, & Čeplak, 2017).

Technological Devices
Among the 152 respondents, 119 (78.29%) own a smartphone only. During the pandemic, the education sector shifted to digital learning environment to which smartphone has become the most commonly used device. The ability to connect to the internet whenever and wherever desired is a significant benefit offered by mobile devices (Katsumata, et al., 2022). With pre-service teachers going online, mobile phone is the main device of learning; hence, classroom undertakings necessitate mobile-friendly activities.

Daily Internet Usage
Pre-service teachers mostly go online for about six (6) to 10 h (71, 46.71%). In the Philippines, the average use of internet is 9 h and 45 min on a daily basis. With the onset of the pandemic prompting schools to shift from traditional to virtual classroom,

Table 1. Profile of the Pre-service Teachers

Profile	Frequency	Percentage
Sex		
Male	64	42.11
Female	88	57.89
Technological Devices		
Smartphone Only	119	78.29
Laptop and Smartphone	32	21.05
Desktop, Laptop and Smartphone	1	0.66
Daily Internet Usage		
1–5 h.	59	38.82
6–10 h.	71	46.71
11–15 h.	17	11.18
16–20 h.	5	3.29
Internet Speed		
Less than 1 Mbps	7	4.61
1–5 Mbps	103	67.76
6–15 Mbps	23	15.13
16–25 Mbps	12	7.89
25 Mbps and Above	7	4.61
Total	**152**	**100.00**

it is but tolerable to spend such amount of time for different online activities such as synchronous classes, answering activities in the web, surfing the net, watching videos, and others.

Internet Speed

One hundred three (67.76%) of the pre-service teachers have an internet speed of 1-5Mbps. Correspondingly, according to Ookla in its Speedtest Global Index July 2022 report, the median fixed broadband speeds of the country are now at 50.26 Mbps and the Philippines is ranked at #63 worldwide. On the contrary, the respondents don't enjoy such internet connection since most of them live in rural areas where there is limited access to wi-fi and broadband.

Table 2. Technology Proficiency

Domains	Mean	SD	VD
Email	3.88	0.52	Proficient
World Wide Web	3.67	0.57	Proficient
Integrated Applications	3.68	0.63	Proficient
Teaching with Technology	3.86	0.53	Proficient
Teaching with Emerging Technologies	4.09	0.57	Proficient
Emerging Tools	3.90	0.58	Proficient
General Weighted Mean	**3.88**	**0.47**	**Proficient**

3.2 Respondents' Level of Technology Proficiency

The Table 2 shows the respondents' level of technology proficiency in terms of the following aspects: sending emails, using World Wide Web, integrated applications, teaching with technology, teaching with emerging technologies and applications of emerging tools.

Based on the results, pre-service teachers are proficient in the application and utilization of technology. It has general weighted mean of 3.88 that falls under the proficient level and majority of the respondents belong to this level. These results can be related to the proposition of Tapscott (2020), a Net Generation Theorist, who states that the younger generation is more knowledgeable, informed and skillful about an innovation central to society's functioning. He also predicts that the younger generation, members of the "Net-Generation", will in time be able to develop and manipulate digital media to the extent that it will impose a new culture on the rest of society. Locally, Matias & Agapito Jr., (2022) penned that "with our current situation we became all content creator and through the advancement of technology, schools are also advancing their teaching strategy by utilizing multimedia presentations that would benefit the students." Indeed, Tanghal and De Leon (2022) emphasized that the appropriateness of multimedia and technology when integrated in the teaching learning process would harvest beneficial results both for the teachers and learners. Therefore, the technology proficiency of the pre-service teachers is essential in their future roles as full-fledged educators. On the contrary, other researchers argue that technology increases anxiety and stress levels in the teaching profession. Pre-service teachers may also experience the same dilemma as they use technology which, according to Meylan, et al. (2020), 'encourages the development of stress and anxiety.'

3.3 Respondents' Level of Academic Stress

Table 3 summarizes the respondents' level of academic stresses that further discuss by the following statements: stresses related to academic expectations, stresses related to faculty work and examinations, and stresses related to students' academic self-perceptions.

In terms of stresses related to academic expectations, the results show that the pre-service teachers experience high stress when teachers are critical of their academic

Table 3. Respondents' Level of Academic Stress

Statements	Mean	SD	VD
Stresses related to academic expectations	**3.20**	**0.77**	**Moderate**
Competition with my peers for grades is quite intense	2.88	1.15	Moderate
My teachers are critical of my academic performance	3.48	0.91	High
Teachers have unrealistic expectations of me	3.14	0.91	Moderate
The unrealistic expectations of my parents stress me out	3.27	1.21	Moderate
Stresses related to faculty work and examinations	**3.55**	**0.49**	**High**
The time allocated to classes and academic work is enough	3.37	0.91	Moderate
The size of the curriculum (workload) is excessive	3.62	0.79	High
I believe that the amount of work assignment is too much	3.73	1.01	High
Am unable to catch up if getting behind my work	3.37	0.90	Moderate
I have enough time to relax after work	2.95	1.14	Moderate
The examination questions are usually difficult	3.74	0.77	High
Examination time is short to complete the answers	3.73	0.95	High
Examination times are very stressful to me	3.99	0.89	High
Stresses related to students' academic self-perceptions	**3.60**	**0.50**	**High**
Am confident that I will be a successful student	2.85	1.29	Moderate
Am confident that I will be successful in my future career	2.70	1.32	Moderate
I can make academic decisions easily	3.32	1.05	Moderate
I fear failing courses this year	4	1.08	High
I think that my worry about examinations is weakness of character	3.83	0.92	High
Even if I pass my exams, am worried about getting a job	3.51	1.17	High
General Weighted Mean	**3.45**	**0.44**	**High**

performance. In the context of this study, the pre-service teachers are enrolled in a subject that is technology-related; hence, their academic performance relative to technology proficiency may somehow affect the level of stress they experience. As regards stresses related to work and examinations, Items 2, 3, 6, 7, and 8 are the causes of high stress among the pre-service teachers. Topping the list is the statement, "Examination times are very stressful to me," where pre-service teachers undergo assessment of their technological skills; thereby, causing high level of stress to them. Lastly, in terms of stresses related to student's academic self-perceptions, the results reveal that pre-service teachers fear failing in their course, which is technology-related. Pre-service teachers understand the value of education; therefore, they exert all their efforts to pass their subjects, including those that have something to do with technology.

According to Brand and Schoonheim-Klein (2019), stress among undergraduate students is multifactorial, arising from both academic and non-academic factors, including socio-cultural, environmental, and psychological attributes. In the context of this present paper, technology-related factors cause the stress of the pre-service teachers. However, more empirical studies are needed to prove the existence of stress induced due to technology, particularly to students (Upadhyaya & Vrinda, 2021).

Overall, the general weighted mean shows that the respondents' level of academic stresses is rated high. Taking into consideration the background of this study, these academic stresses are technology-related since the respondents are enrolled in a subject that involves technology. The findings concur with the study of Upadhyaya & Vrinda (2021), which states that "techno-invasion was found to be the highest contributor of technostress among students, due to the increasing ubiquity of technology." Under the new normal, the classes shifted to online learning, making technology an omnipresent educational necessity. With the occurrence of such changes, pre-service teachers could not escape the need to use technology, described by Boonjing and Chanvarasuth (2016) as technostress or the overdependence to manipulate technological devices that can unconsciously create stress. In essence, the respondents' level of academic stress may be attributed to their proficiency in using technology.

3.4 Relationship Between Technology Proficiency and Academic Stress

The Table 4 shows the data analysis to determine if significant relationship exists between technology proficiency and academic stress. To test the hypothesis, the Pearson Product-Moment Correlation was used as statistical tool with 5% level of significance. The results of the analysis show that technology proficiency is significantly correlated to stresses related to academic expectations ($r = .164$, $p < .05$). Hence, pre-service teachers with high level of technology proficiency have experienced more stress related to academic expectations. Furthermore, the correlational analysis also reveals that there was a significant correlation between technology proficiency and stresses related to work and examinations ($r = .283$, $p < 0.01$). Therefore, pre-service teachers with high level of technology proficiency have experienced stresses that are related to work and examinations. Similar results were found by Essel et al. (2021), wherein technology dependence had significant association to technology-induced stress. They also found that stress had adverse effects on academic achievement and academic productivity. Certainly, the use

Table 4. Relationship between technology proficiency and academic stress

Variables	1	2	3	4
1. Technology proficiency	1			
2. Stresses related to academic expectations	.164*	1		
3. Stresses related to work and examinations	.283**	.450**	1	
4. Stresses related to students' academic self-perceptions	.118	.264**	.255**	1

Note: *, $p < 0.05$; **, $p < 0.01$.

of technology had countless of advantages; however, it also had negative consequences. As students rely more on technology, they may frequently experience technology uncertainty and complexity that lead to techno-overload. Moawad (2020) pointed out that quick and sudden shift in the educational system to virtual and online framework cause intense stress on students. Particularly, the highest percentage of stress among students is their uncertainty over the end of semester exams and assessments. According to Al-Fudail & Mellar (2008), the existence of technostress when teachers use technology in the classroom arises from lack of fit between the teacher and the technological environment. There was a mismatch between teacher's abilities and work demand, and between teachers' needs and supply in terms of adequate technology, training, and support.

4 Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. Most pre-service teachers are female, own a smartphone only, mostly go online for about six (6) to 10 h and have an internet speed of 1–5 Mbps.
2. Under the new normal, the pre-service teachers demonstrate proficiency in the application and utilization of technology. It must be noted that though most of the respondents are proficient, they can still improve their level to become experts.
3. The respondents' level of academic stress may be attributed to their use of technology particularly in terms of stresses related to academic expectations and work and examinations, as reflected by the high general weighted mean.
4. The results of the analysis show that technology proficiency is significantly correlated to stresses related to academic expectations. Hence, pre-service teachers with high level of technology proficiency have experienced more stress related to academic expectations. Furthermore, the correlational analysis also reveals that there was a significant correlation between technology proficiency and stresses related to work and examinations. Consequently, pre-service teachers with high level of technology proficiency have experienced more related to work and examinations.

5 Recommendations

Based on the findings and conclusion presented, the following recommendations are suggested:

1. Teacher education institutions are encouraged to divert the phenomenal addictiveness of pre-service teacher on the use of technology into something more meaningful such as inquiry-based activities, rather than mere leisure-based engagements; thereby, preventing, if not entirely eradicating, academic stress due to technology proficiency.
2. Future researches are encouraged to conduct similar study. This will further validate and establish the reliability of the findings of the study.

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