

Nomophobia and its Effects on the Psychosocial and Physical Health of University Students

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Abstract

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Mobile technology had an effect on the lives of all people during the 21st century. Excessive cellphone use could be considered a behavioral addiction. After the emergence of the concept of technological addiction, the term nomophobia is used to refer to cellphone dependence.

Excessive cellphone use has also raised concerns about its possible physical implications. The purpose of this quantitative, descriptive and correlational study was to investigate the knowledge university students have about nomophobia and the physical, emotional and social effects it can cause. A questionnaire was administered to 100 participants using the *Survey Monkey*© platform. The results demonstrated that 68% of participants were unaware of the term nomophobia.

However, the results reflected a significant correlation between what nomophobia is and the physical and psychosocial effects in the interviewees. Nomophobia, and the areas to which it relates, is a component that needs to be further evaluated.

Keywords: nomophobia, smartphone use, college students, technology

Introduction

In the early 1990s, cell phones were something only professionals had, especially high income entrepreneurs. In Europe, cell phones were regarded by most people as an expensive "toy" (Choliz, 2012). It was a status symbol. But it has progressively become established among the rest of the population, regardless of their socioeconomic status, as a useful and indispensable tool for organizing daily life. It is now a standard accessory of all citizens and an expression of personal style and of way of life (Demirci, Akgonul & Akpinar, 2015).

The cell phone has a set of characteristics that make it especially attractive to adolescents and university students, since it influences the socialization process and gives them autonomy with respect to their parents' control (Vargas, M., Villareal, K., Guevara, C. & Andrade, M., 2014). In addition, according to these investigators, it favors the establishment and maintenance of interpersonal relationships; facilitates the personal identity acquisition process and gives them social status. On the other hand, it is a source of leisure and recreation. All of these favors using, and even abusing and being addicted to, a tool that is not harmful in and of itself at first, but that given the special characteristics of this age group, can lead to a whole series of problems in various areas of human life (Pellow, E., Cooper, A. & Mattingly, B., 2015).

Despite the unquestionable advantages and undoubtedly positive possibilities it offers (and perhaps partly because of this), one of the main problems it can cause is the abusive or dependent use of an instrument that, in principle, has undeniable advantages over previous technologies. Cell phone dependence is one of the characteristic forms of what are currently called technological addictions (Peraman, R., 2016). The psychosocial and aggressiveness disturbances in individuals who are dependent on the cell phone are known as *nomophobia*.

The daily lives of twenty-first century people are more likely than not to be affected by cellular technology. In 2022, 7.26 billion people own a smart and feature phone, making up 91.54% of the world's population (Turner, 2022). As of 2021, 97% of people in the United States own a cellphone or similar device, of which 85% are smartphones (*Mobile Fact Sheet*, 2021). It is very attractive for the population for the following reasons: (1) it favors personal autonomy, (2) it gives social prestige, (3) it is a technological innovation, (4) it is a source of fun and entertainment, and (5) it favors the establishment and maintenance of interpersonal relationships (Ruiz, 2010). Moreover, smartphones serve as multipurpose communication devices that support their users in a wide variety of activities, such as social networking, navigating, entertainment, and information seeking (Deng et al., 2018).

The term *nomophobia* is short for “no-mobile-phone phobia” (Matoza & Carballo, 2015). It refers to the fear of not having a working cell phone or not having one on hand. This generates a psychological symptomatology that includes anxiety, distress, desperation, inattention, insecurity, stress, and even uncontrolled anger (Bragazzi, 2014). In addition, individuals prefer to interact with others through the cell phone. The inclusion of this phobia in the DSM-V was proposed in 2013 due to its psychological effects (Bragazzi, 2014).

Higher education institutions, in their pedagogical duty to educate, are under the obligation to spread information about what is considered a psychosocial disease with physiological effects. In this way, they will be able to inform their population of the possible damage caused by nomophobia in the university environment and develop a prevention model (Takao, 2014). The purpose of this study was to investigate whether students know what nomophobia is and to correlate the condition with the physical, emotional, and social effects that students at university higher education institutions may experience.

Literature Review

Psychosocial Effects of Cell Phone Use

Currently, most young university students who own a cell phone have an irrational fear (phobia) of not being able to contact other people by means of their phone (Kormendi, A., 2015). In these cases, the person feels panic and anxiety at the thought of losing coverage, not having enough battery charge or, even worse, having their cell phone damaged, broken, lost or stolen (Sansone, R. & Sansone, L., 2013).

The cell phone it becomes an indispensable tool in their day-to-day life, to the extent of not being able to control, interrupt or stop its use. A clear loss of control is observed: they constantly check the screen to see if they received a new message or a missed call or just to watch time passing by, second by second (Villanueva, V., 2012). They hold it in their hands or in their shirt or pants pocket, close to their body, to have the sensation of being in constant contact with their phone (Dixit, 2010). In general, according to García & Echaury (2014, p.5), they feel anxious when faced with the possibility of not being available or able to contact others (e.g., faced with a battery failure or the loss of the phone). When said possibility actually takes place, they describe symptoms similar to the withdrawal symptoms present in other addictions (e.g., anxiety, restlessness, moodiness, irritability, malaise, feeling of emptiness or strangeness). After a while without using it, this use is substantially increased to make up for lost time; users even resort to the cell phone (or engage in very similar behaviors such as the use of the landline or internet) to avoid their problems or withdrawal symptoms (Nikita, C., Jadhav, P. & Ajika, S., 2015). Their use is such that they stop doing other activities that they previously found pleasurable. They even stop spending the night at their friends' houses. There is a kind of paradox at play here: people use the cell phone to be in contact with others, but as time goes by,

they drift apart from people. Likewise, the cell phone lets people communicate with others, but it is an indirect type of communication, which, especially in adolescence, can lead to problems with face-to-face communication (Pellow, E., Cooper, A & Mattingly, B., 2015)

Cell phone abuse, according to Smetaniuk (2014), results in other psychosocial problems, such as the following:

- Family and social problems: arguments with those around them (e.g., due to the overuse or monetary expense); inability to maintain fluid face-to-face communications, isolation, etc.
- Academic and work problems: decreased concentration on everyday tasks due to continually receiving calls or messages; use of the telephone until late at night, leading to excessive daytime sleepiness that interferes with academic and work performance, etc.
- Health problems: insomnia, headaches, skin conditions, physical problems due to traffic accidents (due to using the cell phone while driving), etc.
- Legal problems: debts with the carriers, committing offenses by using the cell phone in situations where it is prohibited, stealing to top up the call card, etc.
- Money problems due to high phone bills.
- Problems affecting personal integrity: here we mostly mean cyberbullying, so in vogue among young people and adolescents recently.

Human introversion is another of the personality factors that could be related to cell phone use. However, it has barely been studied in scientific investigations. Introverts are people who are relatively calm, not very sociable or more socially distant, introspective, reserved, reflective, who do not usually make quick decisions, and prefer an orderly life to a risk- and chance-filled

one (Franco, 2013). Introversion could act as a factor that protects against cell phone abuse and dependence.

Self-esteem psychosocially affects cell phone abuse (Bragazzi, 2014). It is defined as the relatively stable respect and love for or evaluation of oneself, which is very closely related to self-concept and personal identity (García & Fabila, 2014). People with low self-esteem don't value themselves enough, have a negative self-concept, are insecure, and overly critical of themselves. Low self-esteem is a risk factor for addictive behaviors (Dixit, S., Shukla, H., Bhagwat, A., Bindal, A., Zaidi, A. & Shrivastava, 2010).

Some studies show that people with low self-esteem use email largely to communicate with others, since it lets them have more control over the interaction and their own image, while those with high self-esteem prefer face-to-face communication (Choliz, 2012). Since cell phone text messages and email work similarly, low self-esteem could be expected to predict the use of text messages. You could also expect greater cell phone use as another way to escape the negative emotional states linked to their self-concept.

On the other hand, impulsiveness is a multifaceted concept with four components: (1) *urgency*, defined as “the tendency to be subject to strong impulses, often when in a negative emotional state,” (2) *premeditation*, defined as “the tendency to think and reflect on the consequences of an act before participating in it,” (3) *perseverance*, defined as “the ability to concentrate on a boring or difficult task,” (4) *sensation seeking*, defined as “a tendency to enjoy doing exciting activities, along with openness to new experiences” (Elder, A., 2013). In connection with impulsiveness and cell phone addiction, a study carried out by Billieux et al. (2008) found a positive correlation between urgency and perception of cell phone dependence. In addition, it found that lack of perseverance is directly related to the length and number of calls

made per day, as well as to the perception of cell phone dependence. Likewise, it also found that urgency is the most important predictor of perception of dependence, followed by lack of perseverance (Yarto, 2012). Moreover, the results of said study also revealed that the components of impulsiveness can be potent predictors, even when controlling for anxiety and depression (World, 2011).

Perseverance was defined as the ability to remain focused on a tedious or difficult task. Peñaloza & Quintero (2012) hypothesized that perseverance is related to resistance to proactive interference, which refers to the ability of memory to resist intrusions of information that was previously relevant to a task, but has become irrelevant. Therefore, low perseverance can lead to more problems inhibiting irrelevant thoughts or memories. In the case of cell phones, it could be assumed that some people find their use helpful to fight off irrelevant thoughts (for example, thoughts related to a recent argument with a friend), which can favor more frequent cell phone use.

In short, in people with high urgency, cell phone use could be a way to satisfy impulsiveness in order to alleviate short-term negative emotional states, while in people with low perseverance, cell phone use could increase due to failure to suppress irrelevant thoughts or memories (Billieux et al., 2008).

The need for social approval is one of the motivating factors affecting cell phone abuse. *Approval motivation* is defined as the desire to produce a positive perception in others and the incentive to acquire the approval of others, as well as the desire to avoid disapproval (Linares & Quintero, 2012). For approval motivation to occur, a series of conditions must be met:

- 1) The subject must be in direct contact with a person or group of people.

- 2) Social presence has a non-directive effect, i.e., the social group does not provide direct clues as to how a person should act in a situation.

Internet addiction and cell phone addiction could have features in common, since both are tools for communicating and interacting with others, so these factors could also be associated with problematic cell phone use.

Takao and his collaborators (2009) also found that loneliness inversely predicts the time spent and the number of people an individual communicated with using the cell phone (by means of voice calls and text messages). That is, people who feel least alone are those who most use the cell phone and with the most people, perhaps because cell phone use favors their not feeling alone or because the loneliest people do not use the cell phone since their social network is small. In addition, in this study, loneliness did not predict problematic cell phone use (tolerance, cell phone use to escape other problems, abstinence, family, work, or economic [problems]).

In another study, Castells, Fernández & Galperín (2011) compared subjects who prefer to use text messages (texters) to communicate versus those who prefer to call by phone (talkers). These authors found that texters score higher on loneliness and social anxiety and are more likely to reveal their real selves through messages than through voice calls or face-to-face communication. They also found that the texters had a smaller social network and had formed a small circle of people with whom they exchanged messages frequently. Text messages allowed these people to establish new relationships, as well as to strengthen their relationships with friends and family.

On another note, Cholz (2012) also found that people with social anxiety feel more comfortable talking with others online (through social media, email, text messages, voice calls, etc.) than in face-to-face communication. However, not all authors have found the same results;

Ruiz (2010) found that people with higher loneliness scores prefer to make voice calls and assessed text messages as a less intimate method of contact, to be used only as a last resort.

On the contrary, participants with more social anxiety preferred text messages and assessed them as a means enabling self-expression and intimate contact with others. These authors argue that text messages, by delaying or eliminating audience reactions which normally accompany real-time spoken communication, offers anxious individuals the possibility of interacting with others without fear of disapproval or immediate rejection. On the contrary, lonely people prefer voice calls as a way to meet their need for intimacy, since it lets them have a more direct contact with others (Ruiz, 2010).

There is an association between intense and problematic cell phone use and depressive symptoms, anxiety, panic attacks, psychosomatic complaints, insomnia, social dysfunction, etc. For example, Yarto (2012), in a study carried out with a sample of 337 University of Salamanca university students (24% men and 74.8% women) aged 18 to 32, found that 10.4% met the criteria for pathological cell phone use, while 3.86% met the criteria for both pathological cell phone and internet use. In addition, these people were more likely to experience somatic complaints, insomnia, social dysfunction, anxiety, and depression. Garcia & Fabilia (2014) also found that adolescents with depressive symptoms have a 1.74% chance of making heavy use of their cell phones versus those with no signs of depression.

Similarly, Smetaniuk (2014), in a sample of 7,292 Finnish adolescents aged 12 to 18, found that intense cell phone use among adolescents is associated with irregular and shorter sleep patterns, as well as with greater tiredness upon waking up. In addition, among adolescents, a positive correlation was also found between heavy mobile phone use and a more negative perception of health, including psychosomatic complaints as well as musculoskeletal problems.

However, these results were only found in women. The authors attribute these results to girls' different biological and psychological development paths and to their social vulnerability.

García (2012) tells us that today's world is characterized by the dominance of Information and Communication Technologies (ICT), where the possibilities of communication between people have increased vertiginously, inevitably affecting people's lives at all levels, including cognitive and emotional aspects. He states that behaviors that verge on the pathological have also increased, such as anxiety, depression, discipline, violence, eating disorders, etc., which manifest themselves as components of emotional illiteracy (Dueñas, 2002), and show that such illiteracy has very negative effects on people and society (Goleman, 1995). Finally, the psychosocial or social consequences such as social isolation, family, school or work conflicts, failure to carry out routine life activities (loss of normal hygiene habits) and economic and legal problems, such as crimes, robberies and aggressions, should be mentioned (American Psychiatric Association, 2018).

According to Aya (2014), it is now natural to find in all spaces people with a certain level of dependence on and addiction to the use of cell phones and other technological devices, regardless of the time or the context around them. The World Health Organization points out that one in four people have disorders related to the new addictions. In Spain, it is estimated that 6-9% of internet users could have developed the addiction disorder.

Moreover, in the study called *Nomofobia en la adolescencia [Nomophobia in Adolescence]* (Los Nomos, 2016), a random sampling was carried out on 100 students, obtaining as results that 90% of students do not know what nomophobia is, 79% of students only have one cell phone while the rest have 2 cell phones, 16% use their cell phone more than 7 hours a day, 32% check their cell phone even if no messages have been received, 32% feel dependence, while 26%

sometimes feel dependence on the cell phone, 50% have had problems with their family, 13% have problems at school with teachers due to cell phone use in class, and 11% have problems with friends. Other negative effects include that 57% have had eyestrain, 10% have joint pain in their hands as well as headaches and 66% of the population sometimes loses hours of sleep due to cell phone use. Conclusion: These results are really shocking, since most of these questions regard symptoms of nomophobia; therefore, on average, 27.46% of respondents suffer or are starting to suffer from this disease (Los Nomos, 2016).

Moreover, the Fundación Universitaria del Área Andina [Andean Area University Foundation] carried out an investigation in which dependence on cell phone use and its influence on the academic performance of young university students were analyzed. The increasing use of smartphones is diverting attention and taking priority away from academic education, which is reflected in student performance. To illustrate this dependence, 462 students were consulted, of which 62.1% check their cell phone every day of their lives before going to bed, 42.6% do it while studying or doing homework and 61.3% ignore other people to concentrate on their cell phone. Even more distressing, nearly a quarter of respondents obsessively review calls, emails, social media and text messages. It is clear that the academic use of social networks is very limited. Even so, most of the students interviewed have a dependence on them, which is leading them to “academic failure that includes failing subjects, including mathematical analysis or reading and writing,” announced José Gerardo Cardona, person in charge of the research. As if that were not enough, 47.6% of students confessed to waking up earlier to be able to check their cell phones and 83.7% said that they spent very little time on academic education. Going a little further, 293 of the interviewees, 60.9% of the total, fear that life without a cell phone is boring and empty, and 303 feel anxious, nervous or depressed if they do not use it (Estudios, 2016).

Moreover, Sánchez (2013) shows that the objective of the investigation called *Nomofobia y su relación con la adicción a las redes sociales* [*Nomofobia and its Connection With Addiction to Social Networks*] aims to determine the level of nomophobia and addiction to social networks present in the students of two educational establishments of the departmental capital of Sololá with 15- to 20-year-old students. Theoretical sample consisted of 135 subjects and results were obtained by means of a questionnaire prepared specifically for the thesis study. After establishing the presence of nomophobia and social network addiction in the students, the investigators succeeded in establishing the alternative hypothesis which states that addiction to social networks can cause nomophobia. Hence, in order to benefit the students and lower the incidence of these technological and behavioral pathologies, a proposal was made for the awareness-raising workshop on rational cell phone and social network use with a psychoeducational approach with the members of the educational community.

That said, different studies have shown that these technologies are addictive and that those who abuse them experience more academic failure and more concentration and behavioral/self-control problems (Setién, 2016). According to one investigation conducted by the Fundación Universitaria del Área Andina, the growing use of these devices is distracting students at universities in Colombia. “Students are missing all the explanations of the professors because they would rather be using their cell phones. Despite the fact that professors insist that they put away the devices, they always look for ways to use them secretly,” explains José Gerardo Cardona, person in charge of the investigation and professor of the Fundación Universitaria del Área Andina, in *Tecnósfera*, 2016. As part of the study, the educational institution conducted a survey of 462 students from different universities in Pereira. The survey showed that 62.1% of young people always check their cell phone before going to sleep, 42.6% do it while studying or

doing homework and 61.3% ignore other people to concentrate on the cell phone. Moreover, the investigation evidenced that 23.3% of respondents obsessively check calls, emails, social networks and text messages (Tecnósfera, 2016).

In addition, there are groups of people for whom social networks are a way of ignoring their reality, even to the point of addiction. According to Molina & Toledo (2014), subjects with vulnerable personalities, poor social relationships and whose families have weak cohesion run a great risk of becoming addicted if they have an immediate reward habit, have the object of addiction on hand, feel pressured by the group and are subjected to stressful circumstances (school failure, emotional frustrations or competitiveness) or an existential void (social isolation or lack of goals). Thus, we should be talking about addiction-prone people, rather than saying that such people have the profile of a new technologies addict (Echeburúa & de Corral, 2012, p.21, in Molina & Toledo, 2014). Cyberaddiction is established when the child stops seeing his friends and settles in front of the screen with his video games, the teenager pays more attention to his iPhone than to his girlfriend, or the young man does not do well in his studies because he obsessively checks his email. In all these cases, clear negative interference in everyday life is present.

As in chemical addictions, people addicted to a given behavior experience a withdrawal syndrome when they cannot carry it out, characterized by deep emotional discomfort (dysphoric mood, insomnia, irritability and psychomotor agitation) (Echeburúa & de Corral, 2010, pp. 23-24, in Molina & Toledo, 2014). The study entitled *Phubbing. Conectados a la red y desconectados de la realidad. Un análisis en relación al bienestar psicológico. [Phubbing. Connected to the Network and Disconnected from Reality. An Analysis With Regard to Psychological Well-Being]* presented by Capilla (2017) aimed to analyze the extent to which

problematic telephone use affects the psychological well-being of young university students in the Autonomous Community of Extremadura, specifically the city of Badajoz. This study's population is the university students of the Degree in Electronics and Automation and the Degree in Preschool and Elementary Education. A sample was selected through non-probabilistic sampling for convenience, and consisted of 123 participants aged 19-29. The results show a high trend in the scores obtained [suggesting a correlation] between the problematic use of this device and somatic symptoms, social dysfunction and depression.

Thus, for example, Flores et al. (2015) worked on an investigation with a sample of 1,400 university students, of which 1,044 came from the Universidad Nacional San Agustín and 356 from the Universidad Católica San Pablo in Perú. The students were aged 16 to 33. The differences in cell phone addiction and its three dimensions were analyzed according to student sex and to whether they come from a public or a private university. In our study, for example, we showed that women score higher than men in tolerance and abstinence, abuse and difficulty controlling the impulse, and in the total score, but the magnitude of the effect was small in all cases, so it can be said that women are more likely to engage in problematic cell phone use. Likewise, the university students from the private university obtained higher scores in the three dimensions of cellphone addiction and in the total score, with the magnitude of the effect being considerable in all cases, except in the tolerance and abstinence dimension. That means two things: first, that this would not be a clinically significant population, but rather one with problematic cell phone use, as several specialists prefer to call cell phone addiction (Carbonell, Chamarro, Griffiths, Oberst, Cladellas & Talarn, 2012, in Flores et al., 2015). On another note, the financial situation can be a mediating factor in exaggerated, indiscriminate, problematic or

addictive cell phone consumption. This needs to be discussed in greater depth in subsequent studies.

In addition, it has been said that university students who have problems adjusting to campus life might use the internet to escape daily stress. Instead of facing the challenges of social life face-to-face, they have a greater sense of control with the use of internet social networks, email, instant messages and chats. More than 18% of university students are pathological users of the internet, and 58% recognize that its excessive use has disturbed their studies and class attendance, in addition to lowering their GPA (Kanwal & Ananddel, 2003, in Small & Vorgan, 2008, p. 69).

In the study titled *Uso y abuso del teléfono móvil en jóvenes y adolescentes [Use and Abuse of the Mobile Phone in Youth and Adolescents]*, there were 639 participants: 430 adolescents educated in public schools in the province of Barcelona and 209 young university students from the Universitat Ramon Llull (Barcelona) from different branches of the humanities: psychology, labor relations, education (elementary, special, foreign language, children's, music, physical), speech therapy and physical activity and sports sciences. All participants owned a cell phone. Ages ranged from 13 to 18 (adolescents) and 19 to 25 (young people), with the average being 15.28 for adolescents and 20.27 for young people. The mode age is 14 for adolescents and 19 for young people. In terms of gender, 50.5% of the adolescents were female and 49.5% male, and 82% of the young people were women and 18% men. As is to be expected, the general use of the cell phone significantly increases with age, that is, as time goes by, the use of the mobile becomes established. Negative consequences also increase with age. Although it is true that the abuse can correct itself on its own with active intervention by the user or by way of the recommendations of friends and family, preventive intervention in adolescence would be key for

preventing the possible negative consequences or problematic maladaptive uses which, as the results indicate, appear later. The subjective perception of cell phone addiction does not decrease with age, and 23.9% of participants consider themselves cell phone addicts, but only 5.3% of them would be in the extreme group. Perhaps the social alarm about such use is still too strong for that perception to be closer to reality. There are some cases (34 participants) in which psychological or psychoeducational intervention is necessary over and above prevention, since problematic maladaptive use is present (Beranuy et al., 2005).

In any case, cell phone addiction is a psychological, educational, cultural, social and economic problem that merits being dealt with in our locality with greater forcefulness through coverage in the media, having duly trained professionals come to grips with it clinically and investigations that help us to better understand this worldwide phenomenon (Flores et al., 2015).

Physical Effects of Cell Phone Use

The rapid expansion of cellular communications has raised several questions about the effects of its associated fields on the human body, especially on the central nervous system (Kaprana et al., 2008).

Radio frequencies and microwaves emitted by cell phones cause biological changes to various organs, such as the brain, sperm, kidneys, and others (Kumar et al., 2013). In addition, radio frequency fields can interfere with implanted medical equipment, such as heart pacemaker equipment, but [mainly through] the health effects due to this interference, rather than direct effects on the body.

Ahlbom et al. (2004) propose that cell phone use could affect acute symptoms such as headaches. These authors also state that many previous studies incorporate information related to

the intensity of use, place of use, phone use position, type of phone and period of use. They add that body warming from radio frequency exposure can result in issues including mortality from cardiovascular problems, birth defects, and the inability to perform complex tasks.

The possible relationship between cell phone use and malignant diseases such as, for example, brain cancer and leukemia, has become an important and particular cause for concern (Ahlbom et al., 2004). The central nervous system, testicles, and lenses of the eyes appear to be particularly sensitive to heat produced by exposure to radio frequencies (Ahlbom et al., 2004).

There are several symptoms reported by cell phone users. They include headaches, the sensation of heat, dizziness, visual problems, fatigue, and trouble sleeping (Ahlbom et al., 2004).

Symptoms such as headaches, feelings of discomfort, heat behind or around the ears, and difficulty concentrating during cell phone use have been reported (Sandstrom, M., Wilén, J., Oftedal, G. & Hansson, K., 2001). These authors also found statistically significant associations between call length and number of calls per day and the occurrence of sensations of heat and other neurasthenic (psychophysical) symptoms.

On another note, Ahlbom et al. (2004) propose that different types of chronic disease, such as cardiovascular diseases, have been studied in connection with exposure to radio frequencies.

Studies have shown that cell phone radiation to the brain could result in tumor formation and is more likely to occur on the side of the head where the cell phone is used (Kumar et al., 2013). Acoustic neuromas may turn out to be of great interest because they occur near where cell phones are placed during use (Kaprana et al., 2008).

However, Hutter et al. (2010) stated that prolonged high intensity cell phone use is possibly associated with the development of tinnitus, while Philip et al. (2017) established that prolonged and frequent cell phone use [and exposure to] its electromagnetic fields may be associated with hearing loss. Studies have shown that the hearing threshold rises with more than 30 minutes of cell phone use (Ramya, Karthiyanee & Vinutha, 2011).

On the other hand, Kaprana et al. (2008) state that many studies linking the effects of electromagnetic fields to health have shown associations with possible effects on the auditory system and the central nervous system to be inconclusive or contradictory. This could indicate a need to investigate this topic. The detection of biological effects resulting from cell phone use could eventually lead to building better and safer communication systems (Kaprana et al., 2008).

The cell phone addiction phenomenon has been studied for some time now in countries as diverse as the United States, Spain, Japan, Holland, Korea, Tunisia and Italy (Pedrero, Rodríguez and Ruiz, 2012). On another note, in a study carried out in Barcelona with 430 adolescents in public schools and 209 young university students (Beranuy Fargues, Sánchez Carbonell, Graner Jordania, Castellana Rosell and Chamarro Luser, 2007), 22.1% of adolescents and 27.9% of young people considered themselves to be addicted to the cell phone. In 2008 China, the first ever case of technology addiction was identified; then in 2009 in the United States, the first clinic for this pathology was opened. That Asian country is the location of the Beijing Treatment Center, which provides treatment to about 2.5 million Chinese citizens with technology addictions; most patients are young people aged 18 to 36, who are hospitalized by their relatives to overcome these problems.

According to García and Fabila (2014), in 2011 in a British Secur Envoy study, “the term *nomophobia* was coined to define the irrational fear of leaving home without a cell phone,” its

consequent antonym being *nomophilia*. This term is short for the English-language expression “no-mobile-phone-phobia,” or “fear of not having a cell phone.” This disease is extremely common among young people, according to the Centro de Estudios Especializados en Trastornos de Ansiedad [Center for Specialized Studies on Anxiety Disorders] (CEETA), with the 18-24 age group being the most likely to have it. Likewise, **8% of university students have it, according to the University of Granada (UGR).**

Therefore, technology is developed to make life easier, but it can also complicate it. Behavioral disturbances such as obsession to acquire the latest technological novelty, the replacement of personal contact by virtual communication or the need to be permanently connected to the internet have created great social alarm, aggravated in part by the lack of reference criteria on what is normal and what is not. Many of these behaviors have begun to be labeled as addictive, given that they are characterized by dependence generation and freedom curbing by restricting the range of interests, in addition to severely interfering in daily life at the family, school, social or health level (Obregón, 2015).

Similarly, it is reported that excessive cell phone use is related to sleep problems, stress and symptoms of depression (Flores & Gamero, 2015). The development of sleep disorders manifested mainly by a permanent state of alert, greater susceptibility to fatigue and the higher prevalence of stress are some of the direct consequences of excessive use on the mental health of users. Muñoz & Agustín (2005) maintain that the psychological effects of cell phone addiction include isolation from others and loneliness, behavioral and mood disturbances, compulsive behavior, communication problems, language problems and emotional problems. In this way, irresponsible cell phone use by university students causes low academic performance and increases the levels of anxiety and unhappiness; the greater the use of the technological device,

the lower the grades and the higher the level of anxiety. In the most serious cases, people can even steal and lie in order to have and use a cell phone because the addiction is so severe that it can override people's self-control (Flores, Gamero, Arias, Melgar, Sota & Ceballos, 2015).

Cell phone and social network use and abuse can have a negative impact on psychosocial, physiological, educational, social, mental, cultural, and economic levels. Therefore, in view of the identified crisis, it is pertinent to explore how higher education institutions can contribute to spreading information on proper cell phone and social network use, since [their abuse] is considered a psychosocial and physiological disease.

Cell phones have certain characteristics that could lead people to display problem behaviors in areas such as mobility, trust, leisure, social status, ease of access, establishment of social relationships and identity (Muñoz Rivas and Agustín, 2005; Bianchi and Phillips, 2005, in Britos & Brítez, 2015). Van Wielink (as cited in Aguilar, 2013) warns that the consequences of spending so much time in front of a cellular device can lead to serious physical problems, not just the disruption of social dynamics. He also specifies that social intelligence, especially in children and adults, stops growing, since afterwards it is very difficult for them to engage in face-to-face conversations (Obregón, 2015).

Theoretical Framework

The theoretical framework of this investigation was based on *Social Intelligence*, developed by Goleman (2006), in order to observe how cell phone use influences the basic skills of the social competences.

Social Intelligence

Interpersonal relationships for adolescents today become difficult because they no longer establish face-to-face communication; currently, they do it through smartphones, which causes a significant decline in their social development (Obregón, 2015). Goleman (2006) defines *social intelligence* as the human ability to relate. The origin of the social intelligence concept is found in the work of American psychologist Edward Thorndike, who in 1920 defined it as the ability to understand and direct men and women, and boys and girls, to act wisely in human relationships, and who stated that: “the best mechanic in a factory can fail as a foreman for lack of social intelligence.”

Goleman (1998) presents the social competencies, such as interaction with others through empathy and social skills. He defines *empathy* as the aptitude for understanding other people’s emotional makeup and the ability to treat people according to their emotional reactions, while the *social skills* are competence in relationship management, social networking and the ability to find common ground and to strengthen ties. *Emotional Intelligence*, a concept popularized by Daniel Due, is that intelligence which allows individuals to become aware of their emotions, to understand the feelings of others, to tolerate pressure and frustration, to accentuate the ability to work in a team and to adopt an attitude of social empathy that gives them more possibilities for personal development. It establishes two categories of personal intelligence: *intrapersonal competencies* help the individual to know himself and *social competencies* help him to relate to others; the two are complementary.

To the extent that technology commands people’s attention and diverts it towards a virtual reality, it ends up desensitizing them to those around them, making social autism one of

the most unforeseen consequences of the permanent invasion of technology in our daily lives (Goleman, 2006).

Research

Investigational Questions

The investigational questions that guided the research process were as follows:

1. What do students know about nomophobia?
2. What is the relationship between nomophobia and its psychosocial and physical effects on university students?

Investigational Design

To carry out this investigation, a correlational design was used, with the aim of establishing the relationship between nomophobia and its psychosocial effects in university students.

Population Description and Sample Selection

The investigation population was university students, mostly of Hispanic descent. The instrument was administered to a total of 100 students.

Table 1

Description of Population Distribution

Population	Gender		total	%
	F	M		
Students	50	50	100	100
Total	50	50	100	100

Description of the Instrument

Data collection was carried out using a questionnaire, which measured and quantified the variables to be investigated. The questionnaire was composed of 63 items, and it is estimated to take no more than fifteen minutes to answer. The measurement scale was a five (5) point Likert-type agreement level scale, where five (5) means ‘strongly agree,’ four (4) means ‘agree,’ three (3) means ‘neither agree nor disagree,’ two (2) means ‘disagree,’ and one (1) means ‘strongly disagree.’

The instrument was composed of the following sections:

- I. Sociodemographic information of the participants.
- II. Open question about what participants know about nomophobia.
- III. Items on participant knowledge of what nomophobia is.
- IV. Items that gathered information about the relationship of nomophobia with the physical harm to college students it causes.
- V. Items that measured the relationship between nomophobia and its psychosocial harm to university students.

Validity and Reliability of the Instrument

The validity of the investigational instrument was established using the content-validity-by-expert-judgment technique. The investigational instrument was found to have a reliability of 97%.

Investigational Results

The data and results obtained from the Survey Monkey© platform, where 100 responses to the questionnaire questions were reported, were analyzed. Table 1 shows the sex of the

participants. According to the results, most of the interviewees were female: 76% of participants.

Table 2

Sex

Sex				
	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Female	76	76.0	76.0	76.0
Male	24	24.0	24.0	100.0
Total	100	100.0	100.0	

One of the demographic questions made reference to the place of residence. According to the results obtained, the majority of participants said their place of residence was an urban area, while 43% indicated that they lived in a rural area.

Table 3

Place of Residence

Residential Area				
	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Urban residence	57	57.0	57.0	57.0
Rural residence	43	43.0	43.0	100.0

Total	100	100.0	100.0
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Another question referred to the year of study that the university participant was doing. The percentage of all participants in the fifth year of university was the mode, 26%, while 17% of participants were in their first year of study.

Table 4

Year of Studies

Year of Studies				
	Frequency	Percentage	Valid Percentage	Cumulative Percentage
First year	17	17.0	17.0	17.0
Second year	19	19.0	19.0	36.0
Third year	20	20.0	20.0	56.0
Fourth year	18	18.0	18.0	74.0
Fifth year	26	26.0	26.0	100.0
Total	100	100.0	100.0	

One of the fundamental questions of this study was intended to determine whether university students understood the concept of nomophobia. Faced with this question, participants were asked about the term. 68% indicated that they did not know the term, while 32% said they did know what nomophobia meant.

Table 5*Knowledge about Nomophobia*

Do you know what nomophobia is?					
					Cumulative
		Frequency	Percentage	Valid Percentage	Percentage
Validity	Yes	32	32.0	32.0	32.0
	No	68	68.0	68.0	100.0
	Total	100	100.0	100.0	

Pearson Correlation Between Nomophobia and Physical and Psychosocial Harm to**University Students**

Scales	Pearson
Physical harm	.242*
Isolation	.487**
Anxiety	.513**
Obsession	.436**
Compulsion	.502**
Self-esteem	.469**
Emotional intelligence	.430**
Social intelligence	.523**
Sadness	.443**
Insomnia	.500**

**Significant correlation

There was a significant correlation in each of the constructs in which they were asked about the harm caused by the cell phone. Although they do not know what nomophobia is, they proved to be experiencing physical and psychosocial damage.

Conclusions

Undoubtedly, cell phone use is an integral part of today's societies, which is not foreseen to change. Cell phones give us access to a multitude of important skills and entertainment (Redner R., & Hirst, J., 2021). Cell phone use goes beyond being a simple way to make calls. In recent years, countless relationships involving cell phone use have emerged, including the topics discussed in this study: health, psychosocial and physical effects. The study showed that the majority of students surveyed (68%) do not know what nomophobia is. It should be noted that most users who did not know what nomophobia is did not associate the questionnaire's contents with nomophobia. In their study, Cain and Malcon (2019) found that almost all students experienced a degree of nomophobia but highlighted that this could be driven by academic and personal complications. In this study, although respondents did not recognize *nomophobia* as the term for cell phone dependence, they did show characteristics of nomophobic people.

The fact that this study was carried out using a self-response questionnaire is considered a limitation, since the self-reported answers could be prejudiced beforehand. Future studies in this area should include qualitative aspects of the subject.

Nomophobia is a recent psychological term, and this disease's impact is still under study (Cain and Malcon, 2019). In this study, the correlation between nomophobia and physical aspects was clearly established.

Based on the results, the researchers believe that there is a need for the development of an educational tool to help students understand the effects of nomophobia. Furthermore, there could be an offer of workshops for the Higher Education Institutions community related to the subject of nomophobia. More articles about the subject of nomophobia in regular circulation media outlets, like newspapers and popular magazines, would be beneficial. In order to increase awareness among the Hispanic population, this article's researchers will develop a virtual forum to be held in universities in Puerto Rico and the United States. They will also create a quick reference manual about nomophobia. Last, since this research was conducted primarily with Hispanic students, they will extend the research to other ethnic and cultural populations for statistical comparison.

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