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Techno-Stress Levels in Students of Higher Education Institutions

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Abstract: Currently, due to the health emergency, the use of TICs has increased, for this reason, this research analyzed attitudes towards the use of information and communication technologies in order to determine the psychosocial effects regarding TICs In higher education students, two dependent and independent variables were used, the sample consisted of 82 students, the information gathering instrument was the López Barbosa questionnaire, made up of 59 items and 4 subscales, the results were processed using the software SPSS Statistics 25, applying frequency tables, graphs and statistics such as V of Cramer and alpha of Cronbach. The results showed that 50% of the population has a positive attitude towards TICs, and the remaining 50% high levels of stress, however, regarding addiction or effects of the use of TICs, 85.3% are above on the average scale, finally, in the subscale of dimension social networks and TICs in education, 90.2% disagree on the use of these tools as learning support. In conclusion, the use of TICs is proportionally related to technological stress, for that is pertinent to continue with these investigations comparing other variables such as gender, age, use of TICs, among others, correlating with the impact on the field of study, work, affective relationships, mood, and health.

Keywords: Techno-stress, TICs, Students, Covid-19.

INTRODUCTION

The internet is considered a globalized medium, which provides information instantaneously and statically, meeting the basic knowledge needs of the population (Aguilar, 2015). This information and communication tool stores and processes data in different ways the same ones have evolved throughout history, the objective of which is to reach the population not only locally but also globally (Briones & Rodríguez, 2017). The use of the internet and new technologies has grown for that reason its extent forces us to live in a hurry; The changes are so big that they keep us in expectation about the future, which causes anxiety and insecurity in people as they are full of moments that go faster than our judgment and skills, this implies that this way of life impacts and influences physical, social or mental health (Briones & Rodríguez, 2017).

The internet brings social networks, which have had a constant growth since its creation, breaking geographical barriers and communication paradigms that have been replaced by new virtual systems that allow interaction almost instantaneously, in this new context, society. It has evolved in parallel, modifying their behavior habits, the use of their time, and the satisfaction of their needs (Maldonado Berea *et al.*, 2019).

Social media addiction can trap young people due to the virtual world contributes to creating a false identity and distancing or distorting the real world, (Rojas-Jara *et al.*, 2018; & Fernández–Velilla Lapuerta, 2018) some red flags or characteristics that show network addiction, such as sleep deprivation and neglect of other important activities as well as contact with family and studies stand out, (Echeburúa & De Corral, 2010) by combining these psychosocial effects with psychoactive substances such as alcohol and drugs, they can generate obsessive behaviors. Currently due to the health emergency due to COVID-19, the use of TICs has become an indispensable tool (Molina Mora, 2016); In the field of education, it has allowed professional training to not stop, creating distance educational models as well as innovating research and education methodologies, however, the use of these technologies in the academic field has also caused high levels of stress, because the students have been forced to learn the use of these technological means (Ayala Servín, 2021).

Stress is necessary to face the challenges of each day, due to the continuous changes to which we are subjected (Herrera-Chávez *et al.*, 2021), Stress represents a reaction that gives strength to the body and allows it to adapt to the needs of the environment, all organisms experience different levels of response to stress during their lives, but when these reactions are long-lasting, they undermine reserves of people and can cause many problems (Luna *et al.*, 2013).

There are some types of stress associated with the excessive use of TICs, either through exposure to mobile devices and to fixed devices such as computers or any other gadget that facilitates their application; Some types of stress are techno anxiety, which is known as an effect produced by technology, where

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people experience tension and anxiety due to the use of TICs, creating an image of incompetence towards themselves (Moscoso *et al*., 2019).

The term techno-stress was coined by psychologist Craig Brond, he describes it as a "modern adaptive disease caused by an inability to handle new technologies healthily" (Odriozola, 2012).

In this way, identifying the attitude that students have, knowing the effects and factors that generate stress for the use of TICs, provides us supplies to facilitate their adaptation to the use of them (Hinojo Lucena *et al.*, 2019).

The study is relevant considering that young people who are in a university career should face and have a proactive disposition towards the use of TICs, at the end of their training they will have to face a world of work and join institutions or companies where the use, development, and application is a common factor to carry out their process of modernization and implementation of innovative practices in processes and products.

METHODOLOGY

This research is descriptive, a non-experimental cross-sectional research design was used, with a correlational approach, it was carried out with two variables (dependent and independent) based on theoretical (analysis and synthesis), empirical (observation and surveys) methods, and statistical methods to determine and tabulate the results of the applied instrument.

The dependent variable focuses on the analysis of the tendency to suffer technological stress in four dimensions of the construct (attitude towards TICs, work or school stress, effects of the use of TICs and social networks, and TICs in education).

The independent variable is the complementary activities that students carry out within technological development and training.

Due to a health emergency, the educational system adopted 100% technological tools, for this reason, research is focused on two stages, the first reason for this study, made up of a non-probabilistic sample composed of students of the Higher Technology of Environmental Development of the Instituto Superior Tecnológico Sudamericano (ISTS) of the city of Loja, 82 students participated, 51 male and 31 female, the sampling carried out for this research were non-probabilistic of an intentional nature, according to the criteria of the researchers, were analyzed the variables established for all students who were legally enrolled during the development of the research. Thus, the set of people who are part of the sample presented common characteristics that are fundamental to obtain the necessary information and develop the research because they were studying their learning in a teleshopping mode, these results will be the fundamental basis for the continuity of a second stage. An information collection instrument validated by researchers from the University of Colima was used, the questionnaire proposed by López Barbosa in 2018, the same as for the study, was structured online through the Google forms platform, this tool was used to obtain the automatic and ordered responses with real-time data were sent to the students' institutional emails, which took a time of 10 to 15 minutes to be developed. As part of the ethical considerations, an informed consent letter was formulated addressed to the principal, with the purpose to invite students to fill out the online questionnaire, requesting total sincerity and being thoughtful when answering the questions posed, through this document requested the participation of the students, and the confidentiality of their identity was guaranteed.

As mentioned above, the instrument used in this study is the questionnaire proposed by López Barbosa 2018 due to its high internal consistency, made up of 59 items in the form of statements, this instrument is made up of 4 subscales: attitude towards TICs made up of 20 items, work or school stress, effects of the use of TICs made up of 10 items respectively and Social networks and TICs in education made up of 19 items; To determine the index of acceptance or rejection of TICs, the instrument considered the Likert scale with a rating of 1 to 5, where 1 represents total disagreement, 2 disagree, 3 neither agree nor disagree, 4 agree and 5 total agreement.

This instrument allowed to know the degree of acceptance or rejection towards the use of TICs (attitude towards TICs), the degree of stress due to the use of TICs (school stress), the degree of addiction due to the use of TICs (effects of the use of TICs) and the degree of use of TICs (social networks and TICS in education). It should be noted that the terminology changes have been applied so as not to predispose the student when answering the instrument. For the correlation with the activities carried out by the students, the information was processed using the SPSS Statistics 25 software, applying frequency tables, graphs, and statistics, which allowed obtaining a reliability analysis of the collected data.

RESULTS AND DISCUSSION

The results shown below correspond to 100% of the Environmental Development technology students. To determine the reliability of the applied instrument, the internal consistency analysis was used according to the Alpha technique of Cronbach, the reliability analysis was $\alpha = 0.89$ on the general scale; the reliability in the subscales of the instrument corresponds to: $\alpha = 0.83$ for Attitude towards TICs, $\alpha = 0.65$ for school stress, $\alpha = 0.90$ for the use of TICs, and $\alpha = 0.85$ for networks social and TIC in education,

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according to this analysis the coefficient of the school stress subscale is considerably lower concerning the other two.

The techno-stress study was applied to 82 students, made up of 51 male and 31 female, from which the following results were obtained.

In Table 1, through the correlational analysis, the relationship between the independent variables and the tendency to suffer techno-stress was verified, therefore the main results regarding these variables are presented, as well as the effect size obtained from the statistic V for Cramer.

Tabla 1. Statistic V of Cramer

V. independent	Tendency to:	Value x^2	df	Significance asymptotic (bilateral)	V of Cramer
Age	Attitude	9,811	6	0,133	0,245
	Estress	3,596	6	0,731	0,148
	Efect	7,502	9	0,585	0,175
	Social networks	2,318	6	0,888	0,119
Gender	Attitude	5,629	2	0,06	0,262
	Estress	4,206	2	0,122	0,226
	Efect	1,299	3	0,729	0,126
	Social networks	0,133	2	0,936	0,04
Academic cycle	Attitude	12,78	10	0,236	0,279
	Estress	20,618	10	0,024	0,355
	Efect	15,796	15	0,396	0,253
	Social networks	10,124	10	0,43	0,248
Studies section	Attitude	4,858	2	0,088	0,243
	Estress	0,233	2	0,89	0,053
	Efect	0,525	3	0,913	0,08
	Social networks	3,06	2	0,217	0,193
Marital status	Attitude	8,329	6	0,215	0,225
	Estress	9,797	6	0,133	0,244
	Efect	6,985	9	0,639	0,169
	Social networks	4,897	6	0,557	0,173
Work	Attitude	2,794	2	0,247	0,185
	Estress	0,406	2	0,816	0,07
	Efect	2,444	3	0,486	0,173
	Social networks	1,348	2	0,51	0,128
Use of TICs	Attitude	1,128	6	0,98	0,083
	Estress	3,896	6	0,691	0,154
	Efect	9,609	9	0,383	0,198
	Social networks	4,199	6	0,65	0,16
Confort	Attitude	12,25	14	0,586	0,273
	Estress	11,01	14	0,685	0,259
	Efect	22,481	21	0,372	0,302
	Social networks	23,376	14	0,054	0,378

There is no relationship from 0 to 0.10
Small ratio from 0.10 to 0.30
Median ratio of 0.30 to 0.50

Regarding the strength of association, among the independent variables with the tendency to suffer from techno-stress, in Table 1, it can be observed that there is a medium relationship between the degree of stress due to the use of TICs with the academic cycle in which the students are studying; in the same way, the addiction due to the use of TICs and the degree of use, have a medium relationship with the comfort where they carry out their study activities.

Concerning the Attitude towards TIC subscale, in Fig. 1, it can be mentioned that 3.66% (3 female students) present negative attitudes and perceptions towards technology, which can generate an eventual refusal to use them, 46.3% (38 students, 23 men, and 15 women) present a neutral attitude to the use of TICs and the remaining 50% (41 students, 28 men, and 13 women) present a positive attitude towards to TICs.

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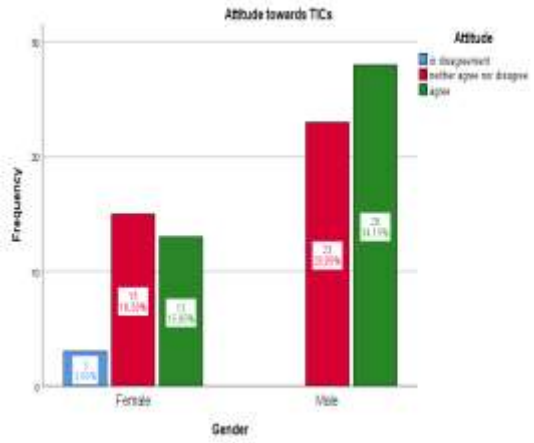

Figure. 1. Attitude towards TICs

Regarding the subscale of work or school stress, it can be determined that 7.3% (6 students, 3 men, and 3 women) present stress levels with values below the average scale of 3, 42.7% (35 students, 18 men, and 17 women), presents neutral levels of stress and 50% (41 students, 30 men, and 11 women), present high levels of stress, manifestations that can be reflected in difficulty to concentrate, anxiety, among others, the main stressors were having multiple windows open to carry out work, immediately check cell phone notifications, check cell phone notifications in the morning, being exposed to a large amount of information through TICs and despairing if there is no internet connection, see Fig. 2.

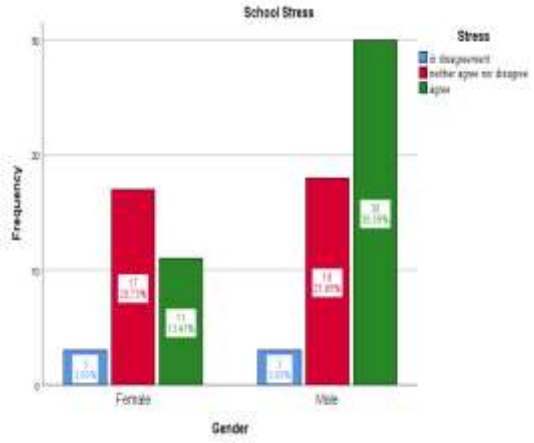

Figure. 2. School Stress

Regarding the addiction or effects of the use of TIC, in Figure 3 high levels could be found due to the use of any type of equipment, or electronic device, so that 85.3% (70 students, 45 men, and 25 women) are above the average scale of 3, this mild addiction occurs mainly because they can spend hours without realizing the use or find it difficult to leave their device to perform other activities, or when they leave the equipment feeling anxious or nervous, because it is difficult for them to concentrate on the activities since they know the device, or because they do not fulfill the assigned responsibilities, among others.

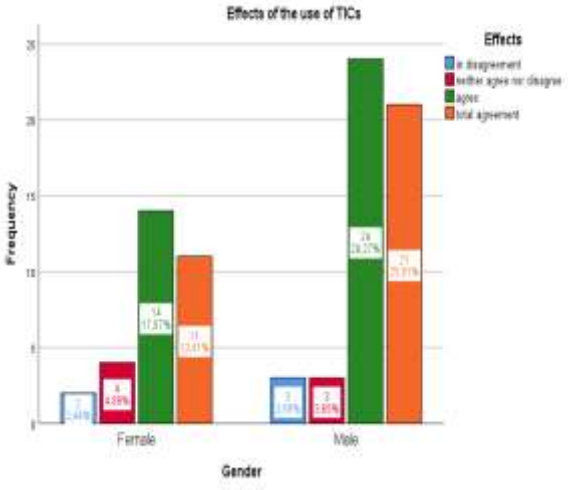

Figure 3. Addiction or effects of the use of TICs

Finally, in the Social Networks and TICs in education dimension subscale, in fig. 4, refers to the involvement of technology in educational processes, allowing to know the use of these tools as support in the learning process, considering RSC (Common Social Networks) such as Facebook, Whatsapp, Twitter, Youtube, WebChat, Tumblr, Instagram, among others; 90.2% (74 students, 46 men and 28 women) disagree on the use of these tools as learning support and 9.8% are in favor of the use of RSC tools.

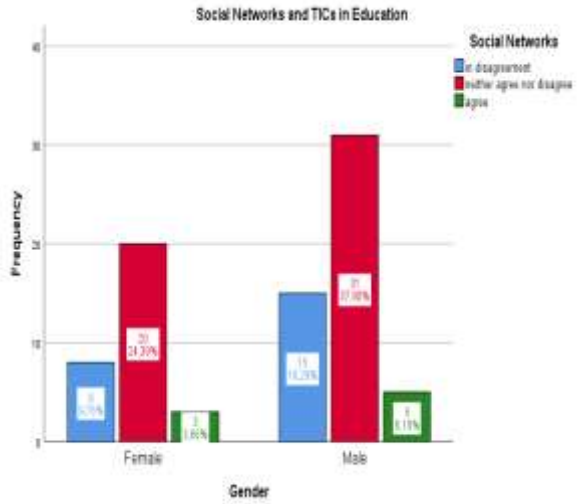

Figure 4. Las redes sociales y las TICs en la educación

After the analysis of levels of techno-stress in higher education students based on the attitude towards the use of TICs, it was determined that these influence the teaching-learning process, being a line widely used in current generations (Tapia Silva, 2018), we can affirm that 50% of the population studied has a positive attitude towards TICs, (Sánchez Pardo *et al.*, 2015)This is due to the fact that technologies provide the opportunity for recreation, permanent communication

with family, friends, co-workers, among others. Communication is faster, keeping us informed of the situations that occur daily in each geographic space; In addition, it can be seen that the use of technology by the male gender prevails in a higher percentage, results similar to the studies of (Valdés-Cuervo *et al.,* 2011). In this study, a neutral group is obtained regarding the use of technologies (46.3%), as in the study of (Álvarez Álvarez *et al.,* 2011), which obtained a percentage of neutral attitude, where it is considered that physical and social improvements should be promoted among groups of people who use technological means. Based on the results, negative attitudes are seen regarding the use of technologies 3.66% as mentioned (Sánchez Pardo *et al.*, 2015), these attitudes are reflected because, as well as there are opportunities in communication and access to information, there are also drawbacks in terms of isolation from people, spending most of the time browsing the internet, becoming dependent on digital media and technological advances.

The results obtained in the research on the school stress construct show high-stress values; This means that these affectations can be reflected in difficulty concentrating among other complications; making a comparison with the research developed by (Sánchez *et al.,* 2019), on TICs in the PEA and technological stress in students of the CARAO-UASPL, the results differ by presenting fewer stressors, thus, the adequate distribution of information and Activities have avoided educational overload, leading to moderate levels in the use of TICs.

The appearance of TICs have had a significant impact in recent years, however with the problem and appearance of the pandemic, it has gained much prominence, satisfying different purposes due to the great influence that technologies have on the young population and all, that through it the communication between the teacher and the student has been maintained, (Florez, n.d.; & Aguayo *et al.,* 2020), despite this and considering that the entire population studied has a technological device at hand, there is no significant addiction, which indicates that it is not a risk, however, comparing the results obtained by (Barbosa *et al.,* 2019) in young university students, there is a similarity of results since in men there is greater interest and management of the use of TICs as opposed to women.

The use of the internet for communication has been increasing over time, so many studies have been carried out on the use of this tool (Jiménez García & Pérez Soto, 2020), the frequency of Internet use varies according to the activities, for example, verify that there were insignificant increases in the use of the internet to review tutorials or to carry out telephone conversations, listen to music or read online, and the frequency of use to send messages was highlighted to a greater degree. Therefore, comparing with the results obtained, it is verified that social networks are not used in a greater proportion as support for learning and 90.2% of students do not use them for this purpose, for this reason, both studies reach the same result regarding the use of TICs, being used more frequently for personal communication, rather than as a support for learning.

In times of the COVID-19 pandemic, we could assume that the use of RSC would become a support for education, however, with the application of platforms to teach virtual classes, other alternatives have had to be found to complement teaching, as Campi demonstrates in his study where prerecorded videos, interactive web pages, virtual laboratories, among others, have become an ideal aid to reinforce teaching-learning in current times, therefore, it can be supported once again that the use of social networks is minimal in the field of education as shown by the study, since only 9.8% of students use them as support for learning, being a very low percentage, in which it requires the teacher to constantly search in finding other ways to interact with students to meet the teaching-learning objective (Campi *et al.*, 2021; & Prieto *et al.*, 2020).

Based on the results obtained, it is pertinent to continue with these investigations following the line of study of techno-stress, comparing female and male genders in terms of the purposes of use of TICs, correlating with age and the impact in the field of study, labor, affective relationships, mood, and health.

CONCLUSION

Throughout the evolution of communication, the development of technology has increased substantially, such as the creation of platforms that allow us to have an immediate connection, for this reason, the present study has focused on currently are facing the COVID-19 pandemic, whose scenario has made digital technologies such as TICs have become indispensable tools in different areas such as economic, social and education, likewise this new normality has had a significant impact. In education, for example; The stress generated for students as well as for teachers has been evidenced throughout the quarantine, as research shows by having a high percentage of students of Higher Technology in Environmental Development with high levels of stress, anxiety, difficulties in terms of connection and adaptation to new technologies, so it can be concluded that in terms of education there is evidence of a before and after COVID-19.

Regarding the acceptance of TICs, it was possible to show significant indices regarding the attitude to the use of these technologies.

Attitude towards TICs

- Over time, TICs interest me less and less, 23.5% agree

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- I could not do my work or my tasks without TICs, 47.1% agree
- I often find it hard to sleep when I have a lot of work related to TICs, 32.9% agree
- When I finish working with TICs I feel exhausted, 43.5% agree
- I feel very comfortable using TICs in my work, 32.9% agree

There are high levels of stress due to the use of TICs, you can see states of frustration and anxiety.

Work or school stress:

- I get frustrated when new technologies are implemented in my workplace or study, 24.7% agree
- I have several windows open in the browser to perform multiple tasks at the same time, 43.5% agree
- I need to check my cell phone notifications immediately, even if I interrupt what I do, 35.3% agree
- When I wake up, I check the time and notifications on my cell phone, 52.9% agree
- I am exposed daily to a large amount of information through TICs, 65.9% agree

The use of electronic devices demonstrates the addiction to TICs, whether it is connected to the internet or not:

Effects of the use of TICs

- When I use my device, hours can pass without realizing it, 34.1% agree
- On weekends I spend all day using my devices, 20% agree
- It bothers me that they are insisting that I leave my device, 12.9% agree

It is important to mention that the use of common social networks (RSC) are relevant as a support tool in the teaching - learning process

Social networks and TICs in education

- I use RSC to share files, links or information about a task with my colleagues, 45.9% agree
- I create groups in RSC to keep us informed about the progress of our subjects, 55.3% agree the teacher notifies us by RSC about tasks or activities, 57.6% agree
- We consult with the professor at RSC with any questions, 63.5% agree
- My research works are easier when I use TICs, 63.5% agree

Based on the results obtained, it is concluded that the means of information and technological communication through internet browsing, the use of mobile devices, and social networks are technologies that contribute to the teaching-learning process as long as they are used in a strategic, planned, and structured way avoiding distractors and stressors that influence technological stress.

The attitude towards the use of TICs is proportionally related to a dependence on technology leading to negative psychosocial effects in the medium and long term. As mentioned, 50% of the population presents high levels of stress due to the asynchronous and synchronous activities of the students have caused a 100% dependence on the use of TICs.

Regarding the use of Social Networks, as tools to support learning, it can be concluded that digital platforms are not considered as support in learning as indicated by 90.2% of the students of Higher Technology in Environmental Development, on the contrary, social networks are used for other purposes such as personal communication means which allow obtaining information immediately.

About addiction due to the use of technologies, students are above the average level, that is, there is no chronic addiction in the use of digital tools, this indicates that the development of teaching-learning in this new modality of Tele study for the appearance of COVID-19 has not been affected by the use of electronic devices.

Based on the sociodemographic parameters, there is a strength of association between the academic cycle with the academic stress generated by the use of technologies; as well as the comfort in the use or addiction of TICs, reflected in the different activities that students carry out as at an academic, social or leisure level, among others, influences. Depending on the results, an objective for future research would be to determine techno-stress by comparing indices by career at an institutional and interinstitutional level to obtain chronological data of social importance.

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