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Assessing The Impact of Covid-19 E-Learning on Nursing Students: An Investigation into Techno-Stress

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Abstract

The COVID-19 pandemic has brought about unprecedented changes in the educational landscape, necessitating a rapid shift towards e-learning platforms. This study sought to explore the techno-stress experienced by Nursing students at the University of Eastern Philippines (UEP) during e-learning amid the COVID-19 pandemic, as well as the coping mechanisms employed to mitigate its impact. The research was conducted with a focus on Level 3 and Level 4 Nursing students officially enrolled. The objectives of the study were to determine the demographic profile of the respondents in terms of age, sex, and year level and assess the level of techno-stress experienced by the students. Research questionnaires were utilized to gather the necessary data. The collected data were subsequently tallied, tabulated, presented, analyzed, and interpreted using percentage, weighted mean, and chi-square test methodologies. The findings of this study shed light on the techno-stressors faced by Nursing students in the context of e-learning during the COVID-19 pandemic. The analysis revealed valuable insights into the coping strategies employed by the respondents to manage these challenges. By understanding the factors contributing to techno-stress and exploring effective coping mechanisms, this research contributes to the broader understanding of the impact of the pandemic on education. Overall, this investigation serves as a significant step in assessing the impact of COVID-19 E-Learning on Nursing Students, highlighting the importance of addressing techno-stress and promoting adaptive coping strategies to enhance the overall well-being and academic performance of students in the ever-evolving landscape of virtual education.

Keywords: Techno-stress; E-learning; Nursing students; COVID-19 pandemic

I. INTRODUCTION

In early 2020, Coronavirus disease 2019 (COVID-19) struck many countries globally. As a result of COVID-19, many people, especially educators, have experienced major disruptive societal changes and emotional issues. (Auger & Formentin, 2021; Dogra & Kaushal, 2021) When COVID-19 was officially declared a pandemic by the World Health Organization (WHO), schools and universities were closed, and classes were shifted to online education. Previously, online education was only used to support face-to-face education, which was not done on a big scale. However now, this change was intended to reduce the transmission of COVID-19. This situation encouraged teachers to prepare themselves and their students for the VUCA (volatile, uncertain, complex, ambiguous) world, as defined by UNESCO (Hadar et al., 2020).

In accordance with the pertinent provisions of Republic Act (RA) No. 7722, otherwise known as the "Higher Education Act of 1994; Republic Act No.11469, otherwise known as the "Bayanihan to Heal as One Act"; and by virtue of Commission En Banc (CEB) Resolution No.412-2020, series of 2020, the Commission on Higher Education adopted and promulgated the Guidelines on Flexible Learning (FL) to be implemented by public and private Higher Education Institutions (HEIs).

The latter CHED Memorandum Order stressed the following: "Although flexible learning is deemed the most appropriate and safest pedagogical approach during the pandemic, there might be some instances that face-to-face delivery of certain courses is necessary. In preparation for such eventuality, there is a need for HEIs to put in place in mitigating measures in their campuses to prevent their students, faculty, and staff from infections or becoming spreaders of the disease. Thus, a cautious and gradual approach to reopening campuses of HEIs shall be taken until safe and effective COVID-19 vaccines are distributed or made available to Filipino tertiary students."

The closure of educational activities in the Philippines due to the ongoing COVID-19 pandemic resulted in an unplanned shift from traditional face-to-face learning to a setup that exclusively involves digital teaching and learning, which is the e-learning program. Students reported the e-learning environment to be even more stressful than regular classrooms.

Technology solutions are very important in distance learning. Online platforms are regarded to be the most advance because of its ability to facilitate various interactive and remote activities and carry a barrage of content to a connected community. Online classes were the ultimate method for imparting education to students in the aftermath of COVID-

19. As a result of the nationwide lockdown, teachers were compelled to run their classes online, primarily by using Zoom, Google Meet, and several other methods that involve the internet.

This situation has shown it is not easy to establish a distance learning and teaching strategies under protective measures for COVID-19 (Akour et al., 2020), one of which was the closure of universities and shifting to remote teaching. The impact of this pandemic could extend beyond the risk of physical harm to substantial psychological consequences. Replacing traditional, in-person teaching with online teaching. (Gobbi et al., 2020)

Indeed, according to a study conducted in China, more than 25% of the general population reported moderate to severe stress or anxiety symptoms as a result of COVID-19. (Amri et al., 2020)

Students are increasingly involved in technology and spend more time using various devices, making them more reliant on the internet, particularly when seeking answers relating to their academic pursuits rather than reading books at the library. However, some lack the devices and internet access to be able to participate in online classes leaving them in a bad spot where they are unable to receive an education that results to a specific kind of stress, called techno-stress, a stress induced by one's ability to adapt to new technologies.

HEIs around the country have taken proactive steps to guarantee that teaching will continue notwithstanding the interruption in classes. These rules, which are designed to facilitate student educational activities, include modified online learning practices. Online learning may include synchronous, real-time lectures and time-based assessments of learning outcomes. However, the emergency transition to online learning due to COVID-19 has posed challenges in terms of maintaining education quality and sound pedagogy. To overcome these challenges, educational institutions are exploring innovative ways for learning and continues the deployment of said available flexible learning.

It is therefore one of the biggest questions that the researchers posed in conducting this study being survivors themselves, albeit the pandemic is no longer an emergency and nearly passed us, if in one of the remotest and technologically disadvantaged academic institutions students were indeed affected by stress brought about by technology in e-learning and how they managed to transcend this same challenge.

II. METHODOLOGY

In this study, the researchers aimed to investigate the techno-stress experienced by Nursing students enrolled in the University of Eastern Philippines during the COVID-19 pandemic's e-learning mode. To achieve this, a meticulously designed researchers-made questionnaire checklist

was developed, taking into consideration the requirements for a reliable data collection instrument. The questionnaire encompassed three main parts: the demographic profile section sought to identify the respondents' age, sex, and year level; the techno-stress assessment aimed to determine the impact of technology on their daily e-learning activities; and the coping mechanism evaluation delved into understanding how students adapted to this novel learning environment. The use of a linear scale from 1 to 5 in the questionnaire provided a structured and quantifiable means for participants to express their opinions and experiences.

The researchers followed a systematic approach to gather data from the targeted Nursing students. They first sought permission from the dean of the College of Nursing and Allied Health Sciences through a communication letter outlining the research objectives and methods. Upon obtaining the necessary approval, the researchers personally distributed the questionnaire to the selected participants, consisting of Level 3 and Level 4 Nursing students officially enrolled for the school year 2022-2023. The collected data were then subjected to meticulous checks for accuracy and completeness before being tabulated and analyzed. By utilizing appropriate statistical tools such as percentage, weighted mean, and chi-square tests, the researchers aimed to derive meaningful insights from the data, shedding light on the techno-stress experienced by Nursing students during e-learning and the coping mechanisms employed to navigate these challenges in the context of the COVID-19 pandemic.

III. RESULTS AND DISCUSSION

This portion presents the results of the study, analysis and interpretation of data which explains the socio-demographic profile of the respondents in terms of age, sex, and year level; techno-stress; and, coping mechanisms.

Table 1a Frequency Distribution of Respondents According to Age

AGE	FREQUENCY	PERCENTAGE
19-20 21-22 23 and above	83 150 21	33 59 8
TOTAL	254	100

Table 1a shows the age distribution of the respondents where majority of the respondents are in the age group 21-22. This indicates that most of

the respondents were mostly enrolled as Nursing students in the University from start of the COVID-19 Pandemic, that is first half of 2020, hence were able to experience shift from face-to-face to online classroom learning while in the college.

Table 1b Frequency Distribution of Respondents According to Sex

SEX	FREQUENCY	PERCENTAGE
Male	39	15
Female	215	85
TOTAL	254	100

Table 1b presents the distribution of sex of the respondents which shows that females far outnumber males in this college course, that is 85% against 15%. This further implies the dominance of female in the nursing profession.**Table 1c Frequency Distribution of Respondents According to Year**

Level

Year Level	FREQUENCY	PERCENTAGE
Third	148	58
Fourth	106	42
TOTAL	254	100

Table 1c presents the year level distribution of the respondents. Out of 254 respondents, 148 or 58% are third year students, and 106 or 42% are fourth year students. Thus, more students are enrolled in third year than in the fourth year which means that responses will reflect more of the former than the latter.

Table 2 Summary of Responses on Techno-stress

ITEM	**RANK**	**MEAN**	**INTERPRETATION**

1.	Number of Hours Spent in Online Class	2	4.32	Strongly Agree
2.	Information Overload	3	4.11	Agree
3.	Signal Connectivity	1	4.38	Strongly Agree
4.	Pace of Change	4	4.07	Agree
5.	Academic Self-perception	5	4.06	Agree
6.	School Home Conflict	6	3.89	Agree
7.	Techno Complexity	7	3.74	Agree

Table 2 shows the respondents' overall responses on techno-stress of the seven listed items comprising techno-stress, signal connectivity and number of hours spent in online class were ranked the first two highest; and techno complexity being the last.

This implies that the biggest techno-stress the respondents experience is when there is poor internet connection. Getting the highest score among all techno-stress components means that this is the most difficult and draining to deal with in remote classes during the pandemic. The data further indicates that, being the last ranked item, complexity in technological demands of online learning is in fact manageable compared to the rest.

Table 2a Techno-stress Responses on Number of Hours Spent in Online Class

ITEM	5	4	3	2	1	TOTAL	MEAN	INTERPRET

								ATION
1. I feel too drowned to attend the online classes in front of cellphone/laptop for 4 to 8 hours a day.	134	91	25	1	3	254	4.39	Strongly Agree
2. My prolonged screen time doing activities and assignments causes eye strain.	139	98	11	5	1	254	4.45	Strongly Agree
3. My rest period is compromised.	93	124	30	7	0	254	4.19	Agree
4. My physical activities are limited because of extended hours in online class.	110	101	32	10	1	254	4.22	Strongly Agree
5. My prolonged exposure to screen causes me headache.	136	88	18	9	3	254	4.36	Strongly Agree

Grand Mean	***4.32***	***Strongly Agree***

Table 2a shows the respondents' techno-stress responses on number of hours spent in online class where most of them strongly agree, choosing four out of five (4/5) items thereof. This shows that soaking in the monitors for extended period of time during online learning is techno-stress. Respondents specifically consider item (2), with the highest score, which states that prolonged screen time doing activities and assignments causes eye strain, a major concern.

Meanwhile, most respondents agree in item (3), with the lowest score, that their rest period is compromised.

From the scores gathered and the overall table information, it can be inferred that health is affected noting that the number of hours in online class causes eye strain, limited physical activity, headache, and inadequate rest.

Table 2b Techno-stress Responses on Information Overload

ITEM	**5**	**4**	**3**	**2**	**1**	**TOTAL**	**MEAN**	**INTERPRETATION**
1. I have poor decisions made due to excess of information to complete a task.	72	129	40	7	6	254	4.00	Agree
2. My endless computer files and email messages leads to mental fatigue.	80	124	35	13	2	254	4.05	Agree
3. I feel restless or confused in processing too much information from	96	113	30	12	3	254	4.13	Agree

the internet.								
4. My brain starts to rush from one idea to another that makes it hard to focus.	107	100	35	10	2	254	4.18	Agree
5. I am likely to make errors when bogged down with too much information that may delay processing of information.	101	109	32	9	3	254	4.17	Agree
Grand Mean							***4.11***	***Agree***

Table 2b shows the respondents' techno-stress responses on information overload, where most of them agree, choosing five out of five (5/5) items thereof. This shows that although this techno-stress is scored lower in the scale than the number of hours spent in online class, the constant barrage and proliferation of information is still a noteworthy mental distress.

Respondents specifically consider item (4), with the highest score, which states that their brain starts to rush from one idea to another that makes it hard to focus, a great concern. Meanwhile, most respondents agree in item (1), with the lowest score, that they have poor decisions made due to excess of information to complete a task.

From the scores gathered and the overall table information, it can be deduced that information overload causes an endless stream of information that results to inability to focus, poor decisions, error and confusion in processing information, and mental fatigue.

Table 2c Techno-stress Responses on Signal Connectivity

ITEM	**5**	**4**	**3**	**2**	**1**	**TOTAL**	**MEAN**	**INTERPRETATION**

1. My internet connection is fast in the morning than in the afternoon.	118	92	30	11	3	254	4.22	Strongly Agree
2. My class is being interrupted due to unstable internet connection.	143	77	29	2	3	254	4.40	Strongly Agree
3. Few students dominating the group discussion or recitation due to unstable internet connection.	116	103	29	6	0	254	4.30	Strongly Agree
4. Weather affects the performance of my signal/internet connection.	153	75	23	3	0	254	4.49	Strongly Agree
5. Internet connectivity differs from place to place.	163	67	16	5	3	254	4.50	Strongly Agree
Grand Mean							***4.38***	***Strongly Agree***

Table 2c shows the respondents' techno-stress responses on signal connectivity where most of them strongly agree, choosing five out of five (5/5) items thereof. This shows that internet is central and instrumental in online learning and therefore associates it as the biggest burden among students being end-users and at the winning or losing end depending upon the performance of independent and external party service providers.

Respondents specifically consider item (5), with the highest score, which states that connectivity differs from place to place, to be the greatest distress. Meanwhile, most respondents agree in item (1), with the lowest score, that the internet connection is fast in the morning than in the afternoon. This suggests that techno-stress comes at specific times during the day.

From the scores gathered and the overall table information, it can be deduced that smooth learning momentum relies heavily on faultless internet connection.

Table 2d Techno-stress Responses on Pace of Change

ITEM	5	4	3	2	1	TOTAL	MEAN	INTERPRETATION
1. I feel socially isolated or feeling less connected to others.	77	102	43	26	6	254	3.86	Agree
2. Self-studying is difficult for me.	84	107	40	18	5	254	3.97	Agree
3. I prefer face-to-face classes.	131	77	40	6	0	254	4.31	Strongly Agree
4. I am missing out on extracurricular/ on-campus activities.	79	121	37	16	1	254	4.03	Agree
5. I have competing priorities due to	102	102	39	10	1	254	4.16	Agree

pandemic, work, family, and school.								
Grand Mean							***4.07***	***Agree***

Table 2d shows the respondents' techno-stress responses on pace of change where most of them agree, choosing four out of five (4/5) items thereof. This shows that the sudden move from classroom to remote setting is techno-stress. Respondents specifically consider item (3), with the highest score, which states that they prefer face-to-face classes, to be reflective of the emotional strain they experienced.

Meanwhile, most respondents agree in item (1), with the lowest score, that they feel socially isolated or feeling less connected to others.

From the scores gathered and the overall table information, it can be inferred that it was hard during pandemic because the need for social interaction in and out of school, which was in a way an academic anchor for the respondents, came to a sudden halt.

Table 2e Techno-stress Responses on Academic Self-perception

ITEM	**5**	**4**	**3**	**2**	**1**	**TOTAL**	**MEAN**	**INTERPRETATION**
1. I am experiencing difficulty with trying to focus or concentrate.	101	114	24	9	6	254	4.16	Agree
2. I believe that the class did not translate well in an online environment.	93	104	41	15	1	254	4.07	Agree

3. I am having a hard time organizing my schedule or my time.	83	113	42	14	2	254	4.03	Agree
4. I have difficulty focusing or paying attention to remote instruction or activities.	81	114	43	15	1	254	4.02	Agree
5. I am generally unhappy with having to move online.	81	109	52	11	1	254	4.02	Agree
Grand Mean							***4.06***	***Agree***

Table 2e shows the respondents' techno-stress responses on academic perception where most of them agree, choosing five out of five (5/5) items thereof. This shows that confidence in understanding the lessons through e-learning is techno-stress. Respondents specifically consider item (1), with the highest score, which states that they are experiencing difficulty with trying to focus or concentrate, to be a cause of anxiety.

Meanwhile, most respondents agree in items (4) and (5), with the lowest score, that they have difficulty focusing or paying attention to remote instruction or activities and they are generally unhappy with having to move online.

From the scores gathered and the overall table information, it can be inferred that there is an individual perception of doubt whether the respondent has somehow understood correctly or not the discussions through online classes. This resulted in difficulties with focus, belief that class did not translate well to online environment, having hard time organizing schedule and paying attention to remote instruction, and the general feeling of unhappiness to having to move online.

Table 2f Techno-stress Responses on School-home Conflict

ITEM	**5**	**4**	**3**	**2**	**1**	**TOTAL**	**MEAN**	**INTERPRETATION**
1. I have inadequate studying environment or distracting home environment.	96	108	29	14	7	254	4.07	Agree
2. I prefer to be on campus to study.	102	94	45	12	1	254	4.12	Agree
3. I have difficulties using online platforms (e.g., Moodle, Google classroom, Google meet, Zoom, Canva, Text website).	73	98	48	25	10	254	3.78	Agree
4. I experience difficulty with								

proctoring application during test.	75	107	50	20	2	254	3.92	Agree
5. I have no access to class notes or lecture recordings.	63	80	61	36	14	254	3.56	Agree
Grand Mean							***3.89***	***Agree***

Table 2f shows the respondents' techno-stress responses on school-home conflict where most of them agree, choosing five out of five (5/5) items thereof. This shows that the transition creating the physical distance of school and home also gave rise to logistical deficiencies in e-learning at home that were previously available at school is techno-stress. Respondents specifically consider item (2), with the highest score, which states that they prefer to be on campus to study, of considerable interest.

Meanwhile, most respondents agree in item (5), with the lowest score, that they have no access to class notes or lecture recordings.

From the scores gathered and the overall table information, it can be deduced that respondents share the feeling of inadequacy in learning tools and support. There is the distracting home environment, the need to be in campus to study, the difficulty in using online platforms during discussions, proctoring application during tests, and access to class notes or lecture recordings.

Table 2g Techno-stress Responses on Techno Complexity

ITEM	**5**	**4**	**3**	**2**	**1**	**TOTAL**	**MEAN**	**INTERPRETATION**

1. I find it difficult to effectively use applications due to my limited investment of time and effort.	65	113	44	24	8	254	3.80	Agree
2. I have discomfort feeling or having lack of familiarity with required technologies or applications.	59	107	42	41	5	254	3.69	Agree
3. I do not find enough time to study and improve my technological abilities.	56	98	62	35	3	254	3.67	Agree
4. I find others more knowledgeable about this technology than I do.	69	103	50	29	3	254	3.81	Agree
5. I often find it too complex to understand and use new technology.	69	96	49	33	7	254	3.74	Agree
Grand Mean							***3.74***	***Agree***

Table 2g shows the respondents' techno-stress responses on techno complexity where most of them agree, choosing five out of five (5/5)

items thereof. This shows that the implied requirement to self-teach oneself with navigating through programmes and applications which are outside and beyond the course or subject description is techno-stress. Respondents specifically consider item (4), with the highest score, which states that they find others more knowledgeable about this technology than they do, a cause of concern.

Meanwhile, most respondents agree in item (3), with the lowest score, that they do not find enough time to study and improve their technological abilities.

From the scores gathered and the overall table information, it can be deduced that respondents are one in expressing discomfort in effectively using applications due to some limitations, familiarity with applications, limited time to improve technological abilities, know-how insecurity, and complexity in understanding and use.

Techno complexity, having the least score among all components of techno-stress, is considered the least burdensome to respondents in online classes during pandemic.

IV. CONCLUSION

In conclusion, the study provided valuable insights into the techno-stress experienced by Nursing students during e-learning amid the COVID-19 pandemic. The majority of respondents acknowledged experiencing techno-stress and indicated the use of coping mechanisms to address these challenges. Although relationships between certain variables could not be conclusively determined due to limitations in the data and statistical analysis, the study highlights the pressing need for addressing techno-stress in the academic setting.

Based on the findings, several recommendations can be made to alleviate techno-stress and improve the e-learning experience for students. Academic institutions should prioritize addressing techno-stress even post-pandemic, recognizing its ongoing impact on both students and faculty members who rely on e-learning. Providing students with alternative options for attending classes and fulfilling requirements can help reduce the reliance on technology and mitigate techno-stress. Moreover, considering the variance in internet connectivity across locations, institutions should be flexible in accommodating students in rural areas or places with inconsistent internet service.

To empower students with the necessary skills for e-learning, relevant government agencies should implement free programs and training sessions, focusing on essential applications commonly used in virtual learning. School administrators can play a vital role by offering emotional support programs, particularly for students who may find it challenging to

share their techno-stress-related issues with family and friends. For future research, additional demographic data, such as family income and parents' professions, could provide a more comprehensive understanding of the impact of techno-stress. Additionally, enhancing the data-gathering tools and procedures can enable more in-depth assessments of techno-stress levels and coping mechanisms among Nursing students. By heeding these recommendations, academic institutions can foster a healthier and more supportive e-learning environment for students during and beyond the challenges posed by the COVID-19 pandemic.

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