

Article

University Students' Perceptions of Sustainability and Ecological Footprint in the Use of Digital Leisure

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Abstract: The paper explores the impact of digital transformation on young people's interaction with digital leisure and its ecological footprint. The study highlights the increasing awareness of ecological sustainability in digital consumption among university students. It also delves into the concept of emotional sustainability, a term proposed to address the psychological and emotional effects of digital entertainment consumption. The digitalization of leisure has led to significant changes, including the rise in digital dependency, anxiety disorders, and the dehumanization of human relationships. The paper underscores the need for emotional sustainability in managing digital leisure to mitigate these negative consequences. Additionally, it discusses students' awareness of the ecological footprint associated with digital activities, pointing out gaps in knowledge regarding the environmental impact of maintaining digital infrastructure. The authors advocate for integrating emotional sustainability into digital consumption practices to promote healthier and more sustainable digital lifestyles. This exploratory study provides a framework for understanding the dual aspects of sustainability in digital leisure, emphasizing the importance of both ecological and emotional dimensions in fostering a balanced and sustainable digital future. This context has generated needs that must be addressed from the perspective of the emotional sustainability of digital entertainment consumption.



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1. Introduction

The concept of sustainability has become common in the everyday language of the 21st century (García & Vergara, 2000). However, when thinking about sustainability, there is a need to understand the impact that human beings have on the environment and on the planet's environmental resources. The awareness generated by the different environmental movements that have emerged since the 1980s has generated a new mode of development based on sustainable consumption (Lipietz, 2002). The ramifications of the sustainability concept (García & Vergara, 2000) have made humans reinterpret other aspects of their existence, where sustainability was not a prevailing concept, leading to greater global awareness regarding the traceability of the ecological footprint.

Not only the concept of what is sustainable has undergone transformations, but leisure has also been one of the vital aspects that have been transformed during the last decade in the entire planet. This Westernizing current has prevailed in many countries, thanks to the preponderance of ICT in leisure (Tapia, 2017). The digitalization of leisure consumption has popularized access to a wide range of options for certain population groups. After

the global confinement that was experienced during the year 2020, the Netflix digital entertainment platform grew by 16 million users (El País, 2020, April 22). This shows the transfer of leisure consumption to a digital field, which was already experienced in the field of video games in 2003 with the arrival of the STEAM platform as a market for digital products (iProUP, 2023) and later, in 2007, with the opening of the digital stores of Sony (Vidaextra, 2021) and Microsoft (Xbox, 2021, December 13). These digital stores represent a step forward in the consumption of digital leisure and the normalization of the use of the digital market in contrast with the consumption of leisure in physical format (Tejero et al., 2011).

Nevertheless, the proliferation of digital stores has not only affected video games. The appearance of electronic books together with digital bookstores has transferred the same reality of the video game sector to reading consumption worldwide. The music sector has suffered a similar situation, with companies such as Spotify, Apple Music, or Amazon Prime Music, which have also adopted this model of digital consumption (Librandia, 2019).

The transformation of the leisure industry into a digital world represents an improvement in sustainability due to the null need to reproduce these elements in a physical format. This involves the elimination of mass production (for which certain materials are used and their subsequent contamination), transportation, and distribution of the physical product (with the emissions derived from the transfer to the physical store) (Tejero et al., 2011). However, emissions have not been eliminated. In 2021, Netflix revealed for the first time the emission data for an hour of content viewing on its platform, which was equivalent to 100 g of CO₂. To these data, we must add the electricity consumption of the screen or computer and the internet service needed. Currently, Netflix has about 213 million subscribers, but it should be added that each subscription can accommodate several more users using devices simultaneously (El Nacional, 2023).

Another study carried out by Credit Suisse (2022) revealed that one of the most polluting activities that currently existed within leisure was related to the consumption of video games. For example, a high-performance gaming computer has an impact of 452 kg of CO₂. These numbers are worrying, especially if we take into account the total number of users on the planet and add the consumption of the servers to host the online game and the digital stores. Sony has sold a total of 117.2 million Playstation 4 and around 50 million Playstation 5 (Vandal, 2024); Nintendo has sold 140 million Nintendo Switch (Nintendo of Europe GmbH, 2023); and Microsoft about 70 million consoles between Xbox One and Xbox Series S and X. All these video consoles have digital stores, and the most recent models of Microsoft have renounced to the physical format in some of their models, a strategy also followed recently by Sony.

Also, the STEAM digital platform publishes regularly its own data on its website (SteamDB, 2023). On January 23, 2022, STEAM broke the record with more than 29 million users connected simultaneously. This information can be used to calculate approximately the consumption of CO₂ involved in the digital use of video games.

In addition to the concept of sustainability, there is a new consequence of the consumption of digital leisure among young people (Collado-Ruano, 2016), which is the emotional sustainability of the repeated use of this type of leisure. The generation of automatisms, the decrease in human contact, addiction to social networks, and the anxiety generated by the use of networks are just some of the consequences of the abuse of digital leisure that have laid the foundations for this study (Prieto et al., 2022).

1.1. Theoretical Framework: Concepts on Digital Leisure and Sustainability

The conceptualization process in this research has helped update the vocabulary and introduce new terminology. Identifying specific elements observed in recent years has

confirmed the theorization of consequences anticipated since the beginning of the decade. Before proceeding with the research, it is essential to understand certain key concepts.

1.1.1. Sustainability

The concept of sustainability serves as the foundational principle of this research, functioning as the compass guiding technological progress. Sustainability is defined as the effective outcome achieved by global citizenship—a complex adaptive system—in conditions that balance order and disorder (Collado-Ruano, 2016). Consequently, sustainable development is also an emotional and spiritual issue, as neuroscience shows. Furthermore, sustainable development encompasses emotional and spiritual dimensions, supported by findings in neuroscience. Therefore, understanding the emotional connection is crucial for comprehending how sustainable development is being monitored by major corporations and certain states worldwide. Engaging emotions to foster environmental care promotes universal participation, essential for collaborative efforts on a global scale. However, the emotional impacts of sustainable development have been overlooked, prompting their exploration in this investigation (Prieto et al., 2022).

1.1.2. Digital Leisure

Digital leisure encompasses various forms such as social digital leisure (virtual social networks), mobile digital leisure (smartphones), and recreational digital leisure (video games) (Galzacorta et al., 2014, p. 53). Additionally, the consumption of audiovisual content platforms has seen significant growth in recent years (Del Moral-Pérez et al., 2021). Thus, digital leisure can be understood as the consumption of audiovisual elements, social networks, and video games facilitated through technological devices. This modern form of leisure introduces novel features not found in traditional leisure activities, including flexibility in scheduling, unrestricted usage, and interactive experiences that break traditional barriers (Neira, 2016).

1.2. Digital Footprint

We are surrounded by devices and sensors that allow us to monitor our activity. Thus, for example, we leave our digital footprint when we use our mobile phones, pay with a credit card, use public transport, or participate in social networking sites. These data constitute invaluable raw material for the study of human behavior (Gutiérrez-Puebla, 2018).

The digital footprint is a way of monitoring human behavior and can be used for social control from a political and cultural perspective (Quirós-García, 2021). In the 21st century, the ephemeral capacity of human memory has become very intransigent with certain behaviors carried out on social networks, so an individual's digital footprint can remain indelible in the collective imagination (Gutiérrez-Puebla, 2018). Also, there is a growing concern regarding cybersecurity and the consequences of inappropriate use of internet access (Vidal, 2021).

1.3. Ecological Footprint

The ecological footprint measures the area necessary to produce the resources consumed by an average citizen of a given community and the area necessary to absorb the waste it generates, regardless of where these areas are located. When the ecological footprint is calculated, the illusion that we have an inexhaustible cornucopia at our disposal vanishes like smoke (Castillo, 2007).

The concept of measuring the necessary resources has to be transferred to the individual's personal sphere so they can understand the real figures of their impact on the environment. Access to unlimited resources is a very Westernized vision, so the recent lack

of raw materials has surprised the population of the Northern Hemisphere of the planet (Prieto et al., 2022).

These four initial concepts are the basis for understanding the consequences of digital leisure consumption. In addition, there are a series of concepts that have been determined which, after investigation, have emerged as the real consequences that are beginning to spread among young consumers of entertainment in digital format.

1.4. Social Media Addiction

Addiction to technology, and specifically to social networks, is a growing social issue that is being debated widely among professionals (Cash et al., 2012). To define the existence of dependence on the use of social networks, we should establish observable clinical criteria that suggest the presence of such behavior in a person. The most relevant characteristics are as follows: loss of responsibility, constant obsession, continued use despite its consequences, self-deception or denial, serious negative consequences, and conspiracy to consume. These criteria respond to the excesses and compulsive actions undergone by some users, giving rise to negative effects and health deterioration (Fernández-Rovira, 2022). The symptoms are social deterioration, such as estrangement, individualism, isolation, the dispersion and distraction of attention, sudden changes in mood, reduced productivity, and negative impact on cognitive abilities (Prieto Gutiérrez & Moreno Cámara, 2015). These patterns are easily identifiable in young people who engage in abusive consumption of digital leisure. The negative impact on the lives of young people is alarming, and the global situation experienced during the years of COVID-19 has led to abusive use of digital entertainment. The appearance of anxiety in young people is becoming more pronounced and the development of isolation behaviors can be a refuge for those who do not feel integrated into the societies in which they live (RTVE, 2024).

There is also a direct relationship between abuse in the consumption of social networks and the impact of the digital footprint (Valencia Ortiz et al., 2021). This circumstance can also cause low self-esteem and, as a result, academic and emotional problems (Llobet Pérez, 2018). Addiction to social networks, therefore, is one of the most worrying consequences of the migration of leisure to a digital world.

1.5. Anxiety and ICT Use

Excessive use of social networks has been related to anxiety patterns. These usually involve sleeping less than 5 h, abandoning certain leisure activities, abandoning responsibilities, and a euphoric feeling during consumption of social networks (Prieto Gutiérrez & Moreno Cámara, 2015). Also, there is a significant negative relationship between addiction to these networks and self-esteem: the greater the addiction, the lower the self-esteem. Likewise, the excessive use of networks is linked to higher levels of addiction and different signs of anxiety (Reyes et al., 2021).

The need for approval through the socially typified reward of accumulating “likes” directly affects self-esteem and the happiness index. However, when self-esteem is regulated by the approval of others, there is a risk of developing anxiety disorders in individuals who do not meet expectations (Marengo et al., 2021).

1.6. Automatism in the Use of ICT

One of the consequences that derive from the abusive use of digital leisure is the generation of automatisms in the use of ICT. It is the process in which man is replaced in the task of measuring, deciding, and acting, by some mechanism (Stassi, 2020). The generation of automatisms is understood as an advantage, eliminating certain repetitive tasks. Other authors have also treated automatism from a positive perspective, arguing that it will favor future generations (White & Le Cornu, 2011, 2017). In relation to digital

leisure, the generation of automatism counteracts the ability to rationalize the performance of certain actions, simply by memorizing the quick access or the process of finding an application (Stassi, 2020).

1.7. Dehumanization Process

Finally, the last concept related to the consequences of the abuse of digital leisure is the process of dehumanization. In Martínez et al. (2017), we can find the following extract: “to mechanize means to perceive others as if they were robots or machines. In this way, mechanization would be easily observable in the context of industrialization or technology”. The dehumanization process is the means by which the individual is linked so much to a digital world that he considers it his own. This process masks discontent with reality and causes a loss of human characteristics that affects their perception of reality and relationships with others. This process of dehumanization was accelerated when restrictions regarding physical and visual contact were introduced during the pandemic of COVID-19 (Scribano & Cárcel, 2020).

The dehumanization process is then understood as the process by which the individual loses human characteristics in favor of automated processes and is favored by an abuse of technological tools. This will make him lose part of his rational capacity in certain processes that will have been automated and simplified through the use of shortcuts, visual elements, and task delegation. The most severe dehumanization processes will involve social isolation, elimination of human physical contact, and reduction in empathy with other human beings (Jimenez & Ruiz, 2020).

2. Materials and Methods

2.1. Objectives

The objectives of this research are as follows:

1. Analyze how young consumers of digital entertainment conceptualize sustainability;
2. Identify the emotional consequences of the abuse of digital leisure among young people;
3. Comprehend student’s perceptions of their use of digital leisure.

2.2. Sample

The study was conducted using incidental non-probabilistic sampling. The sample consisted of 573 participants, aged between 17 and 26 years. Most of the sample were students, with an average age of 20.54 years, as 72.07% of the surveyed population was between 18 and 21 years old. The respondents were mainly students enrolled in the degrees of Primary Education, Early Childhood Education, Social Education, and Pedagogy in the Autonomous Community of Madrid, out of a total of 21,428 registered students (UNIVBase, n.d.). Participants were selected with the aim of ensuring representativeness. The gender distribution of the participants was as follows: 440 females (76.75%), 128 males (22.33%), and 5 others (0.92%).

2.3. Instrument and Procedure

At the beginning of the research process, we worked from the perspective observed by university students after three years of living with the reality of COVID-19. This process was carried out through observation of students, the literature review, and discussion with experts in the field of sociology and psychology. The aim was to address the issue of the growing number of young individuals with many problems derived from the use of digital leisure (RTVE, 2024).

After this process, a questionnaire was created ad hoc to further understand the current situation of students' reality regarding sustainability in the use of digital leisure. Subsequently, we focused on the selection of suitable methods for formulating the response options based on the needs of the study (León-Carrascosa et al., 2020). The questionnaire consisted of 29 items and included multiple choice questions, Likert scale questions, and short answer questions (see Table 1). Answers were classified using the Likert scale, using 1 as the value for nothing, never or totally disagree, and 5 as the value for everything; always or totally agree.

Table 1. Final questionnaire designed to assess the uses of digital leisure among university students.

Category	Item	Question
Category 1.0 Demographics	Q1—Age	Multiple choice
	Q2—Gender	Multiple choice
	Q3—Studies	Short answer
Category 1.1 Access to digital devices	Q4—Age of access to internet	Multiple choice
	Q5—Age of daily use of digital devices	Multiple choice
	Q6—Hours per day of use of digital devices	Multiple choice
	Q8—Use of social networks	Multiple choice
Category 1.2 Use of social networks in leisure	Q9—Social networks used	Multiple choice
	Q10—Number of weekly posts	Multiple choice
	Q14—Concern about the consequences of the misuse of social	Likert scale
	Q15—Need for approval through social media	Likert scale
	Q17—Mistrust of contact through social networks	Likert scale
Category 1.3 Changes in relationships	Q18—Negative experiences in social networks	Likert scale
	Q19—Preference for non-digital personal relationships	Likert scale
	Q21—Use of social networks as a partner search tool	Likert scale
	Q22—Preference of places to meet future sentimental partners	Likert scale
	Q7—Automation of rational processes in digital devices	Likert scale
Category 1.4 Emotional consequences of the use of social networks	Q11—Dependency of digital devices	Likert scale
	Q12—Feeling of anxiety when not having access to social networks	Likert scale
	Q13—Addiction to technology	Multiple choice
	Q16—Footprint traceability	Likert scale
Category 2.1 Use of digital platforms	Q20—Loss of physical contact in human relationships	Likert scale
	Q23—Audiovisual content platforms used	Multiple choice
	Q25—Videogames used	Multiple choice
Category 2.2 Environmental consequences of digital leisure	Q26—Format of videogames	Multiple choice
	Q24—Pollution of digital platforms	Likert scale
	Q27—Emissions from video game consumption	Likert scale
	Q28—Degree of knowledge of the polluting effect of charging a mobile phone	Likert scale
	Q29—Traceability of the environmental footprint	Likert scale

Source: Own Elaboration.

The questionnaire comprises 7 dimensions based on the literature review listed above. These dimensions were Demographics, Access to the digital world, Use of social networks as digital leisure, Changes experienced in social relationships, Use of digital platforms and social networks, and Knowledge of the impact of the use of digital leisure on the environment.

2.3.1. Instrument

To obtain evidence of the instrument's content validity we selected two education and two sociology research experts to independently evaluate the items of the questionnaire.

They were informed of the purpose of the test, and they assessed each item for relevance and clarity using a Likert scale. The final model consisted of 29 questions. After following the experts' recommendations, only some small corrections were made regarding changes in phrasing or grammar.

Finally, the instrument was designed using Google Forms to facilitate its digital distribution and to collect the data in an organized, safe, and anonymous way, respecting the right to privacy of the participants.

2.3.2. Procedure

To achieve participation in the study, a meeting was set up with the Head of Studies to explain the purpose of the study, and the procedure and to set the dates of the administration of the questionnaire. The instrument was finally administered over a period of 3 weeks through social networks. Also, members of the research team went to the university to seek participation, ensuring complete anonymity and confidentiality of the answers. The information collection process was carried out in the university environment, taking approximately 15 min to complete.

2.4. Data Analysis

Data were analyzed using R version 4.3.2. and Jamovi 2.4. Descriptive statistical analysis was used to explain the data obtained and to find answers to the questions generated by the research instrument. A complementary analysis was carried out on certain questions to verify the existing relationship through an exploratory analysis. For this, Spearman's correlation coefficient test measures the strength and direction of the association between two variables classified within the collected data. After verifying that the data did not follow a normal distribution using the Shapiro–Wilk test ($p < 0.001$), the Kruskal–Wallis test was conducted using Jamovi (version 2.4) on variables categorized into three groups. Additionally, pairwise comparisons were performed using the Dwass–Steel–Critchlow–Fligner method to identify significant differences between the medians of the groups. Spearman's correlation coefficient (r) can be interpreted based on its value as follows (Sánchez-Huete, 2013):

- When $0 < r < 0.2$, the correlation is considered small and indicates a very weak relationship;
- When $0.2 < r < 0.4$, the correlation is classified as low, suggesting a small but noticeable relationship;
- When $0.4 < r < 0.6$, the correlation is described as moderate, representing a considerable relationship;
- When $0.6 < r < 0.8$, the correlation is high, indicating a strong relationship;
- When $0.8 < r < 1$, the correlation is very high, reflecting a very strong relationship.

2.5. Limitations

The limitations of the study are characterized by a sample with a wide age range among participants. The acceptance of responses should have been restricted based on age to improve consistency. Additionally, the failure to inquire about the participants' specific university degrees represents a missed opportunity to introduce new variables for further analysis. It is important to highlight that the use of a validated questionnaire would have yielded more precise and reliable data.

3. Results

The statistical review of the obtained data will be based on descriptive statistical analysis to explain the collected data and attempt to draw conclusions regarding the questions posed by the research instrument. Additionally, a complementary analysis will

be conducted on specific issues to verify the existing relationships through an exploratory analysis of the data directly related to the presented concepts.

To this end, Student's *t*-test will be employed to examine the influence of age on response patterns; Spearman's rank correlation coefficient test will be used to measure the strength and direction of the association between two ranked variables within the collected data.

Firstly, the use of devices among participants was analyzed. The daily use of devices showed a heterogeneous distribution. Notably, 17.8% ($n = 102$) of students used devices for more than 10 h per day. Additionally, over 80% of participants used devices for more than 4 h daily. None of the respondents reported using devices for 0 h per day (see Figure 1).

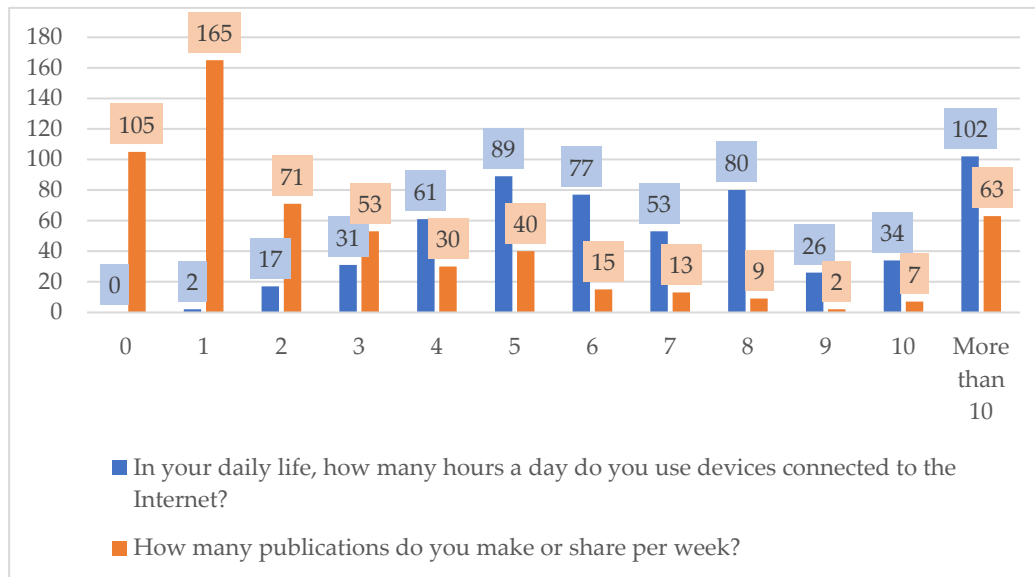


Figure 1. Daily hours of digital device usage and weekly number of posts. Source: Own Elaboration.

Regarding social media activity (Figure 1), 31.23% of respondents made more than 3 posts per week, with 35.19% of these making 10 or more posts. However, 18.32% of participants did not publish any posts, suggesting that these individuals might use social networks primarily for browsing or communication. Notably, 33 respondents used social networks for more than 9 h daily and made 9 or more posts per week. On one side, we can see there is a total of 270 respondents who made 0 or 1 post a week, but in turn, consumed an average of 6.59 h a day. Thus, it can be determined that almost 50% of the respondents used social networks to stay updated. On the other side, there were 72 cases that posted content 9 or 10 times a week and spent an average of 8 h a day with their devices. It could be concluded that the longer a person is connected, the higher the number of publications. When comparing the two variables, results showed a very weak Spearman's correlation ($r = 0.191$).

Figure 2 illustrates a key issue directly linked to sustainability research: the generation of automatism and the consequences of their abusive use. A significant 84.46% of respondents either agreed or strongly agreed that they have automated the mechanism of using electronic devices. Gender did not influence this response significantly, with female respondents averaging 4.3 and male respondents averaging 4.2.

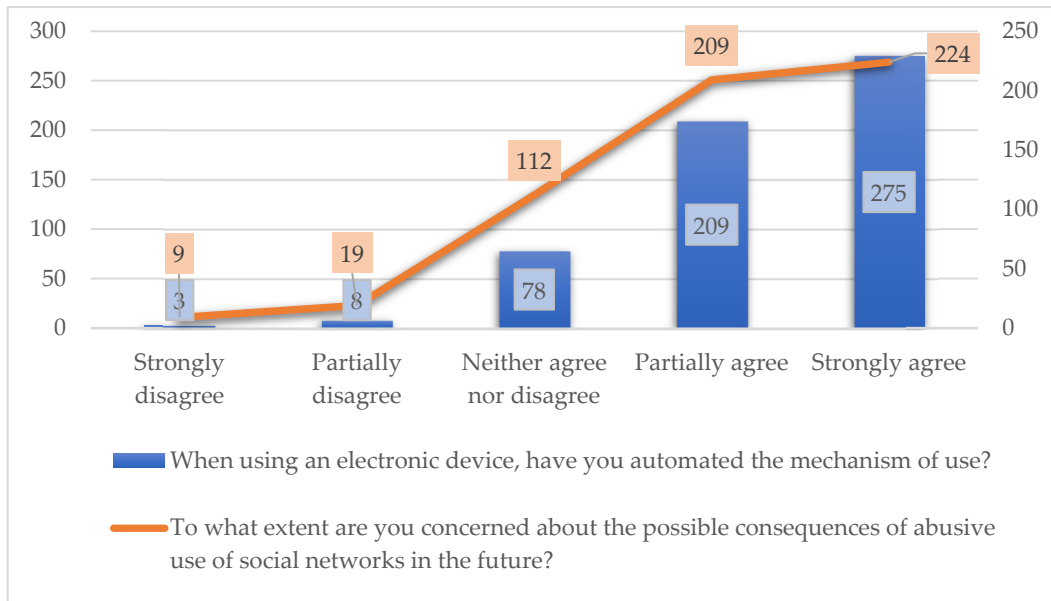


Figure 2. Concern about the consequences of social media use and generation of automatized behaviors.

Regarding concerns about the abusive use of social networks, 75.56% of respondents either agreed or strongly agreed that they are worried about the possible consequences in the future. The correlation between the automation of device use and concerns about social network abuse was very weak ($r = 0.136$).

Dependence on mobile phones is a significant aspect of this research. As shown in Figure 3, 52.87% of respondents indicated a value between 4 and 5 on the Likert scale, regarding their dependence on mobile devices. Male respondents had a mean score of 3.14, slightly lower than females, who had a mean of 3.6. This indicates that females were 12.77% more dependent on mobile devices than males.

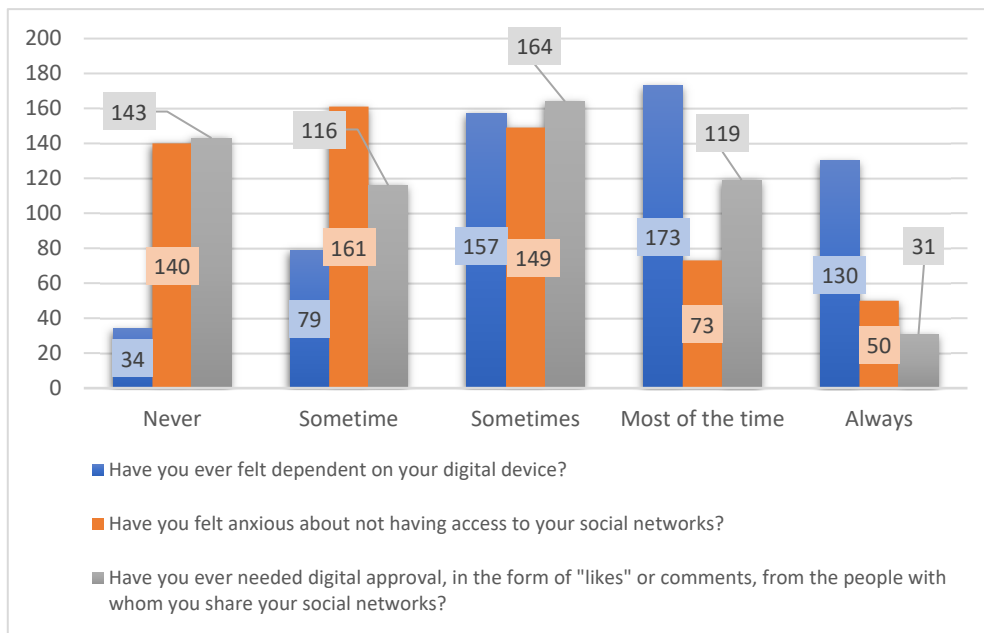


Figure 3. Dependence on device usage, anxiety about accessing social media, and the need for “Likes”.

Figure 3 also shows the level of anxiety when deprived of access to social networks. The average response was 2.52, indicating a generally low level of anxiety. However, 21.46% of respondents felt anxious when unable to access their social networks, with the average

age of these respondents being 20.46 years. Comparing the dependency and anxiety variables, a strong correlation was found ($r = 0.593$), suggesting that many individuals who felt dependent on their mobile devices also experienced anxiety when deprived of social network access.

Also, 24.95% of respondents did not feel the need for approval on social networks, while 28.62% were at a midpoint of 3, and 26.17% scored between 4 and 5 on the Likert scale. This indicates that more than a quarter of respondents felt a need for approval through social networks. A moderate correlation was found between the need for approval through “likes” and mobile device dependence ($r = 0.36$). There was also a correlation between the need for approval and anxiety when unable to access social networks ($r = 0.351$).

Social networks expand the possibilities of connecting with a large number of people. However, this can sometimes have a negative outcome and young users are apparently aware of this. As shown in Figure 4, 71.55% of respondents mistrusted the people they met through social networks. Although there was concern about being deceived by people who met online, the number of respondents who had actually experienced this was much lower. This suggests that the mistrust experienced by social network users was not necessarily based on real events.

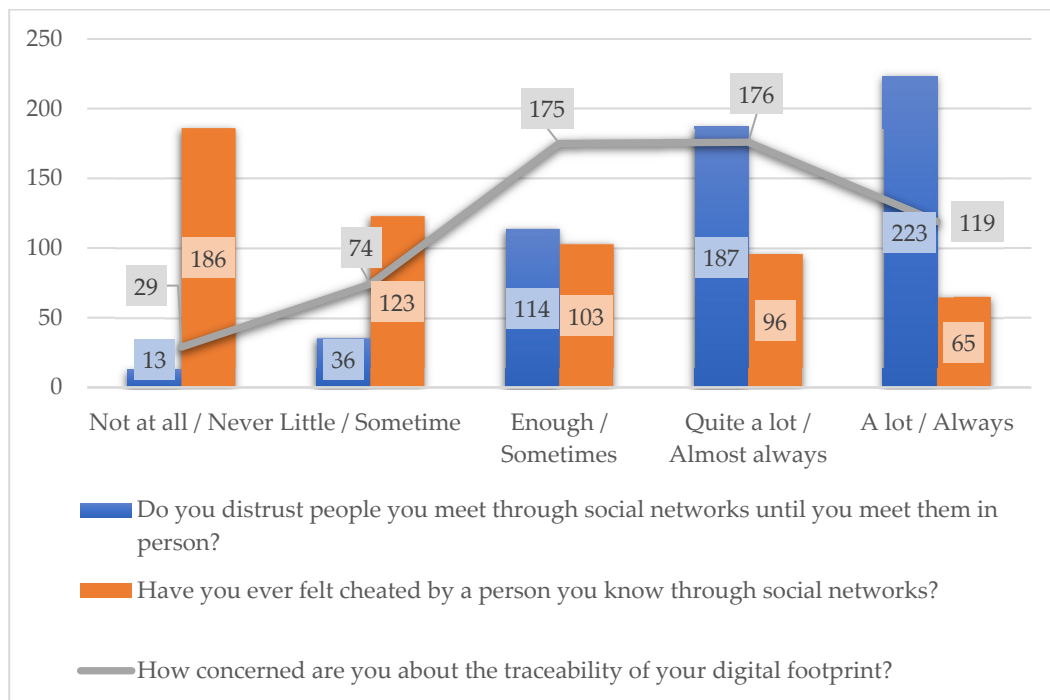


Figure 4. Distrust of strangers, feeling deceived on social media, and concern about digital footprint.

Nevertheless, 125 respondents (21.81%) answered “often” or “always” when asked if they had negative experiences with people they met through social networks. This is significant, as it means that a fifth of the sample has had bad experiences online. Despite this, no correlation was found between the two variables.

Regarding the traceability of the digital footprint (see Figure 4), the results of this item could be slightly biased, as the concept had to be explained during data collection. However, 51.48% chose 4 and 5 on the Likert scale, indicating a higher level of awareness and concern about their digital footprint.

Figure 5 shows the item referring to physical contact has an overwhelming response, with 83.24% of respondents choosing strongly agree and 8.9% choosing to agree, together summing 92.14% of the cases. This could be influenced by the recent pandemic context.

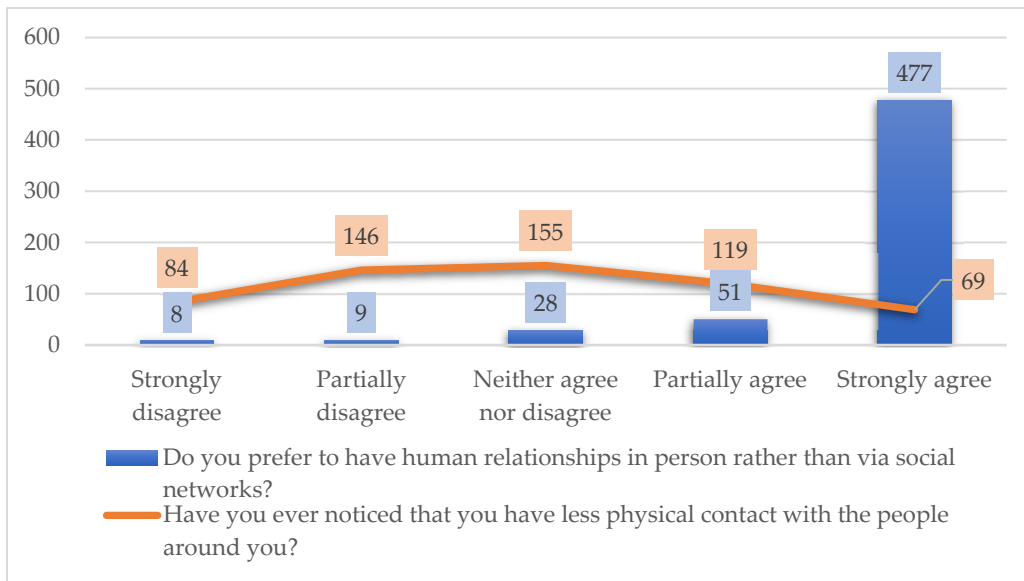


Figure 5. In-person human relationships and perceived decrease in physical contact.

In contrast, the data about physical contact were widely distributed, with 40.13% being between the values 1 and 2 on the Likert scale, which means they did not notice much change in their daily lives regarding physical contact. On the other hand, 32.8% of those surveyed noticed a decrease in their physical contact.

Figure 6 illustrates respondents' awareness of ecological footprint, most respondents (68.58%) were unaware of the degree of contamination digital platforms produce. Only 13.43% seemed to be aware of the environmental impact of consuming digital platforms. Of the 519 respondents who had a subscription to Netflix, most responded unaware, which gives a clear picture of the situation among users.

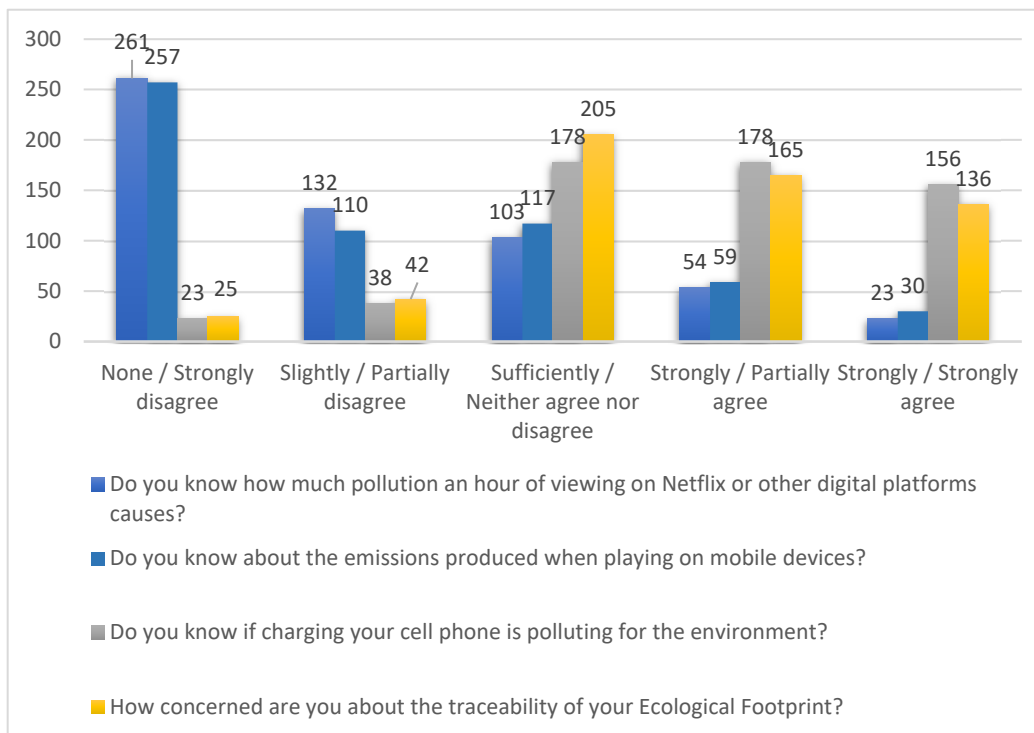


Figure 6. Degree of pollution from Netflix, consumption while gaming, pollution from charging mobile devices, and concern about ecological footprint.

Also, in relation to the use of devices to play games, there was a tendency to ignore the emissions produced, with the average response being 2.14. However, those who claimed they did not play had an average response of 4.38, which implies a high degree of awareness.

Regarding the pollution produced by mobile phones, it seems that there was greater awareness since 89.35% of the respondents placed their answers between 3 and 5 on the Likert scale. In this case, a weak correlation was found between the concern about the digital footprint and the knowledge of the pollution of mobile phones ($r = 0.24947$).

Finally, the question of the traceability of the environmental footprint seemed to be a concern for a more significant number of respondents as 52.53% of those surveyed agreed or strongly agreed. Also, 35.77% neither agreed nor disagreed, perhaps due to their ignorance of the term environmental footprint. Nevertheless, it seems that there is a growing concern about the environmental footprint among young people. A weak correlation was found concerning the footprint and the ecological footprint ($r = 0.2603$).

To conduct the Kruskal–Wallis tests, the sample was divided into three age groups: Group 1 (17–19 years), Group 2 (20–23 years), and Group 3 (24–26 years).

In the item Need for Digital Approval, a significant difference was found between Group 2 and Group 3 ($p = 0.015$). Older individuals reported a lower need for digital approval compared to the intermediate group. This suggests that as age increases, the need for digital approval decreases. The ages at which personality becomes more consolidated contribute to a reduced need for external approval.

In the item Concern About the Abusive Use of Social Media, significant differences were identified between Group 1 and Group 3 ($p < 0.001$) and between Group 2 and Group 3 ($p = 0.005$). Group 3 expressed greater concern about the long-term negative effects of social media compared to Groups 1 and 2.

In the item Anxiety about Not Having Access to Social Media, a significant difference was observed between Group 1 and Group 3 ($p = 0.041$). Interpretation: Group 1 experienced less anxiety about lacking access to social media compared to Group 3.

In the item Automation of the Use of Electronic Devices, a significant difference was found between Group 1 and Group 2 ($p = 0.021$). Group 1 demonstrated a higher level of automation in the use of electronic devices compared to Group 2.

A Dwass–Steel–Critchlow–Fligner post hoc analysis was conducted to identify specific differences across genders.

For the question regarding the traceability of the digital footprint, comparing Females vs. Males ($p = 0.008$), women exhibited greater concern than men. In the item Knowledge about the Environmental Impact of Charging a Mobile Phone, comparing Female vs. Male ($p = 0.024$), women demonstrated higher levels of knowledge compared to men. For the question regarding the use of social networks to meet romantic partners, in the comparison of Females vs. Others ($p = 0.011$), the “Other” group showed greater use of social networks for this purpose than women. Similarly, for Males vs. Others ($p = 0.027$) within the same item, the “Other” group also surpassed men in this type of usage. In the item Distrust toward acquaintances on social networks, comparing Females vs. Males ($p < 0.001$), women displayed greater distrust toward acquaintances on social networks compared to men. Regarding concerns about the consequences of social network misuse, in the comparison of Females vs. Males ($p = 0.016$), women expressed greater concern. For the measurement of anxiety due to lack of access to social networks, comparing Females vs. Males ($p < 0.001$), women experienced significantly higher levels of anxiety. Finally, in the item Dependence on Digital Devices, comparing Females vs. Males ($p < 0.001$), women reported a greater sense of technological dependence.

4. Discussion

To begin the discussion, it is essential to recall the established objectives: to analyze how young consumers of digital entertainment conceptualize sustainability; to identify the emotional consequences of digital leisure abuse among young people; and to understand students' perceptions of their use of digital leisure.

The digital transformation of the past two decades represents a monumental shift. Moreover, global events over the last two years, primarily due to the pandemic, have created an unprecedented reality (Del Moral-Pérez et al., 2021; Dyatlov et al., 2019). The shift from traditional to digital leisure has reconfigured human entertainment processes, leading to a series of consequences that have altered the understanding of human reality, especially among young people (Urcola Eceiza et al., 2022). Additionally, based on the results of this study, differentiated gender patterns have been observed.

The first notable aspect is the age at which individuals access the internet. The survey revealed that respondents first accessed the internet at approximately 12 years of age. This indicates a clear trend toward the early introduction of technology into individuals' lives. As noted by García (2021), the age of internet access decreases with each generation. Access at age 12 had a mean of 21.55 years, while access before age 12 had a mean of 20.62 years. These data reflect the current trend (Galzacorta et al., 2014), which was intensified by the pandemic reality (Moreno-Correa, 2020). The results highlight significant patterns across the analyzed ages. Group 1 is characterized by lower anxiety about not accessing social networks, greater automation in the use of electronic devices, and less concern about the long-term effects of social network abuse. Group 2 reports a higher need for digital approval and less frequent automation in device use compared to Group 1. Group 3 shows greater concern about the negative consequences of social network abuse, higher anxiety due to lack of social network access, and a lower need for digital approval.

An interesting finding of this study is the connection between the restrictive context experienced during the pandemic and the increase in social network use. However, individuals still prefer face-to-face interactions and maintaining physical contact with others, as well as seeking romantic partners in traditional environments rather than on social networks. At the same time, an increase in digital content consumption has been recorded, indicating a complex situation with limited awareness of the potential consequences of prolonged digital usage.

This occurs at a time when digital content consumption has increased. The findings demonstrate a complex situation where individuals are unaware of the consequences of unlimited digital leisure consumption. These emotional consequences for university students in Early Childhood Education, as highlighted by Álvarez-Herrero (2021), align with the 31.2% of the obtained sample. This suggests that young people's conceptualization of digital leisure varies depending on their age, fulfilling the first objective.

In a study by Carbonell and Oberts (2015), it was concluded that there is no clear relationship between social network consumption and addiction patterns. However, this conclusion contradicts the reality presented by the data, where 52.87% admitted to feeling dependent on their mobile device, and 83.73% reported knowing someone with patterns of social network addiction. This supports the positions discussed by Prieto Gutiérrez and Moreno Cámara (2015) and Fernández-Rovira (2022), as well as the trend toward anxiety generation addressed by Reyes et al. (2021).

Knowledge about the ecological footprint, as highlighted by Castillo (2007), is a growing concern among young people. However, there is a contradiction in their awareness of the emissions resulting from their digital leisure consumption. This suggests a concern that is not backed by empirical data. It is reasonable to assume that awareness of such data would increase concern in this area. Furthermore, Gutiérrez-Puebla (2018) discussed

the traceability of the digital footprint, which is also significant. The research showed that 51.48% of participants expressed high concern about their digital footprint and its medium- and long-term consequences. However, the results highlight significant patterns for women, including greater concern for the traceability of their digital footprint and greater knowledge about the environmental impact of charging devices compared to men.

The process of dehumanization, as noted by [Martínez et al. \(2017\)](#), contrasts with the generation of automatism highlighted in the study, where 84.46% of respondents expressed strong or very strong agreement. Younger participants reported the most significant data on the emergence of automatism. The dehumanization process begins with automatic processes at the expense of the rationality that accompanies an action, thereby transforming the sequence of desire-rational choice-rational action into an automatic process devoid of rational procedure ([Hechter & Kanazawa, 1997](#)). The generation of anxiety, addiction to digital leisure consumption, isolation, and lack of physical contact are some consequences of this dehumanization process, which is beginning to take root, although few respondents are aware of its true consequences.

The data analysis of the female group details a profile characterized by greater distrust toward acquaintances on social networks, heightened concern about the consequences of social network abuse, higher anxiety due to lack of social network access, and a greater sense of dependence on digital devices. These findings reflect the achievement of the second research objective by establishing a clear pattern of unintended emotional consequences. Conversely, men are characterized by lower levels of concern and anxiety across most evaluated dimensions and by less knowledge about the environmental impact of charging devices. Finally, the gender categorized as "Other" is characterized by more frequent use of social networks to meet romantic partners.

After presenting the data alongside various perspectives from authors associated with each analyzed concept, it is evident that the data examined are in a state of constant evolution. It is highly likely that, in a few years, perceptions within the scientific field and among digital leisure users will shift from the reality presented in this study. Thus, the objectives can be considered fulfilled, although perceptions on these issues are likely to vary in the future.

5. Conclusions

The study reveals that access to devices occurs increasingly at an earlier age, with no restrictions and with a growing number of hours of digital consumption. Currently, the consumption of social networks is completely normalized among young people. Studies such as those conducted by [López-Sintas et al. \(2017\)](#) on digital leisure activities among young individuals highlight several potential benefits that warrant consideration:

- Utilization of idle time: digital leisure provides an effective mechanism for young people to occupy their free time, particularly in situations where they are alone or unable to engage in face-to-face interactions with peers;
- Enhancement of social connectivity: digital platforms facilitate sustained interaction with friends and family, even in contexts of physical separation, thereby fostering a sense of connection and belonging;
- Provision of immersive engagement: the inherently captivating nature of digital content enables deep involvement, offering an immersive experience that can serve as a temporary escape from daily routines.

These findings underscore the multifaceted role of digital leisure in the lives of young individuals, serving not only as a source of entertainment but also as a tool for social and emotional support in increasingly digitalized societies.

However, the number of posts differs widely among users, due to a growing concern about the traceability of the digital footprint. Also, there is a growing concern about the emotional consequences of social media consumption, including addiction to social media. The feeling of dependence on mobile phones is growing and is understood as a problem among young people. Furthermore, there is a general feeling of mistrust when meeting other users of social networks, and they usually prefer traditional ways of meeting their romantic partners. Nonetheless, this trend declines as age increases.

Regarding the ecological footprint, there is an uneven knowledge among young adults of the ecological consequences of the consumption of digital entertainment. Young people are aware of the most visible aspects, like the footprint of the use of electricity when charging a mobile phone, but they are unaware of the emissions produced by the maintenance of servers that support digital leisure.

The generation of automatisms is a growing problem, as it directly threatens the rationalization capacity required in digital processes. This reality triggers the dehumanization processes that bring consequences as complex as anxiety, digital dependency, addiction, and even isolation. Future studies could consider introducing the term Emotional Sustainability. This term exists in architecture, design, and working environment (McDonagh, 2017), but not in digital leisure (Roldán-Castellanos et al., 2023).

Upon analyzing the results, the need to address the consequences of digital leisure consumption has emerged. Emotional sustainability has been defined as an individual's ability to cope with the internal and external pressures caused by digital leisure consumption, which directly affect their perception of the environment and their self-concept. Excessive digital leisure consumption can alter the perception of reality, including how people are perceived physically or emotionally, how cities or landscapes are viewed, or even the quality associated with certain products. This highlights more complex consequences of digital leisure addiction, beginning with a process of dehumanization, a loss of rational capacity in the face of unlimited digital consumption, and the development of anxiety and emotional dependence.

Emotional sustainability is a concept that exists in other disciplines; however, despite the use of an existing nomenclature, the concept developed through this study is distinct. The definition of emotional sustainability has led to the understanding of a dynamic and growing reality during the exploratory process, which has unveiled a series of characteristics associated with digital leisure consumption, demonstrating the existence of an emotional sustainability process. This concept must be considered in the context of digital leisure consumption to evaluate the suitability of unrestricted access, which is increasingly occurring at younger ages. The data obtained in this study indicate that emotional sustainability is challenged by the development of anxiety and a sense of dependence on mobile devices, with women experiencing the most severe consequences.

Emotional sustainability is a concept that must be integrated into our society. It cannot be overlooked that a shifting reality has transformed the way leisure is consumed. Simultaneously, this transformation has global, personal, and individual consequences in the form of addictions, the creation of automatic behaviors, the loss of rationality in everyday processes, and, in some cases, social isolation that leads to a decline in human contact and interaction. Although numerous private initiatives through entities, companies, or NGOs are attempting to mitigate the consequences of use, it is essential for authorities to begin reaching a consensus on measures that ensure real control and analyze usage impacts to establish effective strategies. The data provided by this study, along with the conceptualization of emotional sustainability that young people must develop, can serve as a starting point for addressing the unintended consequences of mass digital leisure consumption today. Certain indicators, such as mobile device dependency and anxiety,

can serve as key tools for universities to intervene through academic and psychological support services. These indicators can be leveraged to develop comprehensive strategies aimed at addressing the challenges associated with students' digital leisure consumption.

In this context, the identification and analysis of these indicators represent an opportunity for counseling and guidance departments to implement support programs designed to mitigate the adverse effects of excessive technology use. This approach not only enhances students' emotional and social well-being but also strengthens their ability to manage and navigate digital environments effectively. By providing targeted tools and resources, universities can play a proactive role in fostering a healthy balance between digital leisure and academic activities, thereby promoting a more inclusive and sustainable educational environment.

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