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Research article

Predictive factors of problematic smartphone use in young Spanish university students

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ABSTRACT

Smartphones have evolved from being a helpful tool in our days to be an indispensable complement. Its presence in our daily lives has grown to reach a problematic use on occasions. This fact is even more remarkable when we speak of young adults and adolescents, in which problematic situations can be identified as derived from its use. In this study, we analyze the self-perception of 409 young adults pursuing an Education university degree on the use and consumption of the smartphone via their responses to the Mobile Phone Problem Use Scale. The results show that, despite not perceiving the use of the mobile phone as problematic, some of the behaviors described by them as habitual would imply inappropriate use of the smartphone. Some outlined by the sample included mitigating loneliness, fear of isolation, or using it to feel better. Surprisingly, these are not recognized as problematic, despite being some of the most apparent indicators of misuse. The analysis of the results shows how younger populations and, mainly women, present this type of worrying and unconscious behavior. However, the increasing use of these devices within training areas offer new options to favor its proper use, mitigating the possible adverse effects of its use.

1. Introduction

In 2019, according to the Ditrendia report, in Spain, there were 51 million smartphone users. This document also indicated that 67% of the Internet connections made in that year were made from these devices. While highlighting the good times that the mobile telephony market is experiencing, this increase in connections can also become a breeding ground for harmful behaviors to develop conditioned on these devices' use and enjoyment.

On the other hand, the report mentioned above shows that smartphones have been installed in our lives, making it revolve around them since their main objective is to "help and facilitate" people's communication process (Busch and McCarthy, 2021; Zapata, 2022). However, excessive use of these devices can cause this circumstance to become a behavior problem at certain ages, given that the high use of these devices can alter our daily lives (Romero and Aznar, 2019).

It is not the objective of this article to enter into the debate on whether to talk about the problematic use of the device (Carbonell et al., 2012; Andrews et al., 2015; Simó et al., 2017, Forster et al., 2021) or addiction itself (Jeong et al., 2016; Olivencia-Carrión et al., 2016) because the debate would be extensive. What we do want to focus on and share with Jeong et al. (2016), Forster et al. (2021), Romero and Aznar (2019) and Hamdan (2021), is that the adolescent and young adult population is the one that presents a greater risk of developing a conduct disorder caused by the excessive use of the mobile phone, having become "determinants on the individual identity and so essential that they can create relationships of dependency and emotional support" (Olivencia-Carrión et al., 2016, p.110).

We share with Díaz-Vicario et al. (2019), that technologies by themselves are not an element of risk for people, and with Gamero et al. (2016) and Polo et al. (2017), that in the case of smartphones they do not generate per se a problematic use of the same, but the problematic relationship that can be established between the number of hours a day used and the behavior that derives from it (Aljomaa et al., 2016).

This excessive use can generate risky situations, leading to crimes and other types of problems arising from these technologies' abusive use. A study carried out by De-Sola et al. (2017) with young Spanish university students reflected that prolonged use of the mobile phone developed the same symptoms as an addiction such as gambling; expressly, this study indicated the existence of mood disturbances, interference with other

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activities and loss of control. Likewise, the results achieved by Kim et al. (2015) reflect the same line of interference in the youth population. We speak of difficulties in carrying out work, educational, family activities, and everyday relationships. Together with these results, it is significant that the meta-analysis carried out by Jiaxin et al. (2020) confirms that problematic use of the smartphone, in the research published to date, is associated with insufficient and inadequate sleep, depression, anxiety or perception of loss of control. As we can see, these elements are also common to other problematic uses or non-technological addictions (Echenburúa and del Corral, 2010; Echeburúa, 2012). Along with the presence of the "FOMO" (Fear of Missing Out) syndrome, where the individual feels that he or she is missing something of what is happening around them if they don't read or answer a message (Przybylski et al., 2013; Servidio, 2021).

However, the device also has a series of advantages, such as promoting socialization, the possibility of being in continuous communication with peer groups, family, work colleagues, etc., the chance of being able to use it at any time and place (Busch and McCarthy, 2021; Rodríguez and Estrada, 2019). Besides, its multiple educational uses (Alonso-García et al., 2015; Fombona and Roza, 2016), which include seeking information or collaborating with colleagues (Polo et al., 2017; Martínez, 2019), along with covering our needs in moments of boredom, or as our mode of entertainment (Besolí et al., 2018; de la Villa and Suárez, 2016). Young people see the mobile phone as an integral part of who they are and consider it an essential part of themselves (Roberts et al., 2015), hence investing in research in this population and environment.

This article brings to the fore the self-perception that young university adults have about their use and consumption of smartphones. Through the application of the Mobile Phone Problem Use Scale (MPPUS), proposed by López-Fernández et al. (2012), the opinions of a group of 409 (N = 409) university students from a College of Education were obtained. The study sought to describe the aspects of smartphone use that can lead to its problematic use.

2. Methodology

The proposed research design is a cross-sectional survey and based on the ex-post-facto typology (Pérez-Juste et al., 2012). Its general objective is to describe opinions on aspects that transcend to the mobile phone's problematic use, made by university students of degrees related to the educational and social field. To respond to this objective, the Mobile Phone Problem Use Scale (MPPUS) instrument, proposed by López-Fernández et al. (2012), is used, as indicated above. This instrument is a validated and reliable Spanish adaptation of the original created by Bianchi and Phillips (2005), with a modification of the measure in the Likert scale with five options (1 totally disagrees and 5 totally agree), following the parameters of Matas (2018).

From the analysis of the problem mentioned above, the following working hypotheses emerge:

H1. There are differences in the problematic use of the smartphone around the gender variable in favor of women.

H2. There are no differences in the problematic use of the mobile device according to age.

H3. There are no differences in the problematic use of the smartphone taking the degree in progress as a variable.

This questionnaire is implemented for the understanding of functional or dysfunctional use in Spanish adolescents and young adults. It consists of 27 items, with 26 grouped in a single factor according to initial data obtained by an Exploratory Factor Analysis (EFA). The value KMO = .89 and Barlett test of sphericity χ^2 (351) = 3660.162 y $p < .001$ supported the correlation and significance of the items (when we eliminated item 1 "all my friends have a mobile phone"). The instrument's reliability determined an α Cronbach of .90, which translates into a remarkable internal consistency analysis (Mateo, 2012).

In order to apply the guidelines of the ethical code that governs research with human beings in Spain. In this research, the guidelines set by the Helsinki Declaration of 1964 and Royal Decree 1720/2007 have been followed and applied to the instrument, where the data protection regulations are developed for participants in general in any research in Spain.

During a semester the data were collected using a paper-based questionnaire. All the questionnaires were administered in groups using the natural class grouping of students. The students participation were voluntaries, and the questionnaire was anonymous. The university's research ethics committee (BIOETHICS AND BIOSECURITY COMMITTEE) approved the study.

The sample selection was carried out employing a non-probabilistic convenience sampling (Álvarez and Moral, 2020). A total of 409 university students (Female, N = 327, and 80%; Males, N = 82, and 20%) majoring in degrees towards the sciences of education and social ambit participated. More specifically, 198 (48.4%) students are majoring in Early Childhood Education; 164 (40.1%) in Elementary Education; and 47 (11.5%) in Social Education; of which 80% (N = 327) are female, and 20% are males (N = 82); with a median age of 21.01 years (SD = 3.312) where 356 have between 18 and 23 years old (87%), 43 between 24 and 29 years old (43%), and 10 are over 29 years old (2.4%) as shown and distributed in Table 1. The combination of two different universities allows us to draw a picture closer to the reality worked in the context of the problematic use of smartphones, given that the social and geographical contexts are different, as well as the academic needs.

In relation to the profile of problematic use manifested by the sample, the score was obtained through the MPPUS instrument (Álvarez and Moral, 2020; Ruiz, 2016), taking into account that the measurement scale was structured between 1 and 5 with 26 items, so the rating range oscillated between a minimum of 26 and a maximum of 130 (M = 65.51; SD = 15.98). In this way, it can be divided into four bands (occasional, regular, at risk, and problematic use) to attend the use of the smartphones (Chow et al., 2009; Denis-Rodríguez et al., 2018) and the 15, 80 and 95 percentiles (Puerta-Cortés and Carbonell, 2014).

The data reflect that 14.7% of the participants in the study are in the occasional category (with a range between 34 and 48, N = 60, M = 42.23, SD = 4.374); 64.3% state that they make a regular use (with an interval between 49 and 78, N = 263, M = 63.22, S.D. = 7919); 15.9% were in the use at risk band (with an interval between 79 and 93, N = 65, M = 84.88, S.D. = 4.129); and, finally, 5.1% report problematic use (with an interval between 94 and 122, N = 21, M = 100.86, S.D. = 6988). Therefore, the defining characteristics, to these groups are in Table 2.

The results are presented according to two categories of analysis. First, we give the descriptive analysis of the identification variables, as well as the other items from the questionnaire and the dimensions that group them. In said descriptive analysis, the means and standard deviations of the dimensions under study are used, along with the most representative items from the dimensions. Also, we study the statistical

Table 1. Sample distribution for degree, age, and gender.

DEGREE	AGE					
	Between 18 to 23 years		Between 24 to 29 years		More than 29 years	
	Female N (%)	Male N (%)	Female N (%)	Male N (%)	Female N (%)	Male N (%)
Early Childhood Education	156 (38.1%)	11 (2.7%)	26 (6.4%)	2 (0.5%)	3 (0.7%)	0
Elementary Education	96 (23.5%)	55 (13.4%)	3 (0.7%)	5 (1.2%)	3 (0.7%)	2 (0.5%)
Social Education	34 (8.3%)	4 (1.0%)	5 (1.2%)	2 (0.5%)	1 (0.2%)	1 (0.2%)

Note. Source: Own elaboration.

differences in order to establish possible relationships between the variables. This analysis was performed based on the differences of means for independent samples, as a function of gender using a Student's T-test (n.s. = . 05); and the degree and age through an ANOVA test (n.s. = . 05). To analyze the data, SPSS version 25 and Jasp statistical packages were used.

3. Results

The analysis of the descriptive results is shown in Table 3, where it can be observed that the participants in this study were more in agreement with the statements of using the mobile to talk to others when they felt lonely or isolated (M = 4.12; SD = 1144); if they did not have a mobile phone, it would be difficult for their friends to contact them (M = 3.49; SD = 1.245); and, the time they spend with the mobile phone has increased in the last year (M = 3.44; SD = 1.209). At the same time, statements indicating more disagreement included implying that they usually dream that they use the mobile (M = 1.10; SD = . 395); or get in a bad mood if they have to turn off the smartphone in class, during meals, or at the movies (M = 1.41; SD = . 765); and try to hide from others the time they spend talking on their smartphone (M = 1.53; SD = . 854).

On the other hand, the inferential analysis was performed based on the differences of means for independent samples, as a function of gender using a Student's T-test (n.s. = . 05); and the degree and age through an ANOVA test (n.s. = . 05), the results of which are shown below.

About the gender variable, statistically significant differences were seen in 4 of the 26 items studied (see Table 4).

Women (M = 3.07; SD = 1.403) agree more with the statement "I find it difficult to turn off the mobile phone", t (407) = 2.427 and p = 0.016; than men (M = 2.65; SD = 1.460). Likewise, in the idea «I am hooked on the mobile phone for longer than I would like», t (407) = 2.266 and p = .024, women (M = 3.26; SD = 1.219) claim to be more in agreement than men (M = 2.91; SD = 1.239). In the statement "when I have felt bad, I have used the mobile to feel better", t (407) = 2.514 and p = .012, they are also the ones who grant a greater degree of agreement (M = 3.05; SD = 1.267) than they (M = 2.66; SD = 1.219). Finally, «I have tried to spend less time with the mobile, but I am unable», t (407) = 2.187 and p = .029, where the students (M = 2.35; SD = 1.167) show a greater agreement than the students (M = 2.04; SD = 1.105).

Considering the degree that the students are studying, an ANOVA test (n.s. = . 05) was carried out, the results of which are shown in Table 5.

The results show that there are significant differences depending on the degree with respect to the statement "the time I spend on the mobile has increased in the last year" F (2,406) = 4.047, p = .018, ηv2 = 0.02. Multiple comparisons indicate that there are significant differences between the group enrolled in Early Childhood Education, and that of Social Education t (406) = 2.831 and p = .015; in the same way, between Elementary Education and Social Education t (406) = 2.407 and p = .049. While there are no differences in said variable between the remaining combinations of groups.

On the other hand, for the students who are in Elementary Education, it is found that there is a statistically significant effect in the statement "my performance has decreased as a result of the time I spend with the mobile phone", F (2,406) = 3.234, p = 0.040, η2 = 0.02, compared to the students who study Early Childhood Education, t (406) = 2.536 and p = 0.034; not causing differences in the other binary groups.

Finally, the results obtained in the analysis of means through an ANOVA test (n.s. = . 05) as a function according to age are:

Table 6 shows that there are significant differences in the age variable in the statement "I have used my mobile to talk to others when I felt alone or isolated", F (2,406) = 10.021, p < .001, η2 = 0.04, between people between 18 and 23 years old, t (406) = 4.393 and p < .001, and those over 29 years old; in the same way, those who are between 24 and 29 years old, t (406) = 3.504 and p = .002 claim to be more in agreement with this statement than those who are over 29 years old. For the rest of the comparisons, there are no significant differences.

While Item 6 "I spend my time with my mobile, when I should be doing other things, and this causes me problems". However, there is a statistically significant effect, and the applied post hoc tests do not show significance between the comparison of groups, thus observing only the main effect (F (2,406) = 3.589, p = .028, η^2 = 0.02).

Finally, in item 15, "when I have felt bad I have used the mobile to feel better", there is a main effect, F (2,406) = 7.198, p = .001, η2 = 0.03, where multiple comparisons indicate that there are significant differences among people between 18 and 23 years old, t (406) = 3.070 and p = .007, and those between 24 and 29 years old. There are no more comparisons.

There are no significant results in comparing gender, degree, and age with the total score of the MUPPS. The data do not reflect relevance in the categories occasional, regular, at-risk, or problematic use of the smartphone.

4. Discussion and conclusions

As we have already indicated above, using a mobile digital device does not lead to the development of a behavior or behavior disorder and has numerous advantages (Błachnio et al., 2019; Álvarez and Pulido--González, 2022). The question is to detect what has occurred or is occurring. For this, an examination of conscience is necessary, which not everyone is willing to carry out because perhaps the result would surprise them. In any case, what is proven is that the excessive number of hours spent with the mobile, the tablet, or the console is a predictor of problematic use of the said device (Busch and McCarthy, 2021; Forster et al., 2021; Marín et al., 2018; Ruiz, 2016; Romero and Aznar, 2019; Ruiz--Palmero et al., 2019).

Table 2. Characteristics of the sample by categories of functionality or dysfunctionality in the use of the smartphone.

		1	2	3	4	Total
		N (%)	N (%)	N (%)	N (%)	N
GENDER	Female	44 (13.5%)	211 (64.5%)	58 (17.7%)	14 (4.3%)	327
	Male	16 (19.5%)	52 (63.4%)	7 (8.5%)	7 (8.5%)	82
DEGREE	Early Childhood Education	27 (13.6%)	131 (66.2%)	31 (15.7%)	9 (4.5%)	198
	Elementary Education	23 (14.0%)	106 (64.6%)	26 (15.9%)	9 (5.5%)	164
	Social Education	10 (21.3%)	26 (55.3%)	8 (17.0%)	3 (6.4%)	47
AGE	Between 18 to 23 years	46 (12.9%)	235 (66.0%)	56 (15.7%)	19 (5.3%)	356
	Between 24 to 29 years	9 (20.9%)	25 (58.1%)	8 (18.6%)	1 (2.3%)	43
	More than 29 years	5 (50.0%)	3 (30.0%)	1 (10.0%)	1 (10.0%)	10

Note. The number 1 corresponds to occasional use (14.7% total); number 2 corresponds to regular use (64.3% total); number 3 corresponds to at risk use (15.9% total); and 4 to problematic use (5.1% del total), manifested with the smartphone.
Source: Own elaboration

Table 3. Descriptive results.

Item	N	Min	Max	M	SD
Item 2. I have used my mobile to talk to others when I felt lonely or isolated	409	1	5	4.12	1.144
Item 3. If I did not have a mobile, it would be difficult for my friends to contact me	409	1	5	3.49	1.245
Item 4. The time I spend on my mobile has increased in the last year	409	1	5	3.44	1.209
Item 5. The use of the mobile phone has taken away my sleep hours	409	1	5	3.36	1.356
Item 6. I use my time with my mobile when I should be doing other things, and this causes me problems	409	1	5	3.22	1.163
Item 7. I find it difficult to turn off the mobile.	409	1	5	2.99	1.423
Item 8: When I'm on the phone, and I'm doing something else, I get carried away by the conversation and don't pay attention to what I'm doing	409	1	5	3.12	1.110
Item 9. I find myself hooked on my mobile for longer than I would like	409	1	5	3.19	1.229
Item 10. My friends do not like that I have my mobile off	409	1	5	2.55	1.302
Item 11. If I am not reachable, I worry about the idea of missing a call	409	1	5	2.60	1.295
Item 12. I feel nervous if I spend time without consulting my messages or if I have not connected my mobile	409	1	5	2.55	1.265
Item 13. I feel lost without my mobile	409	1	5	2.66	1.247
Item 14. I have been told that I spend too much time with my mobile	409	1	5	3.02	1.357
Item 15. When I have felt bad, I have used the mobile to feel better	409	1	5	2.97	1.266
Item 16. My friends and family complain because I use my mobile a lot	409	1	5	2.75	1.285
Item 17. I have tried to spend less time with my mobile, but I am unable	409	1	5	2.29	1.161
Item 18. More than once, I have found myself in a hurry because my mobile has started ringing in a class, cinema, or theater	409	1	5	2.30	1.421
Item 19. I never have enough time for mobile	409	1	5	2.13	1.002
Item 20. My performance has decreased as a result of the time I spend with my mobile	409	1	5	2.06	1.045
Item 21: I have spent more than I owed or could afford	409	1	5	1.67	1.048
Item 22: Sometimes I would rather use my mobile than deal with other more urgent issues	409	1	5	1.76	1.036
Item 23: I have discomforts associated with using my mobile	409	1	5	1.66	.937
Item 24: I usually arrive late when I stay because I'm hooked on my mobile when I shouldn't	409	1	5	1.58	.954
Item 25: I get in a bad mood if I have to turn off my mobile in classes, meals, or at the movies	409	1	5	1.41	.765
Item 26: I have tried to hide from others the time I spend talking on my mobile	409	1	5	1.53	.854
Item 27: I dream about my mobile phone	409	1	5	1.10	.395

Note. Source: Own elaboration.

Table 4. T-Student test results on Gender.

Item	GENDER		
	Female	Male	T-Student; p-value
	N; M (SD)	N; M(SD)	
Item 2	327; 4.17 (1.099)	82; 3.91 (1.298)	T = 1.629; p = .106
Item 3	327; 3.45 (1.230)	82; 3.63 (1.301)	T = −1.201; p = .230
Item 4	327; 3.47 (1.190)	82; 3.32 (1.285)	T = 1.010; p = .313
Item 5	327; 3.41 (1.351)	82; 3.20 (1.374)	T = 1.264; p = .207
Item 6	327; 3.26 (1.125)	82; 3.06 (1.299)	T = 1.366; p = .173
Item 7*	327; 3.07 (1.403)	82; 2.65 (1.460)	T = 2.427; p = .016
Item 8	327; 3.11 (1.076)	82; 3.16 (1.242)	T = −0.345; p = .731
Item 9*	327; 3.26 (1.219)	82; 2.91 (1.239)	T = 2.266; p = .024
Item 10	327; 2.59 (1.330)	82; 2.40 (1.174)	T = 1.169; p = .243
Item 11	327; 2.66 (1.308)	82; 2.37 (1.222)	T = 1.848; p = .065
Item 12	327; 2.61 (1.294)	82; 2.33 (1.123)	T = 1.772; p = .077
Item 13	327; 2.71 (1.233)	82; 2.46 (1.288)	T = 1.581; p = .115
Item 14	327; 3.08 (1.338)	82; 2.80 (1.418)	T = 1.642; p = .101
Item 15*	327; 3.05 (1.267)	82; 2.66 (1.219)	T = 2.514; p = .012
Item 16	327; 2.78 (1.278)	82; 2.61 (1.312)	T = 1.072; p = .284
Item 17*	327; 2.35 (1.167)	82; 2.04 (1.105)	T = 2.187; p = .029
Item 18	327; 2.24 (1.392)	82; 2.55 (1.517)	T = −1.754; p = .080
Item 19	327; 2.16 (1.000)	82; 2.04 (1.012)	T = .989; p = .323
Item 20	327; 2.03 (1.028)	82; 2.17 (1.109)	T = −1.062; p = .289
Item 21	327; 1.66 (1.017)	82; 1.71 (1.170)	T = −0.337; p = .736
Item 22	327; 1.71 (0.992)	82; 1.96 (1.181)	T = −1.774; p = .079
Item 23	327; 1.65 (0.941)	82; 1.68 (0.928)	T = -0.299; p = .765
Item 24	327; 1.58 (0.943)	82; 1.59 (1.006)	T = −0.037; p = .971
Item 25	327; 1.42 (0.750)	82; 1.37 (0.824)	T = .529; p = .597
Item 26	327; 1.55 (0.870)	82; 1.44 (0.787)	T = 1.085; p = .278
Item 27	327; 1.09 (0.381)	82; 1.15 (0.448)	T = −1.016; p = .312

Note. Source: Own elaboration.

Through the literature on the subject and in light of the findings, we can respond to the initial objective by indicating that we consider that the young university students surveyed present a problematic use of the smartphone (Marín et al., 2019; Randjelovic et al., 2021; Romero and Aznar, 2019; Ruiz-Palmero et al., 2019), given that they claim to use their mobile phones to talk to their friends when they feel alone, isolated (Ishfaq et al., 2011; Besolí et al., 2018; de la Villa and Suárez, 2016).

In light of the findings found and following the literature on the subject, we can respond to the initial objective by indicating that the general agreement with some of the most representative Items could confirm that the young university students surveyed make a problematic use of the smartphone (Marín et al., 2019; Romero and Aznar, 2019; Ruiz-Palmero et al., 2019), coinciding with studies by other authors when affirming its use to solve their feeling of loneliness (Ishfaq et al., 2011; Besolí et al., 2018; de la Villa and Suárez, 2016).

It is relevant that the students consulted think that if they did not have the mobile device, it would be difficult for them to contact other people (Moral and Suarez, 2016; Marín et al., 2018; Romero and Aznar, 2019), so we could find ourselves with the possibility that many of our students tend to develop the *FOMO* syndrome (Przybylski et al., 2013; Olivencia-Carrión et al., 2016; Servidio, 2021).

On the other hand, the results obtained for the increase in smartphone use may be subject to the ubiquity of the device, which allows it to be used in communication and the development of study subjects (Fombona and Roza, 2016). Perhaps this high university education presence is contributing to the increase in hours employed and fostering said problematic behavior.

As we indicated previously, factors such as sleeping poorly or having difficulties falling asleep or dreaming about using the mobile phone have also manifested themselves as techno-addictive behavior elements (Griffiths, 1995; Aljomaa et al., 2016). However, the participants in our study indicate that they do not share agreement with these aspects, as was observed in previous works by Lee et al. (2014), Marín et al. (2018) and unlike those of van der Schuur et al. (2019). Along these lines, we find that aspects as routine as going to the movies, eating with friends and family, or attending class and having to turn off the smartphone are

Table 5. ANOVA test results according to the degree.

Item	DEGREE			
	Early Childhood Education	Elementary Education	Social Education	F; p-value
	N; M (SD)	N; M(SD)	N; M(SD)	
Item 2	198; 4.23 (1.054)	164; 3.95 (1.272)	47; 4.23 (0.983)	F = 2.913; p = .055
Item 3	198; 3.61 (1.199)	164; 3.42 (1.329)	47; 3.19 (1.076)	F = 2.560; p = .079
Item 4	198; 3.53 (1.195)	164; 3.46 (1.195)	47; 2.98 (1.242)	F = 4.047; p = .018
Item 5	198; 3.30 (1.354)	164; 3.49 (1.318)	47; 3.19 (1.484)	F = 1.369; p = .256
Item 6	198; 3.13 (1.103)	164; 3.34 (1.205)	47; 3.19 (1.245)	F = 1.467; p = .232
Item 7	198; 3.06 (1.455)	164; 2.91 (1.394)	47; 2.91 (1.396)	F = .536; p = .586
Item 8	198; 3.12 (1.035)	164; 3.12 (1.200)	47; 3.11 (1.108)	F = .004; p = .996
Item 9	198; 3.23 (1.224)	164; 3.10 (1.230)	47; 3.32 (1.253)	F = .839; p = .433
Item 10	198; 2.56 (1.308)	164; 2.51 (1.313)	47; 2.68 (1.253)	F = .307; p = .736
Item 11	198; 2.65 (1.292)	164; 2.49 (1.308)	47; 2.79 (1.250)	F = 1.265; p = .283
Item 12	198; 2.47 (1.199)	164; 2.59 (1.320)	47; 2.74 (1.343)	F = .970; p = .380
Item 13	198; 2.67 (1.266)	164; 2.63 (1.273)	47; 2.68 (1.086)	F = .050; p = .952
Item 14	198; 3.05 (1.330)	164; 3.09 (1.376)	47; 2.72 (1.394)	F = 1.347; p = .261
Item 15	198; 3.06 (1.259)	164; 2.88 (1.262)	47; 2.94 (1.309)	F = .901; p = .407
Item 16	198; 2.80 (1.282)	164; 2.79 (1.275)	47; 2.36 (1.293)	F = 2.389; p = .093
Item 17	198; 2.33 (1.157)	164; 2.24 (1.183)	47; 2.26 (1.113)	F = .255; p = .775
Item 18	198; 2.28 (1.415)	164; 2.35 (1.438)	47; 2.23 (1.417)	F = .155; p = .856
Item 19	198; 2.17 (1.011)	164; 2.10 (0.995)	47; 2.11 (1.005)	F = .197; p = .821
Item 20	198; 1.93 (1.003)	164; 2.21 (1.067)	47; 2.06 (1.092)	F = 3.234; p = .040
Item 21	198; 1.60 (0.906)	164; 1.79 (1.202)	47; 1.60 (1.014)	F = 1.631; p = .197
Item 22	198; 1.75 (1.005)	164; 1.82 (1.102)	47; 1.60 (0.925)	F = .899; p = .408
Item 23	198; 1.60 (0.905)	164; 1.73 (0.987)	47; 1.64 (0.895)	F = .801; p = .450
Item 24	198; 1.54 (0.893)	164; 1.65 (1.054)	47; 1.51 (0.831)	F = .765; p = .466
Item 25	198; 1.46 (0.822)	164; 1.35 (0.707)	47; 1.36 (0.705)	F = .949; p = .388
Item 26	198; 1.50 (0.835)	164; 1.51 (0.787)	47; 1.72 (1.117)	F = 1.364; p = .257
Item 27	198; 1.09 (0.400)	164; 1.13 (0.422)	47; 1.06 (0.247)	F = .926; p = .397

Note. Source: Own elaboration.

not perceived as a problematic situation either. The sample consulted also does not consider, in general, that they should hide the number of hours they spend using the mobile phone, unlike the data collected by Kim et al. (2015), who point out this link.

It is interesting to see that it is the youngest students (Smith, 2015; Arandas et al., 2017; Marín et al., 2018) and more specifically females, who present this tendency to problematic mobile use (Gamero et al., 2016; Olivencia-Carrión et al., 2016; Polo et al., 2017; Roberts et al., 2014; Ruiz-Palmero et al., 2019), so it could be indicated that there is a difference in the mobile phone use around gender and age according to which reflected in the works of Choliz and Villanueva (2011), Marín et al. (2018) and Rial et al. (2015) and Busch and McCarthy (2021) and unlike the data collected by Demirhan et al. (2016), González and Estévez (2017) and Romero and Aznar (2019), who point out that both variables are not predictors of problematic mobile use. It could be intuited that women present this possible behavioral disorder (APA, 2013), mainly due to the satisfaction they find in using it, as well as the security that the device itself transmits to them by covering the loneliness they may feel in certain times of the day (Hidalgo-Fuentes, 2021).

Regarding gender, females are the ones who have no problem in assuming that they have problematic mobile use (Busch and McCarthy, 2021; Randjelovic et al., 2021). In the analyzed sample, they assume, with a greater degree of agreement, the mobile's possible problematic use. All this leads to accepting the proposed hypothesis 1. H1 (*There are differences in the problematic use of the smartphone around the gender variable in favor of women)*.

About the age variable, it should be borne in mind that it is the 18–23 years range (mainly) that most openly confirms problematic use of the device, agreeing with statements such as:

"I spend my time with my mobile device when I should be doing other things, and this causes me problems"; "I have used the mobile to talk to others when I felt lonely or isolated"; "When I have felt bad, I have used my mobile to feel better". Therefore, we can conclude that this may be caused because it is in this age group that the student body lives more autonomously, either outside of their home or by enjoying less parental control (Marín et al., 2018; Moral and Suarez, 2016; Rial et al., 2015). Based on this, the second proposed hypothesis (*There are no differences in the problematic use of the mobile device according to age*) must be rejected because divergences exist concerning this variable.

Finally, we want to make special mention of the University Degree under study by the participants. It has been corroborated, as in the research carried out by Marín et al. (2018) in another Spanish university, that it is the students pursuing the degree of Degree Early Childhood Education who present a score within the range of problematic mobile use compared to those who study Elementary Education Degree or Social Education Degree. But it is also significant that this degree is the one with a larger female sample, so it is evidenced that gender is a crucial element in determining a behavior associated with problematic use of the smartphone. This conclusion is also supported by the more significant agreement on the part of the females with statements such as: "I find it difficult to turn off my mobile phone"; "I find myself hooked on my cell phone for longer than I would like"; "When I have felt bad, I have used my mobile to feel better"; "I have tried to spend less time with my mobile, but I am unable". These aspects are not reflected in the study by Romero and Aznar (2019). In our case, the hypothesis raised can't be confirmed (*There are no differences in the problematic use of the smartphone taking the degree in progress as a variable*).

Table 6. ANOVA Test results according to age.

Item	AGE			
	From 18 to 23 years	From 24 to 29 years	More than 29 years	F; p-value
	N; M (D.T.)	N; M(D.T.)	N; M(D.T.)	
Item 2	356; 4.18 (1.100)	43; 3.98 (1.205)	10; 2.60 (1.430)	$F = 10.021$; $p < .001$
Item 3	356; 3.49 (1.248)	43; 3.65 (1.173)	10; 2.60 (1.174)	$F = 2.943$; $p = .054$
Item 4	356; 3.44 (1.196)	43; 3.47 (1.241)	10; 3.30 (1.636)	$F = .076$; $p = .927$
Item 5	356; 3.37 (1.318)	43; 3.47 (1.533)	10; 2.70 (1.829)	$F = 1.324$; $p = .267$
Item 6	356; 3.27 (1.138)	43; 3.00 (1.215)	10; 2.40 (1.506)	$F = 3.589$; $p = .028$
Item 7	356; 2.99 (1.394)	43; 3.00 (1.604)	10; 2.80 (1.751)	$F = .088$; $p = .916$
Item 8	356; 3.10 (1.091)	43; 3.19 (1.160)	10; 3.40 (1.578)	$F = .444$; $p = .642$
Item 9	356; 3.17 (1.194)	43; 3.40 (1.330)	10; 3.00 (1.944)	$F = .772$; $p = .463$
Item 10	356; 2.58 (1.303)	43; 2.53 (1.334)	10; 1.70 (0.823)	$F = 2.234$; $p = .108$
Item 11	356; 2.60 (1.271)	43; 2.67 (1.459)	10; 2.40 (1.506)	$F = .190$; $p = .827$
Item 12	356; 2.54 (1.256)	43; 2.65 (1.361)	10; 2.30 (1.252)	$F = .334$; $p = .716$
Item 13	356; 2.68 (1.247)	43; 2.47 (1.241)	10; 2.80 (1.317)	$F = .620$; $p = .539$
Item 14	356; 3.07 (1.328)	43; 2.77 (1.477)	10; 2.40 (1.713)	$F = 2.068$; $p = .128$
Item 15	356; 3.06 (1.267)	43; 2.44 (1.140)	10; 2.10 (0.876)	$F = 7.198$; $p = .001$
Item 16	356; 2.79 (1.274)	43; 2.53 (1.316)	10; 2.20 (1.476)	$F = 1.666$; $p = .190$
Item 17	356; 2.28 (1.131)	43; 2.30 (1.319)	10; 2.30 (1.567)	$F = .006$; $p = .994$
Item 18	356; 2.35 (1.429)	43; 2.07 (1.404)	10; 1.60 (0.966)	$F = 2.016$; $p = .135$
Item 19	356; 2.14 (0.992)	43; 2.07 (1.078)	10; 2.10 (1.101)	$F = .109$; $p = .897$
Item 20	356; 2.09 (1.047)	43; 1.93 (1.055)	10; 1.60 (0.843)	$F = 1.449$; $p = .236$
Item 21	356; 1.68 (1.064)	43; 1.70 (0.989)	10; 1.40 (0.699)	$F = .353$; $p = .703$
Item 22	356; 1.79 (1.042)	43; 1.47 (0.797)	10; 2.20 (1.476)	$F = 2.782$; $p = .063$
Item 23	356; 1.65 (0.902)	43; 1.74 (1.217)	10; 1.40 (0.843)	$F = .566$; $p = .568$
Item 24	356; 1.60 (0.958)	43; 1.44 (0.934)	10; 1.60 (0.966)	$F = .516$; $p = .597$
Item 25	356; 1.40 (0.757)	43; 1.44 (0.796)	10; 1.50 (0.972)	$F = .138$; $p = .871$
Item 26	356; 1.54 (0.863)	43; 1.40 (0.728)	10; 1.60 (1.075)	$F = .621$; $p = .538$
Item 27	356; 1.10 (0.408)	43; 1.09 (0.294)	10; 1.10 (0.316)	$F = .015$; $p = .985$

Note. Source: Own elaboration.

5. Limitations

The study of people's behavior apart from a small or large handicap is subject to the perception that the subject has of the behavior they develop around the action or use of an element and more when we speak of a university population. In this sense, one of the first limitations is given by the difficulty of assuming when you have a problem and being aware of having it and accepting and verbalizing it. The studies in which we analyze self-perceived behavior present this bias, which means that the results should always be viewed cautiously. That is why we believe it is necessary to develop this study over time, that is to say, to establish the youngest participants as study subjects, given that they will still remain in the university for at least three more academic years, also considering other measures not based solely on self-perception.

On the other hand, another limitation presented by the studies carried out in Educational Sciences is the possibility of showing a bias related to gender, given that there are numerous studies with an eminent female profile. However, studies such as that of Gialamas et al. (2013) show that this will make it possible to establish, carry out, and compare research works in which there is a greater male, in a way that allows the generalization of the data.

Finally, the use of a cross-sectional survey based on student self-reports can be seen as a limitation that we must review in future research, which would involve the use of applications to monitor the use of smartphones over time.

6. Compliance

The authors declare not have conflicts of interest. The participants had been informed about their personal data be not published. They accepted participated in the study when they answered the questionnaire (consent informed).

Declarations

Author contribution statement

Verónica Marín & Begoña E. Sampedro: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Juana María Ortega: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Jorge Figueroa: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The data that has been used is confidential.

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The authors declare no conflict of interest.

Additional information

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