An Intergenerational Framework for Mitigating Technostress in Radiologic Technology Using Augmented Reality

Jerry A. Cabinan[1], Ernie A. Bonzo[2]

[1]RRT, MPA, PhD, [2]MASOR
St. Alexius College

Abstract

The study competitively developed a mitigating framework for technostress intergenerational Radiologic Technology in an augmented reality. This descriptive study used surveying method through Google Form to Radiologic Technologists working as clinical instructors and Radiologic Technology students from all higher education institutions offering the Radiologic Technology program in Region XII. They are classified as Digital immigrants and Digital natives as components of the intergenerational Radiologic Technology. The digital immigrants are more stressed as compared to their digital native counterparts in the learning-teaching process. Digital natives are more stressed as compared to the digital immigrants in the profession oriented. Digital natives are more stressed as compared to the digital immigrants in the technical issue-oriented. Digital natives are more stressed as compared with the digital immigrants in the personal oriented. Digital Immigrants are more stressed as compared with the digital natives in the social oriented domain. It is recommended to conduct performance audit which will include the economics of the development and upgrading of the technological infrastructures, modification of the teaching and learning and workplace environments and adopt the proposed Mitigating Framework for Technostress and the corresponding program components be implemented to help intergenerational Radiologic Technologists and Radiologic Technology students cope with technostress.

Keywords: Techno-Stress, Digital Natives, Digital Immigrants

INTRODUCTION

The COVID-19 Pandemic in the Philippines has brought about massive transition from the actual classroom engagements with the recent online activities in a virtual classroom. After digital transformation and Information and Communication Technologies (ICTs), most organizations have experienced significant changes in fields such as: technological, cultural, and organizational. This change contributed and influenced business models and competition where threats can stem from through misuse, abuse, and overuse which can result in Technostress.

Technostress is a negative psychological connection between people and introduction to new technology. It's first coined in 1980 which believably a stress experienced by the end users of Communication Technologies (ICTs) and the inability to cope with new technologies in a healthy manner. Today, in modern times, modern ICT often results in almost constant "connectivity" through email, the Internet, and the phone. This individual feel that since they are always connected, they are on "call". This leads them to believe that they have lost control over their time and space, which creates feelings of being stressed out.

In today's age there has been a significant growth in interest among young researcher (students) when it comes to dealing with the common problem in terms of technology related stress. Technostress, defined by Weil et al., (2019) is the stress one feels when technology takes a center stage in their work lives, home environments and at play. Nowadays, not only has the workplace been replaced by technologies, but it has also invaded people's private lives. People are relying more and more on technologies and the frustration from it is inevitable. As much as ICT has facilitated numerous work tasks, technostress also has become more common (La Torre et al., 2020). This study examines the prevalence of technostress among the younger generation in the age group below legal age, then the younger generation in the age group of 19-39 years old and among the older generation which belongs to the age group of 40-above years old.

This is proposed so as to define a much clearer picture of the struggles of both worlds (natives and immigrants) in the technological sphere in learning through varied apps, modes and platforms. It is anchored in an augmented reality because the natives and immigrants must reconcile and meet halfway so learning is not being sidelined. Thus, technological stress is present and inevitable because while the Digital natives are struggling how to deal with the Digital immigrants especially with the fast-paced virtual world and on the other hand the Digital immigrants are coping with the demands to become techno-savvy.

In 2007, the technostress model by Tarafdar et al. suggested that technostress might aggravate the role stress (i.e., work stressors), and both stressors jointly have negative impacts on employees' outcomes such as productivity and performance. In the current study it can be noted that the bulk of the work of clinical instructors were found to be doubled or even tripled as everything are now being laid online, from coursework to even with virtual return demonstration, thus the massive need of technology is maximized in a way, the unprepared users were found to be stressed.

The researcher would like to propose this research because of its Novelty and Timeliness. Novel in the sense that no so far has ever conducted this study in the region and if not in the Philippines. Timely because this is what the academic world is trying to survive, the pandemic has affected not only health problems but as well as the difficulties to people concerned in the academic communities. The Learning Continuity Plan has provided this venture into the unknown, where most teachers were found unprepared but needed to cope, thus stress is evident and, in this study, the level of technostress will be reported showcasing those of the Digital natives and Digital immigrants.

It is important because it has policy implications especially in providing more technological training and skills enhancement to both the Digital natives and Digital immigrants. The Digital

immigrants are retooled, reskilled and reinvented. The Digital immigrants will be honed especially with their techno skills and at the same time teaching them how to manage their techno-related stresses. It will provide new means to combat techno-related stress while providing the Digital natives and Digital immigrants with the appropriate skills in facing varied challenges posited by the sudden shift to techno and while still managing the transition, because Digital immigrants were not prepared prior to the coming of the not so welcome pandemic and thus they simple coped with whatever is made available and those that were mechanized for them to survive. Self-discovery and learning by doing were actually helpful for both worlds.

This study has been identified to be the first existing study conducted in the Philippines specifically in region 12. Though there are related studies they were all conducted outside the area of region 12, mainly in international areas. The goal is to
present this study to future researcher as a legitimate and reliable source. Implementing this study has its own potential which can help the researcher give guidance in providing answers and solutions to the problems. With this, the researcher will be able to conduct and conclude the said research problem.

Theoretical Framework

The study is anchored with the Transactional Theory of Stress which suggests that appraisal and coping processes determine the impacts of stressors. Walinga (2015) materialized the context of the theory of Lazarus and Folkman (1984) which described the interplay between the individual and the environment. Furthermore, a contextualized therapy be implemented both for the individual and the environment. Coming to this end, the research strategically equips a mechanism which will provide the users of technology to cope with the demands of the current trends. Digital Generation and the online learning environment should strategize a certain drive to maximize the adaptation and adoption of the current practices thereby possible decrease in stress levels.

Another theory that will support this study is the Person-Environment Fit Theory. According to Edwards, et.al. (1998), the first and most basic distinction is between the person and environment. Digital Natives and Digital Immigrants have distinct prerequisites for the conceptualization of P-E fit and provides the basis for examining reciprocal causation between these Digital Generation and environment in relation to the Technostress level they experienced. Person-environment fit theory focuses on the interaction between characteristics of the individual and the environment, whereby the individual not only influences his or her environment, but the environment also affects the individual

Conceptual Framework

The independent variable is the online learning environment which probably has an impact to the technostress levels of the respondents of the study. The online learning environment refers to the varied learning modalities using different online and digital platforms where teaching and learning are being channeled. The dependent variables are the technostress levels according to Learning-Teaching Process Oriented where teachers act like facilitators, letting the students process their own ideas and thinking process. Profession Oriented is also known as service-oriented occupation where people under this category are mostly career driven. Technical Issue Oriented refers to the technological environment the Radiologic Technology clinical instructors and students are facing in the delivery of instruction such as

data storage, bulk of information to remember in technological environment, technological features repair and maintenance. Personal oriented refers to the awareness of the Radiologic Technology clinical instructors and students on the technology being used by the institution, dependence on the individuals who are better at using technology, familiarization with the terminology used in defining new technologies and training required on the use of technology. Social Oriented refers to the impact of technology in the social interaction between teachers and students and colleagues in the educational processes, time required in the delivery of online instruction, and health problems imposed by using the technology. The study will determine the technological stress of the respondents.
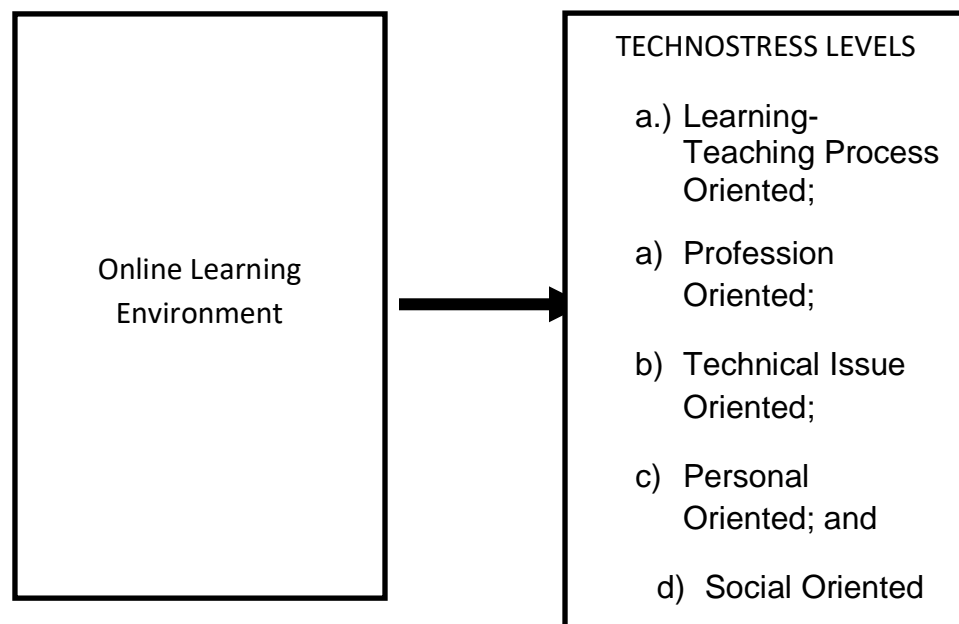

Figure 1. Conceptual Framework

Statement of the Problem

This study aimed to develop a mitigating framework for technostress intergenerational radiologic technology in an augmented reality

Specifically, the research study seeks to answer the following questions:

1. To what extent is the Technostressors Level of:
    1.1. Digital Natives and in terms of:
        1.1.1 Learning-teaching process oriented;
        1.1.2 Professional oriented;
        1.1.3 Technical issue oriented;
        1.1.4 Personal oriented; and
        1.1.5 Social Oriented?
    1.2 Digital Immigrants, and in terms of:
        1.2.1 Learning-teaching process oriented
        1.2.2 Professional oriented;
        1.2.3 Technical issue oriented;

   1.2.4   Personal oriented; and

   1.2.5   Social oriented?

2   To what extent do Technostressors Level of Digital Natives and Digital Immigrants differ in terms of:

   a.   Learning-teaching process oriented;

   b.   Profession oriented;

   c.   Technical issue oriented;

   d.   Personal oriented; and

   e.   Social oriented?

3 To what extent is the online learning environment stressors of the respondents in terms of:

   3.1 Learning-teaching process oriented,

   3.2 Profession oriented,

   3.3 Technical issue oriented,

   3.4 Personal oriented, and

   3.5 Social oriented?

4   To what extent is the effect of the technostressors to the online learning environment of the respondents?

5   Based on the findings, what mitigating framework for technostress intergenerational

   Radiologic Technology in an augmented reality can be proposed?

Hypotheses of the Study

Null Hypothesis (Ho) – There is no significant difference between the over-all

   Technostress Level of Digital Natives and Digital Immigrants.

Alternative Hypothesis (Ha) - There is a significant difference between the over-all

   Technostress Level of Digital Natives and Digital Immigrants

Scope and Limitation of the Study

   This study focuses on the technology related stress of Radiologic Technology Clinical Instructors and Radiologic Technology students, specifically those who are school-based in Region 12. The data collection will be conducted mainly on the Radiologic Technology Clinical Instructors and Radiologic Technology students in higher education institutions in Region 12 in June 2022. This study will not include other hindrances that are not technology related stress and other respondents who are allied health practitioners in Region 12 area. Other respondents that do not reside in the Region 12 area will not be included in the sampling frame. This study will be done through online survey using google forms provided by the researcher. Thus, the stress levels of the immigrants and natives will be determined based from their responses.

Technostress

Technostress is not created by the technology itself but emerges from the interaction of human users with digital technologies. Whether technostress emerges depends on the user's resources, capabilities, assessments, and the type of technology (Gimpel et al., 2019) as that said, technostress only becomes technostress when one has interacted with technology without prior knowledge in handling digital technology both for work and educational purposes. They divided technostress into techno-overload, techno-complexity, techno-insecurity, techno-uncertainty and techno-invasion (Dragano et al. 2020). As a result, technostress is of interest to researcher, as well as organizations, employers, and employees, because it offsets the increase in workforce productivity brought about by digital transformation and the adoption of digital technology. It's especially important when the digital workplace becomes the norm, with an increase in the number of remote workers due to the pandemic (Schymik et al, 2020; Molino et al., 2020).

Digital Natives

Digital native refers to a person who grew up with digital technologies. This person was born in or after 1982. Digital natives are also referred to as Millennials, Generation Y, and the Next Generation (Johnson et al. 2018). As digital natives become familiar with the technology and computers from a young age and view it to be an essential part of their lives. Many teenagers and children in industrialized countries are termed digital natives because they communicate and learn primarily through computers, social networking sites, and text messaging (Halton 2021).

Digital Immigrants refers to individuals who were born before the existence of digital technology. Although Digital Immigrants are also users of information and communication technology, they begin to use these digital devices and technology during their adulthood (Anzariet.,al 2021). According to Li et al. (2020) digital immigrant users of E-learning in distance education resisted accepting this platform for teaching and learning due to lack of digital literacy and E-learning experience. Nowadays, with the development of the online environment and advances in the virtual world, especially during the social distancing era, there are many online opportunities to improve and practice the necessary skills to reflect better in E-learning, e-teaching, and e-assessment.

METHODOLOGY

The study used descriptive-quantitative design. Descriptive research is a quantitative research method that attempts to collect quantifiable information for statistical analysis of the population sample. According to Creswell (2018), quantitative research tests objectives by relating variables that can be measured with instruments that produce numerical data and can be statistically analyzed. In this study, using this research design will enable the researcher to gather facts that encompasses the over-all technostress level of Digital Generation based on the identified dimensions of Technostress.

Another research design used was comparative research. According to Gellert (2018), this research design essentially compares two groups in an attempt to draw a conclusion about them. Researcher's attempt to identify and analyze differences between the over-all Technostress level of Digital Natives and Digital Immigrants will be given emphasis using comparative research design.

This could lead to increase understanding their technostress level in terms of five dimensions such as Learning-Teaching Process Oriented, Profession Oriented, Technical Issue Oriented, Personal Oriented, and Social Oriented.

Intergenerational technostress was measured through the use of the 23 item scale adopted from the work of Tarafdar, et al in 2007. All the items were measured in a five-point like scale, which consists of five sub-dimensions namely the Learning-Teaching Process Oriented, Profession Oriented, Technical Issue Oriented, Personal Oriented, and Social Oriented.

Research Locale

The study was conducted in higher education institutions (HEIs) in region 12 offering Radiologic Technology program where the respondents are affiliated. These HEIs include; North Valley College, Inc., Kidapawan Doctors College, Dr. P. Ocampo College, Inc., St. Alexius College, Notre Dame Siena College-Cotabato and General Santos Doctors College, Inc. The respondents were Clinical Instructors with a Degree in BS in Radiologic Technology and also the . All the HEIs included in the study are located in Region 12 particularly in Cotabato City, Kidapawan City, General Santos City and City of Koronadal, South Cotabato.

Respondents of the Study

The respondents of the study were the Radiologic Technology Clinical Instructors (Digital Immigrants) currently teaching in the program of Bachelor of Science in Radiologic Technology and Radiologic Technology students in the varied HEIs in Region XII.

Sampling Technique

The study used complete enumeration in the given population participated by the BS Radiologic Technology Clinical instructors and Radiologic Technology students from higher education institutions (HEIs) in Region 12.

Research Instrument

The researcher used an online-based survey on the topic: TOWARDS A MITIGATING FRAMEWORK FOR TECHNOSTRESS INTERGENERATIONAL RADIOLOGIC TECHNOLOGY IN AN AUGMENTED REALITY. A 23 item survey questions adapted from Tarafdar, et al in 2007 were enhanced to fit the context of the respondents. These items were grouped into five factors creating technostress, and items were written in the form of statements with which the respondent has to agree or disagree on a 4-point Likert scale. These items were categorized into five variables that leads to technostress: to Learning-Teaching Process Oriented where teachers act like facilitators, letting the students process their own ideas and thinking process. Profession Oriented is also known as service-oriented occupation where people under this category are mostly career driven. Technical Issue Oriented refers to the technological environment the Radiologic Technology clinical instructors and students are facing in the delivery of instruction such as data storage, bulk of information to remember in

technological environment, technological features repair and maintenance. Personal oriented refers to the awareness of the Radiologic Technology clinical instructors and students on the technology being used by the institution, dependence on the individuals who are better at using technology, familiarization with the terminology used in defining new technologies and training required on the use of technology. Social Oriented refers to the impact of technology in the social interaction between teachers and students and colleagues in the educational processes, time required in the delivery of online instruction, and health problems imposed by using the technology. The study will determine the technological stress of the respondents.

Statistical Treatment

The statistical tools used were the mean and tTest. There are different models connected to the integration of technology into educational environments as to be evidenced by the data to be collected from the survey. According to Howard et al., (2013), integration of technology in this study refers to making technology positively contribute to the performance of a complex information system that includes formal and informal use of ICTs, in the classroom as well as outside, by students and teachers. Techno-stress is one of individuals' personal struggles related to technology use which will be measured from the survey which will generate numerical values for statistical analysis.

Ethical Considerations

Willingness of the respondents to be involved in the study should be voluntary after fully knowing the purpose of the study. Privacy and confidentiality will be safeguarded after reviewing the measures to protect privacy and confidentiality or respondent's information.

RESULTS AND DISCUSSIONS

Table 1 presents the technostress level of digital natives as to learning-teaching process oriented. It can be noted that the highest mean is 3.50 on the indicator about feeling uncomfortable that technology leads everyone in the educational environments to laziness and freeriding. The second highest mean is 3.42 for the indicator about the idea that the Radiologic Technologist won't be able to teach the whole course content, because technology use takes time makes me anxious which is interpreted as high level of technostress.

Table 1. Technostress Level of Digital Natives as to Learning-Teaching Process Oriented

Indicators	Mean	Interpretation
The idea that I won't be able to teach the whole course content, because technology use takes time makes me anxious	3.42	High Level of Technostress
I think, that technology use requires more effort in the classroom, affects technology use negatively	3.37	Average Level of Technostress
I feel forced to become more dependent on the internet in the educational process	3.35	Average Level of Technostress
I am worried because digital-technology oriented materials are becoming more common in the	3.34	Average Level of Technostress

educational process		
I feel uncomfortable that, technological devices are used for extra-curricular purposes during the lessons by the students	3.14	Average Level of Technostress
I feel uncomfortable that technology leads everyone in the educational environments to laziness and freeriding	3.50	High Level of Technostress
I am worried that technology use blunts students' research skills	3.27	Average Level of Technostress
Overall Mean	3.34	Average Level of Technostress

The lowest mean in this presentation is 3.14 about the feeling of uncomfortable that, technological devices are used for extra-curricular purposes during the lessons by the students which is interpreted as Average level of technostress.

Technostress level of digital natives as to profession oriented is presented in Table 2. It is evident that the highest mean is reported in the indicator about the belief that technology use increased teachers' workload, 3.33. The lowest mean in this category is 3.11 which is about being worried that might lose prestige might be lost because newer teachers can use technology better which is further interpreted as Average level of technostress.

Table 2. Technostress Level of Digital Natives as to Profession-Oriented

Indicators	Mean	Interpretation
I think technology use makes teaching profession more difficult	3.12	Average Level of Technostress
I think teaching profession is losing its value, because information sources have become technology oriented	3.15	Average Level of Technostress
I am worried that educational understanding might change because of technological devices	3.32	Average Level of Technostress
I am worried that I might get unemployed in the future due to technology use	3.21	Average Level of Technostress
I am worried that I might lose prestige, because newer teachers can use technology better	3.11	Average Level of Technostress
I think technology use increased teachers' workload	3.33	Average Level of Technostress
Overall Mean	3.21	Average Level of Technostress

Technical issue oriented as part of the technostress categories revealed that the highest mean is 3.56 indicating the feeling of being uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites) which is interpreted as high level of technostress. In this table (refer to

Table 3), there are three indicators which are interpreted as high level of technostress which include being worried that data shared in digital environments (memory sticks, internet , etc.) can be lost or change hands (3.48) and being worried because there are too many information (password, account name, etc.) to remember for technological environments, and might be forgotten (3.44). The lowest mean is 3.33 for the indicator about the feeling of being uncomfortable and for being constantly worried about infecting technologies with viruses which is interpreted as Average level of technostress.

Table 3. Technostress Level of Digital Natives as to Technical Issue Oriented

Indicators	Mean	Interpretation
I feel uncomfortable, as I am constantly worried about infecting technologies with viruses	3.33	Average Level of Technostress
I am worried that data I share in digital environments (memory sticks, internet , etc.) can be lost or change hands	3.48	High Level of Technostress
I am worried because there are too many information (password, account name, etc.) to remember for technological environments, and I might forget these	3.44	High Level of Technostress
I feel uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.)	3.56	High Level of Technostress
I am worried about the negative effects of technological devices within the classroom (noise, heating, etc.)	3.40	Average Level of Technostress
I am worried about the security of technological devices (storing, keeping, etc.) at the school.	3.35	Average Level of Technostress
Overall Mean	3.43	High Level of Technostress

The technostress level of digital natives as to personal oriented is presented in Table 4. All the indicators in this part are interpreted as Average level of technostress. The highest mean is 3.25 for the indicator about being worried about technology use, due to the necessity to keep up with constantly developing technology. While the lowest mean is 2.90 on the chance of giving up on using technology, as they cannot find sufficient opportunities for technology education.

Table 4. Technostress Level of Digital Natives as to Personal Oriented

Indicators	Mean	Interpretation
I am worried that I might not be able to learn using technology even if I want to	3.10	Average Level of Technostress
I am worried about technology use, due to the necessity to keep up with constantly developing technology	3.25	Average Level of Technostress
I feel uncomfortable for being dependent on the	3.18	Average Level of

individuals who are better at using technology		Technostress
I might give up on using technology, as I cannot find sufficient opportunities for technology education	2.90	Average Level of Technostress
I am uncomfortable because I am not familiar with the terminology used in defining new technologies	2.99	Average Level of Technostress
Overall Mean	3.08	Average Level of Technostress

The highest mean for the technostress level of digital natives on social oriented is shown in Table 5 I 3.57 about being worried that technology use can cause health problems (sight, hearing, pain, etc..) which is interpreted as high level of technostress. And the lowest mean in this category is 3.14 for the indicator of being worried that problems with colleagues about technology use might surface.

Table 5. Technostress Level of Digital Natives as to Social Oriented

Indicators	Mean	Interpretation
I feel uncomfortable that, digital technology use takes too much time	3.19	Average Level of Technostress
I think social interaction between everyone in the educational processes is damaged due to technology use	3.26	Average Level of Technostress
I am worried that I can have problems with my colleagues about technology use	3.14	Average Level of Technostress
I am worried that technology use can cause health problems (sight, hearing, pain, etc..)	3.57	High Level of Technostress
Overall Mean	3.29	Average Level of Technostress

Digital Immigrants

Technostress Level of Digital Immigrants as to Learning-Teaching Process Oriented is presented in Table 6. The feeling of being uncomfortable that technology leads everyone in the educational environments to laziness and freeriding got the highest mean of 4.00. the lowest mean in this category is 3.04 about being worried because digital-technology oriented materials are becoming more common in the educational process which is interpreted as Average level of technostress.

High levels of technostress is reported for these indicators under the domain of learning-teaching process oriented about the idea that they won't be able to teach the whole course content, because technology use takes time makes them anxious, the feeling of being forced to become more dependent on the internet in the educational process, the feeling of being uncomfortable that technology leads everyone in the educational environments to laziness and freeriding and being worried that technology use blunts students' research skills.

Table 6. Technostress Level of Digital Immigrants as to Learning-Teaching Process Oriented

Indicators	Mean	Interpretation
The idea that I won't be able to teach the whole course content, because technology use takes time makes me anxious	3.42	High Level of Technostress
I think, that technology use requires more effort in the classroom, affects technology use negatively	3.08	Average Level of Technostress
I feel forced to become more dependent on the internet in the educational process	3.42	High Level of Technostress
I am worried because digital-technology oriented materials are becoming more common in the educational process	3.04	Average Level of Technostress
I feel uncomfortable that, technological devices are used for extra-curricular purposes during the lessons by the students	3.27	Average Level of Technostress
I feel uncomfortable that technology leads everyone in the educational environments to laziness and freeriding	4.00	High Level of Technostress
I am worried that technology use blunts students' research skills	3.58	High Level of Technostress
Overall Mean	3.40	Average Level of Technostress

Table 7 is about technostress level of digital immigrants as to profession-oriented which generated the highest mean of 3.35 (refer to Table 2) which is interpreted as Average level of technostress. The lowest mean is 2.85 on the indicator about being worried that prestige might be lost because newer teachers can use technology better.

Table 7. Technostress Level of Digital Immigrants as to Profession-Oriented

Indicators	Mean	Interpretation
I think technology use makes teaching profession more difficult	3.00	Average Level of Technostress
I think teaching profession is losing its value, because information sources have become technology oriented	3.12	Average Level of Technostress
I am worried that educational understanding might change because of technological devices	3.35	Average Level of Technostress
I am worried that I might get unemployed in the future due to technology use	2.88	Average Level of Technostress
I am worried that I might lose prestige, because newer teachers can use technology better	2.85	Average Level of Technostress

| I think technology use increased teachers' workload | 3.08 | Average Level of Technostress |
| Overall Mean | 3.05 | Average Level of Technostress |

Table 8. shows the Technostress Level of Digital Immigrants as to Technical Issue Oriented with the high level of technostress for the indicator of being worried that data share in digital environments (memory sticks, internet , etc.) can be lost or change hands (3.65), the feeling of uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.) (3.65) and being worried about the negative effects of technological devices within the classroom (noise, heating, etc.) (3.42).

Table 8. Technostress Level of Digital Immigrants as to Technical Issue Oriented

Indicators	Mean	Interpretation
I feel uncomfortable, as I am constantly worried about infecting technologies with viruses	3.04	Average Level of Technostress
I am worried that data I share in digital environments (memory sticks, internet , etc.) can be lost or change hands	3.65	High Level of Technostress
I am worried because there are too many information (password, account name, etc.) to remember for technological environments, and I might forget these	3.35	Average Level of Technostress
I feel uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.)	3.65	High Level of Technostress
I am worried about the negative effects of technological devices within the classroom (noise, heating, etc.)	3.42	High Level of Technostress
I am worried about the security of technological devices (storing, keeping, etc.) at the school.	3.35	Average Level of Technostress
Overall Mean	3.41	High Level of Technostress

The highest mean for this category for Technostress Level of Digital Immigrants as to Personal Oriented is 2.96 specifically about being uncomfortable for being dependent on the individuals who are better at using technology (refer to Table 9). On the other hand, the lowest mean is 2.46 on being uncomfortable because of being not familiar with the terminology used in defining new technologies.

Table 9. Technostress Level of Digital Immigrants as to Personal Oriented

Indicators	Mean	Interpretation
I am worried that I might not be able to learn using technology even if I want to	2.88	Average Level of Technostress

I am worried about technology use, due to the necessity to keep up with constantly developing technology	2.92	Average Level of Technostress	
I feel uncomfortable for being dependent on the individuals who are better at using technology	2.96	Average Level of Technostress	
I might give up on using technology, as I cannot find sufficient opportunities for technology education	2.62	Average Level of Technostress	
I am uncomfortable because I am not familiar with the terminology used in defining new technologies	2.46	Low Level of Technostress	
Overall Mean	2.77	Average Level of Technostress	

Table 10 presents the Technostress Level of Digital Immigrants as to Social Oriented with the highest mean score 3.96 which is interpreted as high level of technostress on the specific indicator of being worried that technology use can cause health problems (sight, hearing, pain, etc..). The lowest mean is 2.88 which is about being worried that problems with my colleagues about technology use is prevalent.

Table 10. Technostress Level of Digital Immigrants as to Social Oriented

Indicators	Mean	Interpretation	
I feel uncomfortable that, digital technology use takes too much time	3.23	Average Level of Technostress	
I think social interaction between everyone in the educational processes is damaged due to technology use	3.23	Average Level of Technostress	
I am worried that I can have problems with my colleagues about technology use	2.88	Average Level of Technostress	
I am worried that technology use can cause health problems (sight, hearing, pain, etc..)	3.96	High Level of Technostress	
Overall Mean	3.33	Average Level of Technostress	

Comparing the technostress status of the digital natives and digital immigrants is shown in Table 11. It can be noticed that the feeling of being uncomfortable that technology leads everyone in the educational environments to laziness and freeriding for both the digital natives (3.50) and digital immigrants (4.00) were interpreted as high level of technostress. The idea that Radiologic Technologists won't be able to teach the whole course content, because technology use takes time makes them anxious for both the digital natives (3.42) and digital immigrants (3.42) were interpreted as high level of technostress.

Table 11. Technostress Level of Digital Natives as to Learning-Teaching Process Oriented

Indicators	Digital Natives		Digital Immigrants	
	Mean	Interpretation	Mean	Interpretation
The idea that I won't be able to teach the whole course content, because technology use takes time makes me anxious	3.42	High Level of Technostress	3.42	High Level of Technostress
I think, that technology use requires more effort in the classroom, affects technology use negatively	3.37	Average Level of Technostress	3.08	Average Level of Technostress
I feel forced to become more dependent on the internet in the educational process	3.35	Average Level of Technostress	3.42	High Level of Technostress
I am worried because digital-technology oriented materials are becoming more common in the educational process	3.34	Average Level of Technostress	3.04	Average Level of Technostress
I feel uncomfortable that, technological devices are used for extra-curricular purposes during the lessons by the students	3.14	Average Level of Technostress	3.27	Average Level of Technostress
I feel uncomfortable that technology leads everyone in the educational environments to laziness and freeriding	3.50	High Level of Technostress	4.00	High Level of Technostress
I am worried that technology use blunts students' research skills	3.27	Average Level of Technostress	3.58	High Level of Technostress
Overall Mean	3.34	Average Level of Technostress	3.40	Average Level of Technostress

Table 12 reports the Technostress Level of Digital Natives as to Profession-Oriented for both the digital natives and digital immigrants. The highest mean for the digital natives is 3.33 for the indicator about thinking technology use increased teachers' workload. While on the other hand, the highest mean

for digital immigrants is 3.35 for being worried that educational understanding might change because of technological devices. Comparing the two generations it can be viewed that they have the same level of technostress considering that their means are not distant with one another.

Table 12. Technostress Level of Digital Natives as to Profession-Oriented

Indicators	Digital Natives		Digital Immigrants	
	Mean	Interpretation	Mean	Interpretation
I think technology use makes teaching profession more difficult	3.12	Average Level of Technostress	3.00	Average Level of Technostress
I think teaching profession is losing its value, because information sources have become technology oriented	3.15	Average Level of Technostress	3.12	Average Level of Technostress
I am worried that educational understanding might change because of technological devices	3.32	Average Level of Technostress	3.35	Average Level of Technostress
I am worried that I might get unemployed in the future due to technology use	3.21	Average Level of Technostress	2.88	Average Level of Technostress
I am worried that I might lose prestige, because newer teachers can use technology better	3.11	Average Level of Technostress	2.85	Average Level of Technostress
I think technology use increased teachers' workload	3.33	Average Level of Technostress	3.08	Average Level of Technostress
Overall Mean	3.21	Average Level of Technostress	3.05	Average Level of Technostress

Table 13 is about Technostress Level of Digital Natives as to Technical Issue Oriented. The presentation revealed that the highest mean for digital natives is 3.56 which is about the feeling of being uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.) which for the digital immigrants was also found to be the highest mean (3.65).

Table 13. Technostress Level of Digital Natives as to Technical Issue Oriented

Indicators	Digital Natives		Digital Immigrants	
	Mean	Interpretation	Mean	Interpretation
I feel uncomfortable, as I am constantly worried	3.33	Average Level of Technostress	3.04	Average Level of Technostress

about infecting technologies with viruses				
I am worried that data I share in digital environments (memory sticks, internet , etc.) can be lost or change hands	3.48	High Level of Technostress	3.65	High Level of Technostress
I am worried because there are too many information (password, account name, etc.) to remember for technological environments, and I might forget these	3.44	High Level of Technostress	3.35	Average Level of Technostress
I feel uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.)	3.56	High Level of Technostress	3.65	High Level of Technostress
I am worried about the negative effects of technological devices within the classroom (noise, heating, etc.)	3.40	Average Level of Technostress	3.42	High Level of Technostress
I am worried about the security of technological devices (storing, keeping, etc.) at the school.	3.35	Average Level of Technostress	3.35	Average Level of Technostress
Overall Mean	3.43	High Level of Technostress	3.41	High Level of Technostress

Technostress Level of Digital Natives as to Personal Oriented is reported in Table 14. This is indicative that the highest mean is 3.25 for the digital natives which concerns about being worried about technology use, due to the necessity to keep up with constantly developing technology. For digital immigrants their highest mean is on the indicator about the feeling of uncomfortable for being dependent on the individuals who are better at using technology (2.96). In this part the two generations revealed having no same means.

Table 14. Technostress Level of Digital Natives as to Personal Oriented

Indicators	Digital Natives		Digital Immigrants	
	Mean	Interpretation	Mean	Interpretation
I am worried that I might not be able to learn using	3.10	Average Level of Technostress	2.88	Average Level of Technostress

technology even if I want to				
I am worried about technology use, due to the necessity to keep up with constantly developing technology	3.25	Average Level of Technostress	2.92	Average Level of Technostress
I feel uncomfortable for being dependent on the individuals who are better at using technology	3.18	Average Level of Technostress	2.96	Average Level of Technostress
I might give up on using technology, as I cannot find sufficient opportunities for technology education	2.90	Average Level of Technostress	2.62	Average Level of Technostress
I am uncomfortable because I am not familiar with the terminology used in defining new technologies	2.99	Average Level of Technostress	2.46	Low Level of Technostress
Overall Mean	3.08	Average Level of Technostress	2.77	Average Level of Technostress

Table 15 shows the Technostress Level of Digital Natives as to Social Oriented. It revealed that the highest mean for digital natives is 3.57 for the indicator of being worried that technology use can cause health problems (sight, hearing, pain, etc..). While on the other hand the highest mean for digital immigrants is also reported the same indicator with the mean of 3.96)

Table 15. Technostress Level of Digital Natives as to Social Oriented

Indicators	Digital Natives		Digital Immigrants	
	Mean	Interpretation	Mean	Interpretation
I feel uncomfortable that, digital technology use takes too much time	3.19	Average Level of Technostress	3.23	Average Level of Technostress
I think social interaction between everyone in the educational processes is damaged due to technology use	3.26	Average Level of Technostress	3.23	Average Level of Technostress
I am worried that I can have problems with my	3.14	Average Level of Technostress	2.88	Average Level of Technostress

colleagues about technology use				
I am worried that technology use can cause health problems (sight, hearing, pain, etc..)	3.57	High Level of Technostress	3.96	High Level of Technostress
Overall Mean	3.29	Average Level of Technostress	3.33	Average Level of Technostress

The feeling of being uncomfortable that technology leads everyone in the educational environments to laziness and freeriding got the highest mean of 3.75 which is interpreted as high level of technostress. Being worried that technology use blunts students' research skills 3.43 and the idea that Radiologic Technologists won't be able to teach the whole course content, because technology use takes time makes them anxious (3.42)

Table 16. Technostress Level of Digital Natives as to Learning-Teaching Process Oriented

Indicators	Mean	Interpretation
The idea that I won't be able to teach the whole course content, because technology use takes time makes me anxious	3.42	High Level of Technostress
I think, that technology use requires more effort in the classroom, affects technology use negatively	3.23	Average Level of Technostress
I feel forced to become more dependent on the internet in the educational process	3.39	Average Level of Technostress
I am worried because digital-technology oriented materials are becoming more common in the educational process	3.19	Average Level of Technostress
I feel uncomfortable that, technological devices are used for extra-curricular purposes during the lessons by the students	3.21	Average Level of Technostress
I feel uncomfortable that technology leads everyone in the educational environments to laziness and freeriding	3.75	High Level of Technostress
I am worried that technology use blunts students' research skills	3.43	High Level of Technostress
Overall Mean	2.93	Average Level of Technostress

For profession-oriented category it can be shown that the highest mean is 3.34 which is interpreted as Average level of technostress level (refer to Table 17). The lowest mean for this category

is 2.98 representing the indicator about being worried about losing prestige because newer teachers can use technology better.

Table 17. Technostress Level of the respondents as to Profession-Oriented

Indicators	Mean	Interpretation
I think technology use makes teaching profession more difficult	3.06	Average Level of Technostress
I think teaching profession is losing its value, because information sources have become technology oriented	3.14	Average Level of Technostress
I am worried that educational understanding might change because of technological devices	3.34	Average Level of Technostress
I am worried that I might get unemployed in the future due to technology use	3.05	Average Level of Technostress
I am worried that I might lose prestige, because newer teachers can use technology better	2.98	Average Level of Technostress
I think technology use increased teachers' workload	3.21	Average Level of Technostress
Overall Mean	3.13	Average Level of Technostress

Table 18 depicts the Technostress Level of the respondents as to Technical Issue Oriented with 3.57 as the highest mean which is about being worried that data shared in digital environments (memory sticks, internet , etc.) can be lost or change hands and the lowest mean is 3.19 for the indicator about feeling uncomfortable as constantly worried about infecting technologies with viruses.

Table 18. Technostress Level of the respondents as to Technical Issue Oriented

Indicators	Mean	Interpretation
I feel uncomfortable, as I am constantly worried about infecting technologies with viruses	3.19	Average Level of Technostress
I am worried that data I share in digital environments (memory sticks, internet , etc.) can be lost or change hands	3.57	High Level of Technostress
I am worried because there are too many information (password, account name, etc.) to remember for technological environments, and I might forget these	3.40	Average Level of Technostress
I feel uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.)	3.61	High Level of Technostress

I am worried about the negative effects of technological devices within the classroom (noise, heating, etc.)	3.41	High Level of Technostress
I am worried about the security of technological devices (storing, keeping, etc.) at the school.	3.35	Average Level of Technostress
Overall Mean	3.42	Average Level of Technostress

Technostress Level of the respondents as to Personal Oriented is presented in Table 19. It can be reported that the highest mean is 3.09 about being worried about technology use, due to the necessity to keep up with constantly developing technology. Being uncomfortable because of being not familiar with the terminology used in defining new technologies got the lowest mean of 2.73.

Table 19. Technostress Level of the respondents as to Personal Oriented

Indicators	Mean	Interpretation
I am worried that I might not be able to learn using technology even if I want to	2.99	Average Level of Technostress
I am worried about technology use, due to the necessity to keep up with constantly developing technology	3.09	Average Level of Technostress
I feel uncomfortable for being dependent on the individuals who are better at using technology	3.07	Average Level of Technostress
I might give up on using technology, as I cannot find sufficient opportunities for technology education	2.76	Average Level of Technostress
I am uncomfortable because I am not familiar with the terminology used in defining new technologies	2.73	Average Level of Technostress
Overall Mean	2.93	Average Level of Technostress

Table 20 is about the Technostress Level of the respondents as to Social Oriented. The highest mean is 3.77 about technology use which can most likely cause health problems. The lowest mean is 3.01 about being worried about having problems with colleagues about technology use.

Table 20. Technostress Level of the respondents as to Social Oriented

Indicators	Mean	Interpretation
I feel uncomfortable that, digital technology use takes too much time	3.21	Average Level of Technostress
I think social interaction between everyone in the educational processes is damaged due to technology use	3.25	Average Level of Technostress

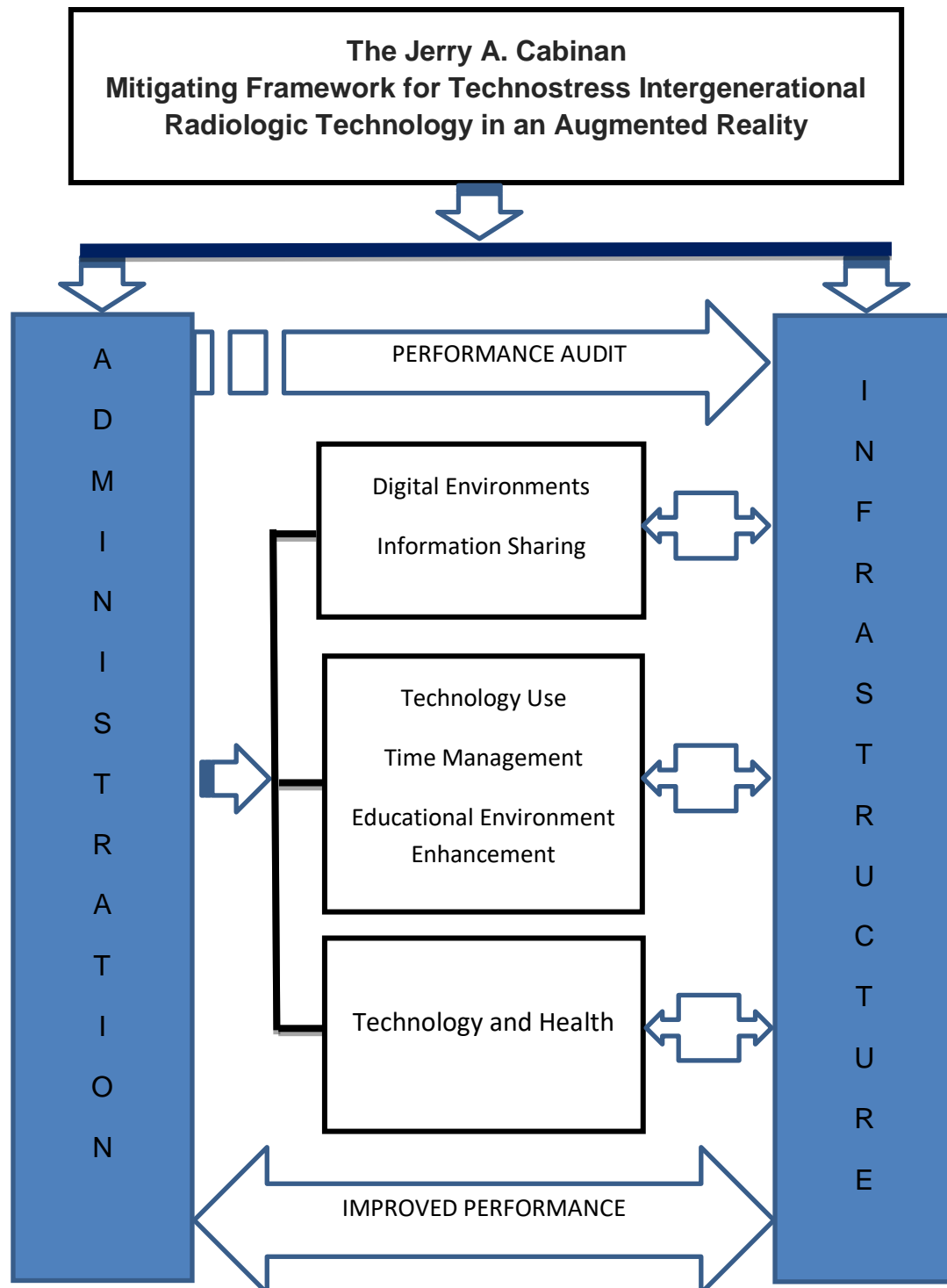| I am worried that I can have problems with my colleagues about technology use	3.01	Average Level of Technostress
I am worried that technology use can cause health problems (sight, hearing, pain, etc..)	3.77	High Level of Technostress
Overall Mean	3.31	Average Level of Technostress

Looking at the vantage point about the difference about Technostress Levels between the Digital Natives and Digital Immigrants, Table 21 reports significant difference was found with the domain on profession oriented and personal oriented. The pvalue for profession oriented which is 0.019562 is less than the alpha value of 0.05, also personal oriented reported the pvalue of 0.002775 which is also less than the alpha value of 0.05 which is interpreted as significant. The rest of the domains got pvalues higher than 0.05 which are all interpreted as not significant. The decision for hypothesis testing is to accept the Null Hypotheses on the teaching-learning process oriented, technical issue oriented and social oriented, while on the other hand the hypotheses for profession oriented and personal oriented are hypothesized as significant.

Table 21. Summary Table of the Difference on Technostress Levels between the Digital Natives and Digital Immigrants

Domains	Statistic	df	p	Interpretation
Teaching-Learning Process Oriented	0.549458	6	0.301263	Not Significant
Profession Oriented	-2.77519	5	0.019562	Significant
Technical Issue Oriented	-0.24845	5	0.406833	Not Significant
Personal Oriented	-5.43829	4	0.002775	Significant
Social Oriented	0.269289	3	0.402583	Not Significant

Levene's test is significant ($p < .05$)

The Jerry A. Cabinan Mitigating Framework for Technostress Intergenerational Radiologic Technology in an Augmented Reality

The Jerry A. Cabinan
Mitigating Framework for Technostress Intergenerational
Radiologic Technology in an Augmented Reality

ADMINISTRATION

PERFORMANCE AUDIT

Digital Environments

Information Sharing

Technology Use

Time Management

Educational Environment Enhancement

Technology and Health

IMPROVED PERFORMANCE

INFRASTRUCTURE

Summary of Findings

1. High level technostress for digital natives is reported with these indicators; feel uncomfortable that technology leads everyone in the educational environments to laziness and freeriding, being worried that data shared in digital environments (memory sticks, internet , etc.) can be lost or change hands, worried because there are too many information (password, account name, etc.) to remember for technological environments, and might forget these, and the feeling of uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.).

2. High level technostress for digital immigrants is recorded with the following indicators; the idea that they won't be able to teach the whole course content, because technology use takes time makes me anxious, the feeling of uncomfortable that technology leads everyone in the educational environments to laziness and freeriding, worried that technology use blunts students' research skills, feeling uncomfortable because technology costs a lot (purchase, repair, and maintenance, paid websites, etc.), being worried about the negative effects of technological devices within the classroom (noise, heating, etc.), and worried that technology use can cause health problems (sight, hearing, pain, etc..)

3. Profession oriented and personal oriented indicators were found to be significant for both the digital natives and digital immigrants.

Conclusion

Digital immigrants are more stressed as compared to their digital native counterparts in the learning-teaching process. Digital natives are more stressed as compared to the digital immigrants in the profession oriented. Digital natives are more stressed as compared to the digital immigrants in the technical issue-oriented. Digital natives are more stressed as compared with the digital immigrants in the personal oriented. Digital Immigrants are more stressed as compared with the digital natives in the social oriented domain.

Recommendations

In line with the findings of the study, the conclusions reached, and their various implications, the following recommendations are hereby made:

1. Conduct performance audit which will include the economics of the development and upgrading of the technological infrastructures.
2. Modification of the teaching and learning and workplace environments to help reduce the accounted technostress levels.
3. Provide a healthy environment for the digital natives and digital immigrants where hazards and further health problems be minimized.
4. Adopt the Jerry A Cabinan Mitigating Framework for Technostress be adopted and the corresponding program components be implemented to help intergenerational Radiologic Technologists and Radiologic Technology students cope with technostress.

REFERENCES

1. Abilleira, M. P., Garcia, M.-L., De Jesus, M. P., & Gonzales, M. J. M. (2021, February 25). Technostress in Spanish University Teachers During the COVID-19 Pandemic. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.617650/full

2. Abo Mokh, A. J., Shayeb, S., &Badah, A. M. (2021, May). Levels of Technostress Resulting from Online Learning among Language Teachers in Palestine during Covid-19 Pandemic. 10.12691/education-9-5-1

3. Adedoyin, O., &Soykan, E. (2020, September). Covid-19 pandemic and online learning: the challenges and opportunities. 10.1080/10494820.2020.1813180

4. Aksentijevi´c,, N. K., Ježi´c, Z., &Zaninovi´c, P. A. (2021, September 3). The Effects of Information and Communication Technology (ICT) Use on Human Development—A Macroeconomic Approach.

5. Aktan, O., &Toraman, C. (2022, April 18). The relationship between Technostress levels and job satisfaction of Teachers within the COVID-19 period. https://link.springer.com/article/10.1007/s10639-022-11027-2

6. Anzari, P. P., Shiddiq, I., Pratiwi, S., &Fatanti, M. N. (2021, April). Teachers Technological Capability as Digital Immigrants in Learning from Home Activities. https://www.researchgate.net/publication/350775580_Teachers_Technological_Capability_as_Digital_Immigrants_in_Learning_from_Home_Activities

7. Aziz, N., Kader, M., & Halim, R. (2021, October 31). The Impact of Technostress on Student Satisfaction and Performance Expectancy. https://ajue.uitm.edu.my/wp-content/uploads/2021/12/46_Done_-Nurul-Nadia-et-al_10.12.2021.pdf

8. Aziz, N. N. (2021, December 10). The Impact of Technostress on Student Satisfaction and Performance Expectancy https://doi.org/10.24191/ajue.v17i4.16466