Technostress in Digital Age

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***Abstract*—Technostress is anxiety, tension, or distress caused by technology.In this digital era where technology is becoming the essential part of our lives it is also causing technostress . Although it is still not recognized as an issue but it is a leading cause of distraction among people specially the youth.With the advancement in the technology technostress is also increasing but actually the severity of this problem was realized after COVID-19 when the whole world was shifted towards online.People used to spend their whole day sitting on the internet. Someone performing their job, someone doing shopping, someone playing games, someone going for an online checkup and many more.As the time passed these habits were irreversible everyone started completely relying upon technology as a result of which many issues arose information overload, constant connectivity, digital distractions and many more. All of these were unacknowledged along with their impact on us.**

This research is the answer to all these questions, all the rising questions in the society that WHAT IS TECHNOSTRESS?

I. Introduction

Stress is a state of mental tension or distress caused by an interaction between a person and his/her environment. We are living in an era where digital technology encompasses every aspect of our lives. The phenomenon of "techno-stress" – the stress experienced due to the use and adaptation of new technologies – has emerged as a topic of growing concern!! This research report delves into the complex relationship between technology usage and the emotional and psychological distress caused by it.

The digital age has revolutionized our lives. It changed and elevated the way we communicate, work, and engage with the world around us. These technological advancements have undoubtedly brought many benefits, but sadly our lives become heavily influenced with technology. These conditions introduced a new phenomenon in our lives called techno-stress, which is a modern form of stress due to constant connectivity and information overload. Despite its such big impact on human life, techno-stress remains a much of an under-explored area in psychological research.

Understanding the dynamics of techno-stress demands us to delve into its causes and consequences. Factors such as information overload, constant connectivity, and the rapid pace of technological advancements contribute to the complex landscape of techno-stress. Due to the immense pressure to stay constantly connected with the digital world, people become highly overwhelmed and overburdened by technological tools that destroy their mental health. Moreover, due to the COVID-19 pandemic, the reliance on digital technologies, virtual communication, and remote work has increased, leaving concerns such as burnout, fatigue, and the destruction of work-life balance.

The main objective of this research is to analyze the impact of technology usage on the well-being of people in this digital age. Also, to identify the common sources and symptoms of techno-stress and to explore coping mechanisms used by different people. This study seeks to shed light on this pressing and hot issue. This research report also offer insights into managing techno-stress for improved well-being and productivity

This study shows valuable insights. In this study, we have also used various analysis techniques. Techno-stress is a global issue. There is a dire need for its research. Our study is really valuable in this aspect but it is limited due to a specific number of self-reported data and demographics from the participants. In the future, our research could be widened by targeting a diverse audience and using various research methodologies.

In the coming section of the literature review, we will

discuss some previous research on technology-related stress. We will also share our previous findings on the base of which we further broadened our research. In the section on methodology, we will shed light on the methods used for this research. Afterward, we will share our research questions, their collected data, experimentations using various analysis techniques, and their results. Lastly, we will conclude our topic with some discussions and share valuable outcomes from this much-needed study.

II. Literature Review

The concept of techno-stress is mainly driven from smart technologies.Early 20's tech was not of everyone's need but nowadays it become a very crucial part of modern lives.The compensation of these technologies in our lives effect us mentally.Now due to excessive use of these technologies everyone is getting within so far but here the cherishing fact is that ,The world is just like a Global village, A click far away'.These facts are the base of the development of technologies and is proportional to the techno-stress in our society.

In facts are the basis of technological development and they In line with the technological stress of our society.Researchers have focused on various aspects in recent years Techno-stress, including designer techno-stress (e.g. Tarafdar etal. (2007), anxiety (e.g. Gimpel et al. (2018b)), techno-stress Inhibitors (e.g. Ragu-Nathanet al. (2008) and behaviour).(e.g. Pirkkalainen et al. (2019)). Ayyagari et al. (2011) highlighted the issue of the role of different characteristics.Digital technology plays the role of techno-stress.The nature of digital technology is functional and inactive tasks that the user sees, which can be done directly or indirectly. many other researchers Followed the call of Ayyagari and others. (2011) but list The proposed specifications may not be complete and that This may happen in the future with the advent of new technologies in a new character. Therefore, Mayer et al.

(2015) examined the characteristics of enterprise resource planning (ERP) systems, Salo et al. (2019) focused on social network characteristics and Hung et al. (2015) looked at characteristics of mobile phones that influence techno-stress.So, there are additional features that lead to further research on specific technologies or References that extend the list of Ayyagri et al. (2011). However,End the black box phenomenon in technology And more research is needed on techno-stress. Now!No studies use long lists of characteristics Analyze their impact on techno-stress and see Are there any other features apart from this [2].

Types associated with techno-stress .The circumstances are reviewed and then a special investigation is conducted on data. Two psychological experiences related to use: ICT should be considered: dependence on technology and Techno-stress. Dependence on technology makes users unhappy because and forced use of ICT with techno tension Users are overwhelmed and show a combination of anxiety, Belief in failure, fatigue, and uncertainty are linked Use of technology.

* Security Archetype: Self-confident.And social networks help maintain order By building effective relationships that improve society Existence and communication.

* Ideal "intimate": fear of losing something and love.A friend who shows interest and responds emotionally.

*Escapist Ideal: Dislikes reality and society.Media helps us live in an imaginary parallel reality.

*Narcissist Ideal: Likes to feel accepted by others.Use social media to compete with others.

* Not conforming to the archetype: completely attached to society media, but it's the opposite of a waste of time demanding [3]..

In contrast to the negative aspects associated with constant communication in the workplace through access to mobile technology, some Research also suggests that such a relationship may exist in some cases.It can be considered a beneficial stress reducer. Instant communication (Mazmanian, Yates, and Or loux, 2006; Ninous et al., 2015) Allowing people to control their own actions and processes Provide information and more flexibility.People can log in regularly Communicate all day long, even outside their normal work environment, thus reducing the need take longer to cross Email Backlog. This access allows people to work .More efficient and productive than your office (Alin) and Shoard, 2005). Furthermore, instant communication is possible.It is useful in terms of work-life balance because it provides someone who can work easily within the family Commitment, thereby ruling out negative health effects.Due to work-life imbalance [4]. TS affects professional and personal life. This can lead to a decrease in work and life satisfaction as well as productivity and is often linked to the emergence of psychology and conduct disorder [1]. So here,as we have added many beneficial previous work research papers its obvious and clear that techno stress exists and it influenced many life's.Previously, during COVID 19's pandemic technology was become necessity of every individual.Students were taking online classes and many employees(tech or non-tech)of government and private sectors were enforced to do Remote working.It became fuss for many and ease for others.The world is just revolutionize after that era. In the long Run techno-stress may or may not be categorized as a stress factor.According to the studies it shows if 70 out of 100 people are taking stress from social media then there will be 30 out of 100 that uses tech to release stress.We can't neglect that factor.Moreover, it depends on an individual how they are using these sources that's includes or excludes the stress factor.

III. Methodology

In this study, the methodology employed for researching our topic involved utilizing an online survey as the primary data collection tool. Participants were selected based on the relevance of our research, with a significant amount of data collected from Lahore, Pakistan, we got a big portion of our data from PUCIT (Punjab University of Communication and Information Technology) as well. This approach ensured that

the gathered information aligned with our research requirements.

Following participant selection, relevant statistical analyses were applied to the data, yielding desired results to be discussed in detail in the experimentation and results section. Various statistical tests were performed for data analysis, including the Run Test of Randomness, Chi-square Test of Independence and Goodness-of-Fit Test, Linear Correlation, and Hypothesis Testing Z-score Test. These tests were implemented through Python codes.

The Chi-square Test of Independence was utilized to examine the relationship between two categorical variables using a contingency table. This categorical analysis method provided insight into the potential existence of a significant association between the variables.

Similarly, the Chi-square Goodness of Fit Test was employed to check if our observed data matched our expectations. This involved comparing actual and expected frequencies, providing a measure of how well our data followed a specific pattern or model.

The Run Test of Randomness was used to analyze consecutive occurrences within the sequence, helping determine whether the sequence was random or followed a specific pattern.

Additionally, Linear Correlation was applied to quantify the strength and direction of relationships between continuous variables, offering concise insights into their association.

Lastly, the study incorporated the Z-score Test for Hypothesis Testing. This involved calculating Z-scores to assess if a sample significantly differed from a known population mean or proportion, enabling meaningful inferences about the sample's characteristics in relation to the broader population.

These statistical methods produced insightful analyses aligned with the study's objectives. Python served as an efficient tool for their implementation. Ethical guidelines were diligently followed, emphasizing informed consent, participant rights, and confidentiality. Noteworthy is the deliberate omission of participant names and emails to safeguard anonymity and privacy in our survey.

IV. Experiments and Results

In investigating the persuasive impact of technostress in our digital era, a systematic and comprehensive experimental methodology was employed.Our aim was to conduct an experiment among different people belonging to different categories to find out the impact of technostress on our society.In this aspect we designed a survey form with the following questions that helped us to analyze the technostress scenario in digital age. We collected the data of 206 individuals from Pakistan. Our survey participants included 118 females and 88 males. We applied an interesting technique called Run Test of Randomness to check whether there is randomness in the order of filling of males and females in our survey.

Null Hypothesis: The sequence is random.

Alternative hypothesis: The sequence is not random.

We got 99 runs in our sequence. After applying the run test of randomness we got the result that our sequence is indeed random.

Most of our survey participants included youth. Following is graphical representation of our survey participant's gender and age group.

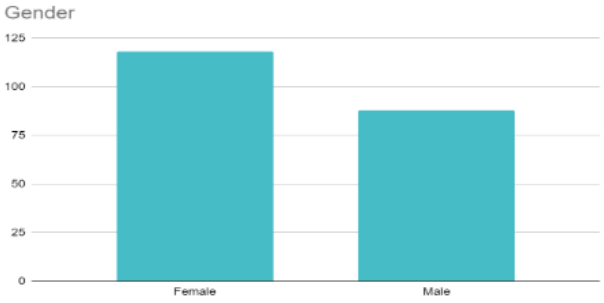

Fig. 1: GENDER

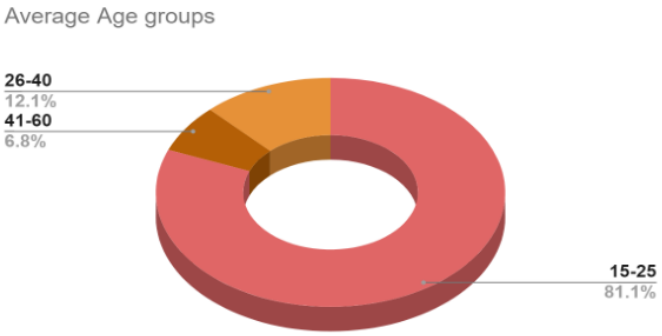

Fig. 2: AGE GROUP

Here you will have a deep look to our survey questions.

Q:1 Highest level of education completed?

As this was a categorical question we have applied CHI-SQUARE TEST OF INDEPENDENCE here. For this experiment we have paired Q1 along with the OCCUPATION.

Null Hypothesis: There is no significant association between education and occupation.

Alternative Hypothesis:There is a significant association between education and occupation.

Computations are done using python codes.After that we can easily conclude that we can reject the Null Hypothesis. This shows that according to our survey data yes there is an association between the highest level of education completed and occupation gained. Following is the graphical representation of occupation count according to our survey population taken by 207 people.

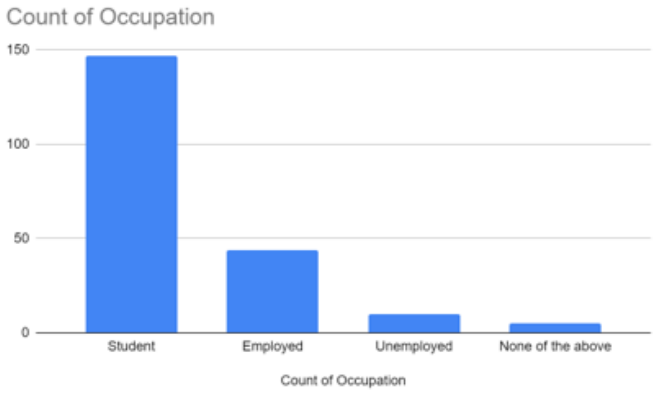

Fig. 3: OCCUPATION COUNT

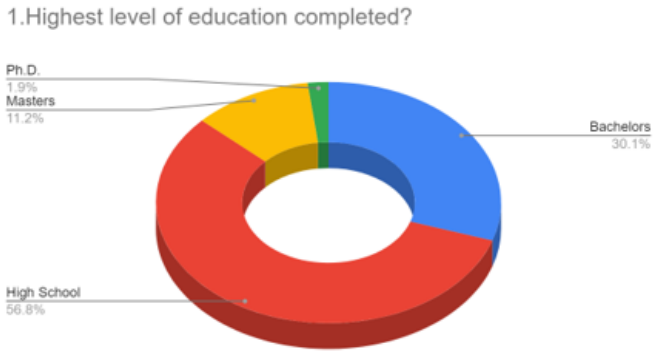

Fig. 4: HIGHEST EDUCATION COMPLETED

Above is the graphical representation of highest level of education completed according to our survey population. 4.

After having a look to both the graphical representations we can clearly see the significant association. Most of the people have completed their high school according to which they should lie in the category of student and so that our finding states.

Q:2 On average how many hours per day do you use digital devices?

For this question we have used Chi Square Goodness Of Fit Test

Null Hypothesis: The distribution of device usage across categories follows an equal distribution.

Alternative Hypothesis:The distribution of device usage across categories does not follow an equal distribution.

Computations are done using python codes.

We can Reject the null hypothesis:There is significant evidence that the distribution differs.

Following is the graphical representation 5.

Fig. 5: USE OF DIGITAL DEVICES

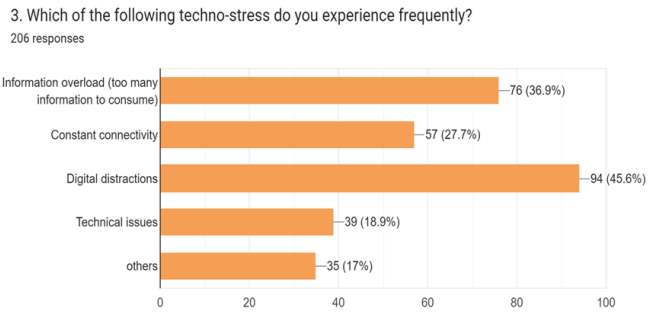

Fig. 6: FREQUENT TECHNOSTRESS

It is so clear from the above graph that the distribution is not even most of the people lie in the category of 4-8 hours very few in less than 2 hours and few in other two categories.

Q:3 Which of the following technostress do you experience frequently?

Q:4 How do you typically cope with technostress?

As this was a categorical question we have applied CHI-SQUARE TEST OF INDEPENDENCE here. For this experiment we have paired Q3 along with the Q4.

Null Hypothesis: There is no significant association between technostress experience and coping mechanism.

Alternative Hypothesis:There is a significant association between technostress experience and coping mechanism

Computations are done using python codes.After that we can easily conclude that we can reject the Null Hypothesis.

On this page graphical representation of question 3 can be found.

Following is the graphical representation of question 4.

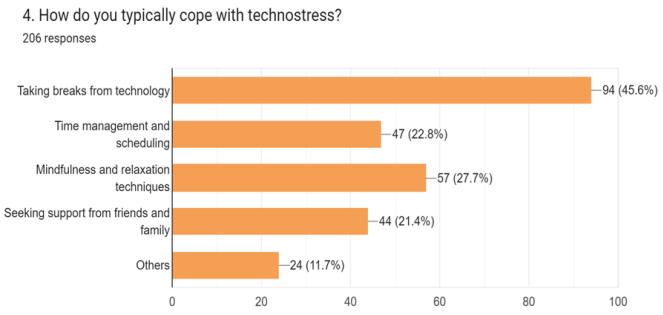

Fig. 7: COPING WITH TECHNOSTRESS

Q:5 Have you experienced any mental or physical health effects due to technostress?

As this is a categorical question we have applied Hypothesis Testing Z-score here.

Null Hypothesis: The population mean is 0.60.

Alternative Hypothesis: The population mean is less than 0.60.

Calculations are done using python code. Here we accept null hypothesis stating that the population mean is 0.60.

Following is the graphical representation of question 5.

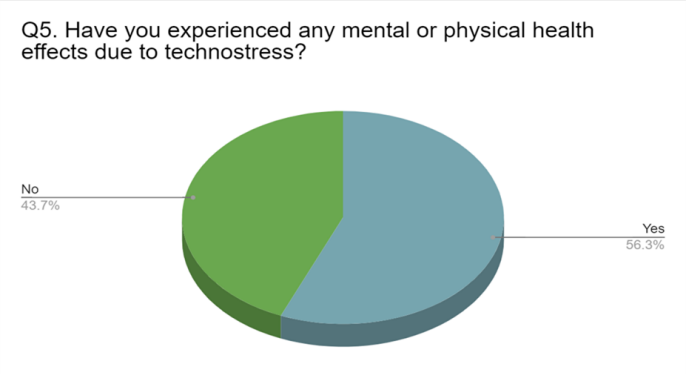

Fig. 8: FREQUENT TECHNOSTRESS

Q:6 How frequently have you experienced techno-stress due to cyberbullying?

Q:7 How did techno-stress affect you emotionally and psychologically?

We applied the TEST OF LINEAR CORRELATION here. For this experiment, we have paired Q6 along with the Q7.

Null Hypothesis: There is no correlation between experiencing techno-stress due to cyberbullying and the effect of techno-stress on a person.

Alternative Hypothesis: There is a correlation between experiencing techno-stress due to cyberbullying and the effect of techno-stress on a person.

Computations are done using Python. After that, we concluded that there is no linear correlation between experiencing techno-stress due to cyberbullying and the effect of techno-stress on a person. Hence, we accepted the null hypothesis.

Following is the graphical representation of question 9.

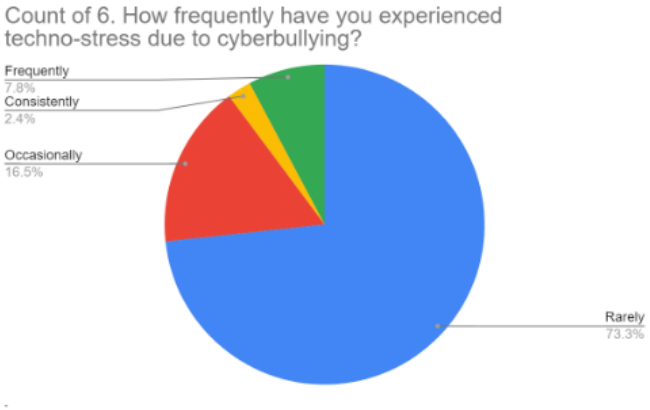

Fig. 9: EXPERIENCING TECHNOSTRESS DUE TO CYBERBULLYING

Following is the graphical representation 10.

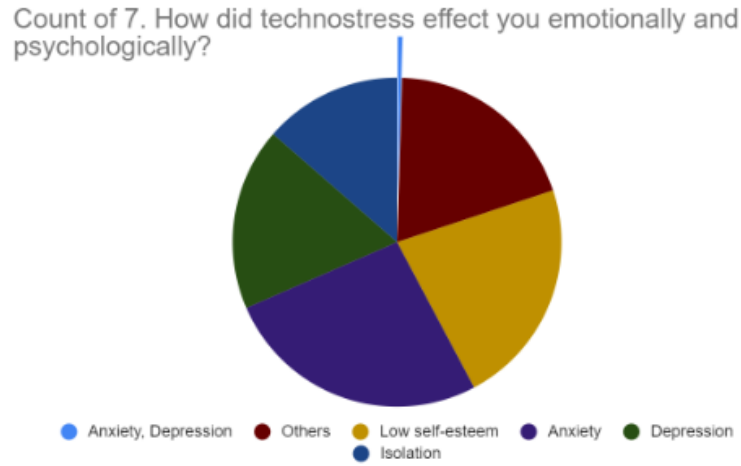

Fig. 10: EFFECT OF TECHNOSTRESS

Q:8 Which are the apps that cause the most stress?

Q:3 Which of the following technostress do you experience frequently?

We have combined Q:3 and Q:8 and applied Chi-Square Test of Independence.

Null Hypothesis: There is no joint association between the frequency of experiencing technostress and the choice of apps causing stress.

Alternative Hypothesis:There is a significant joint association between the frequency of experiencing technostress and the choice of apps causing stress.

Calculations are done using python code. Here we accept the null hypothesis stating that there is no joint association

between the frequency of experiencing technostress and the choice of apps causing stress. Following is the graphical representation of question 3.

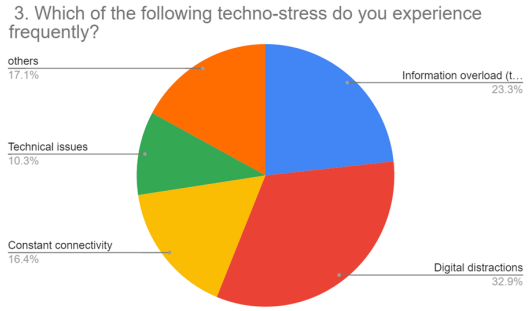

Fig. 11: FREQUENT TECHNOSTRESS

Following is the graphical representation of question 8.

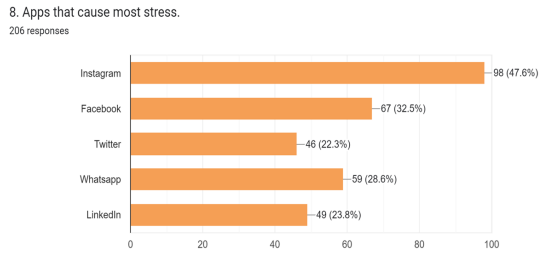

Fig. 12: APPS CAUSING MOST STRESS

TYPES OF CYBERBULLYING

We have defined many types of cyberbullying in our questionnaire options are:

Trolling and offensive comments (36.4)

Harassment and threats (19.4)

Image based harassment (16.5)

Identity theft (15.5)

Others (12.1)

Trolling and offensive comments are chosen on the bases of high ratio among all the options.

Q:9 What type of cyberbullying do you think is the most common?

Null Hypothesis: The population mean for trolling or offensive comments is 0.36.

Alternative Hypothesis: The population mean for trolling or offensive comments is less than 0.36.

We have applied mean hypothesis testing Z-score test to find the mean relation. Python libraries are used for computations.After applying values we Fail to Reject the Null Hypothesis that population mean for trolling or offensive comment is 0.36.

Following Graphical representation 13.

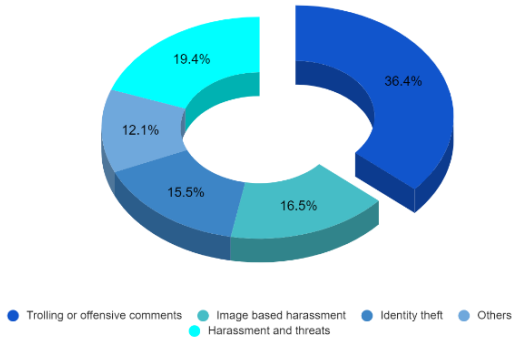

Fig. 13: TYPES OF CYBERBULLYING

V. CONCLUSION

In this digital era of technology where everything is just a click away from us and we rely upon technology to perform most of our daily routine tasks,it has become our major need. With the advancement in technology not only its benefits but the stress arising from it is also alarming for all of us .Where it is helping us in our daily life it is also taking away our relations, our sense of responsibility for the people who count upon us. The happiness that we used to get from humans is now dependant upon the technology.With the help of this research we just wanted to raise awareness in our society regarding the technostress. We wanted everyone to know that technostress is not a minor issue that we can easily ignore.It's the high time when we should start acknowledging the impact of technostress on our society especially on the youth of our society.

After performing all the analysis we can easily say that the youth is the most effected by the technostress and apart from the analysis if you just look in your surroundings you will agree with us its just the mater of thinking,realization and knowing your importance in the society. Realizing the fact that everything has its limits and if we start exceeding those limits it will be harmful to us not only for ourselves it may also harm our society.The evidence to which is our survey which states that majority of people cope with technostress by taking break form technology. We are looking forward to make further research on technostress.

REFERENCES

[1] Iliana Sciarra Marta Chiappetta Giuseppe La Torre, Alessia Esposito. Definition, symptoms and risk of techno-stress: a systematic review. 92:13–35, 2019.

[2] Henner Gimpel Julia Lanzl Christian Regal Julia Becker, Michelle Berger. Considering characteristic profiles of technologies at the digital workplace: The influence on technostress. pages 1–17, 2020.

[3] M.Isabel Sánchez-Hernández Oscar R.Gonzalez Lopez, Marira Buenadicha-Matios. Overwhelmed by technostress? sensitive archetypes and effects in times of forced digitalization. 2021.

[4] Joe Robinson. An investigation into the effect of age on instances and experiences of technostress: A qualitative study on the perceptions of digital natives and immigrants in the sales industry. pages 1–107, 2018.