

Self-perception of Problematic Use of the Mobile Phone in University Students According to Sex

Auto-percepción del Uso Problemático del Teléfono Móvil en Estudiantes Universitarios de Acuerdo a su Sexo

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Abstract

To evaluate the self-perception of problematic mobile use by sex in university students, we applied the Mobile-Related Experiences Questionnaire [CERM (by its acronym in Spanish)]. Women used it more time and showed higher total CERM-score than men. In the group with mobile use ≥ 8 h/day and CERM-score ≥ 16 , the highest proportion of women was identified compared with the group of mobile use < 8 h/day and CERM-score ≥ 16 and the group with CERM-score < 16 regardless time of mobile use, respectively. While in the last group, the use of mobile phones was the highest to take academic notes (11.21% vs. 1.20% and 1.60%; Chi-square= 14.89, $p = .001$) and the lowest to access to social networks (40.18% vs. 62.65% and 55.20%; Chi-square= 11.29, $p = .004$) compared with those with mobile use ≥ 8 h/day and CERM-score ≥ 16 and the group with mobile use < 8 h/day and CERM-score ≥ 16 .

Keywords: mobile phone use, university students, sex

Resumen

Para evaluar la auto-percepción del uso problemático del móvil por sexo en estudiantes universitarios, aplicamos el Cuestionario de Experiencias-Relacionadas con el Móvil [CERM (por su acrónimo en español)]. Las mujeres lo utilizaron más tiempo y tuvieron mayor puntuación-CERM que los hombres. En el grupo con uso ≥ 8 h/día y CERM ≥ 16 , se identificó la mayor proporción de mujeres en comparación con el grupo de uso < 8 h/día y CERM ≥ 16 y el grupo con CERM < 16 independientemente del tiempo de uso, respectivamente. En este último grupo, el uso fue el más alto para tomar notas (11.21% vs. 1.20% y 1.60%; Chi-cuadrada = 14.89, $p = .001$) y el más bajo para acceder a redes sociales (40.18% vs. 62.65% y 55.20%; Chi-cuadrada = 11.29, $p = .004$) comparado con los de uso ≥ 8 h/día y CERM ≥ 16 y el grupo con uso < 8 h/día y CERM ≥ 16 .

Palabras clave: uso del teléfono móvil, estudiantes universitarios, sexo

Introduction

Advances in technology have substantially modified our lives. For example, communication with the mobile device is so related with daily routines that nowadays it seems indispensable. In Mexico, the Instituto Nacional de Geografía e Informática, according to the National Survey on Availability and Use of Information and Communication Technologies in Households [INEGI (by its acronym in Spanish), 2018], identified that 73.5% of the population ≥ 6 years uses the mobile phone. Furthermore, 8 out of 10 have the possibility of connecting to the Internet and the total number of these users grew from 60.6 million of people in 2016 to 74.3 million in 2018.

The benefits of smartphones that are currently in use seem to make the new services offered attractive for many purposes such as higher education (Mehdipour & Zerehkafi, 2013), mobile health apps in health care management (Lu et al., 2018) and businesses (Kukulka-Hulme, 2007) among others. Many of these smartphones have programs that are similar to those found on a laptop or desktop computer and can be the solution for finding information for a student without having to use the computer room. Key motivations for the use of learning have been described using the mobile: better access to education, the ability of the mobile to change the teaching of learning, and the projection of mobile devices to allow the development of institutional objectives either business or commercial (Kukulka-Hulme, 2007), allowing theory and practice to occur in the same place (Attwell, 2007).

However, along with the multiple benefits, the concern about the inappropriate or addictive use of these devices is growing and there are reports in the literature showing negative effects due to improper use of the mobile or other electronic devices both in the educational and work context (Amador-Licona, Aguirre-García, Anguiano-Peña, & Guízar-Mendoza, 2018; Sánchez-Martínez & Otero, 2009). Also a relationship of their use close to bedtime and sleep disturbances (Soyemi, Olorunfoba, & Okafor, 2015; Yen-Sen & Bin-Seng, 2016) that could affect attention to different purposes.

Differences by sex in addictive behaviors

Young people's mid and late adolescence is considered a critical period of increased risk-taking behaviors and increased emotional reactivity while they increase in autonomy (Casey, Jones, & Hare, 2008). These behavioral changes are influenced by both socio-cultural environmental and internal factors (Becker, McClellan, & Glover-Reed, 2017).

It is considered that biological differences between men and women as a result to sexual differentiation of the brain during early life (Perry, Westenbroek, & Becker, 2016), as well as pubertal gonadal hormones, may influence how each engage in addictive behaviors or even how responds to drugs of abuse (Becker, Perry, & Westenbroek, 2012; Kerstetter & Kippin, 2011; Sanchis-Segura &

Becker, 2016). This has been supported by similar results in addictive behaviors among female rats and humans in addiction or addiction-like behaviors (Becker et al., 2012; Perry et al., 2016; Perry, Westenbroek, & Becker, 2013). Nonetheless, in a more integrative view, researchers in different sciences have demonstrated that addictions and their consequences are the result of complex interactions between biological characteristics and environmental factors, then we can consider that health behaviors including abuse of mobile phone could be related to biological sex, by gender, by the physical environment, and sociocultural experiences (Becker et al., 2017; Hines, 2011). Even more, macro-economic factors and implementation of gender equity public policies for women development may influence women psychological health (Torsheim et al., 2006).

So, the objective of this study was to compare the main uses of the mobile phone in men and women university students (where applications or programs of mobile use have not been formally included) for academic activities during class hours and the proportion of problematic use of smartphone according to the Mobile Related Experiences Questionnaire [CERM (by its acronym in Spanish)] with items based on the DSM-IV criteria for substance abuse and pathological gambling (Beranuy, Chamarro, Graner, & Carbonell, 2009).

The following were the hypothetical assumptions:

1. There is no difference in the average time of use between men and women university students.
2. The proportion of the problematic use of the mobile phone is different between men and women university students.
3. There is a differentiated use in university students regardless of the time of use.

Methods

A cross-sectional, descriptive and comparative study by sex was conducted in 315 university students (158 men, 157 women) of a Business School, which were selected by systematic random sampling. After informing them about the objective of the study and specifying that their participation would be voluntary, and no economic or academic incentives would be offered, the CERM questionnaire was applied. In addition, the registration of general data was requested and only one of the students decided not to participate. The sample size was calculated in the MedCalc program by means of a difference in the expected proportion of some problematic mobile use of 12% (60% versus 72%) between the groups and 1: 1 ratio, with 80% power and significance of 0.05, identifying that 192 volunteers were required per group, however it was adjusted to a finite population, leaving 155 per group.

The CERM questionnaire is an instrument carried out by Beranuy et al. (2009) validated in the Spanish language, which evaluates conflicts related to mobile abuse in relation to their emotional and communicational use. It consists of 10 items with four-point Likert responses - almost never (1), sometimes (2), quite a few times (3), almost always (4), so the score can go from 10 to 40, being the higher score related to greater "misuse" or "abuse" of the mobile. It evaluates two factors, the first factor (conflicts) explains 34.6% of the variance and the second factor (communicational and emotional use) explains 9.22%. Adequate internal consistency of the factors has been reported (Beranuy et al., 2009), in addition it has already been applied in Mexican population (Amador-Licona et al., 2018). According to a previous publication, it was classified as following: a) without problems with the mobile in case of a total score from 10 to 15 points, b) with occasional problems from 16-23 points, and c) with frequent problems from 24 to 40 points (Carbonell et al., 2012). And because this instrument does not consider the time of its use, a combined category was constructed as following: 1) Group with CERM report <16 regardless of the time of use of the mobile; 2) group with CERM report ≥16 and mobile use ≥8 h; 3) CERM rating ≥ 16 regardless of the type of mobile use.

Students were also questioned about the main activities they carried out on the mobile according to the various applications available and specific situations such as: 1) Have a telephone plan, 2) Use the mobile phone for academic activities such as taking pictures of the notes of peers or share information, 3) Use of the mobile phone for looking information on the topic of the class and 4) Review their social networks while they are in class.

Statistical analysis

To analyze the existence of statistically significant differences between men and women and in students with and without problematic use of the mobile, unpaired Student's t-test or chi-square were performed (to compare continuous variables or proportions, respectively). For the comparison of proportions between the group with CERM report <16 regardless of the time of use of the mobile; the group with CERM report ≥ 16 and mobile use ≥ 8 h and the group with CERM rating ≥ 16 regardless of the type of mobile use, also a chi-square test was performed. A $p < .05$ value was considered significant and the analysis was carried out in the STATISTICA software, version 11.0.

Results

In the entire group, 207 (65.71%) of the students reported some level of problematic use with the mobile and 205 (65.07%) that their academic performance has been negatively affected by the use of mobile phones.

In the comparison of students by sex, there was no significant difference in age, but women showed higher mobile use per day ($M = 6.70$ h, $SD (3.10)$ vs. 5.66 h, $SD (3.14)$; $t = -2.97$; $p = .003$, for women and men respectively), higher score in the communicational and emotional use of the mobile as well as higher total CERM score than men (Table 1). In the entire group 71.74% students have a mobile telephone plan, and no difference by sex was identified for the use that was given to the mobile to take notes, to look information for the academy, use the GPS function, WhatsApp, listening to music, or access to social networks.

Table 1
Comparison of Age and CERM Evaluation by Sex in University Students

Variable	Men, n=158		Women, n=157		t	p
	M	SD	M	SD		
Age (years)	20.07	1.67	20.10	1.74	-.127	.898
Movil use evaluation						
Conflicts	6.98	1.75	7.35	1.93	-1.77	.077
Communicational and emotional use	9.84	2.24	10.84	2.52	-3.73	<.001
Total CERM score	16.82	3.28	18.20	3.78	-3.44	<.001

Note. CERM; Questionnaire on Mobile Related Experiences

However, women reported less use for surfing the Internet, but higher use to take pictures than men. Though no significant difference was found in the proportion of no problems, occasional and frequent problems with the use of mobile phones (Table 2). These results allow to reject H1 and H2.

Table 2
Comparison of Mobile Use by Sex in University Students

Variable	Men, n=158 n (%)	Women, n=157 n (%)	Chi-square/ U	p
Have a mobile telephone plan	116 (73.41)	110 (70.06)	.44	.508
Mobile use				
Looking information/Academy	37 (23.41)	28 (17.83)	1.50	.265
To take scholar notes	5 (3.16)	10 (6.36)	1.78	.198
GPS	3 (1.89)	6 (3.82)	1.05	.335
Surfing the Internet	41 (25.94)	23 (14.64)	6.24	.013
To listening to music	55 (34.81)	59 (37.59)	.26	.640
To take pictures	8 (5.06)	20 (12.73)	5.73	.018
To access to social networks	84 (53.16)	101 (64.33)	4.05	.051
WhatsApp	109(68.98)	124 (78.98)	.538	.606
CERM classification				
Without problems	64 (40.50)	44 (28.02)	U 11860	
Ocasional problems	86 (54.43)	99 (63.05)		.473
Frequent problems	8 (5.06)	14 (8.91)		

Note. CERM; Questionnaire on Mobile Related Experiences

No difference in age was observed when we compared students with and without problematic use of the mobile M=20.10, SD (1.51) vs. M= 20.01 SD (1.72) respectively; $t= .172$; $p=.863$. However, students with report of problematic use of mobile phones used it for a greater amount of time per day M= 6.63 SD (3.20) vs. M=5.31, SD (2.99) than those students without problematic use respectively; $t= -3.58$; $p<.001$.

Also the group of students with problematic use, access more to social networks, but use this device less to take notes than those without problematic use (Table 3).

Table 3
Characteristics of the Students With and Without Problematic Use of the Mobile

Variable	Without problematic use, n=108 n (%)	With problematic use, n=207 n (%)	Chi-square	p
Men	64 (59.25)	94 (45.41)	5.44	.024
Women	44 (40.74)	113 (54.58)		
Have a telephone plan	77 (74.07)	149 (71.98)	.02	.89
Mobile use				
For looking information /Academy	27 (25.0)	38 (18.35)	1.91	.187
To take scholar notes	12 (11.11)	3 (1.44)	14.61	<.001
GPS	4 (3.70)	5 (2.41)	.42	.498
Surfing the Internet	24 (22.22)	40 (19.32)	.37	.557
To listening to music	42 (38.88)	72 (34.78)	.52	.537
To take pictures	9 (8.33)	19 (9.17)	.07	.966
To access to social networks	52 (48.14)	133 (64.25)	7.59	.007
WhatsApp	74 (68.51)	159 (76.81)	2.53	.136

Those who used the mobile ≥ 8 h/day ($n = 103$) had a significantly total higher score in the total CERM score ($M = 18.53$, $SD (3.32)$ vs. $M = 16.90$ $SD (3.63)$, $t = 3.69$; $p < 0.001$) than those who reported less use ($n = 212$).

In the group with mobile use ≥ 8 h/day and CERM score ≥ 16 , the highest proportion of women was identified compared with the group of mobile use < 8 h/day and CERM ≥ 16 and the group with CERM < 16 regardless time of mobile use. While in the last group, the use of mobile phones was the highest to take academic notes and the lowest to access to social networks and to consider less negative effect on academic performance (one specific item in the CERM) compared with those with mobile use ≥ 8 h/day and CERM score ≥ 16 and the group with mobile use < 8 h/day and CERM ≥ 16 (Table 4). Therefore, the H3 is accepted, since a differentiated use of the mobile phone was identified in the students regardless of the time of use.

Table 4

Characteristics of University Students According to the Type Use of the Mobile

Variable	CERM < 16 , regardless time of mobile use, $n = 107$ n (%)	CERM ≥ 16 , mobile use ≥ 8 h/day, $n = 83$ n (%)	CERM ≥ 16 mobile use < 8 h/day, $n = 125$ n (%)	Chi-square	p
Men	63 (58.87)	29 (34.93)	66 (52.80)	11.293	.004
Women	44 (41.12)	54 (65.06)	59 (47.20)		
Mobile use					
Looking information/ academy	26 (24.29)	13 (15.66)	26 (20.80)	2.13	.344
To take scholar notes	12 (11.21)	1 (1.20)	2 (1.60)	14.89	.001
To access to social networks	43 (40.18)	52 (62.65)	69 (55.20)	10.26	.006
Surfing the Internet	23 (21.49)	21 (25.30)	20 (16.00)	2.80	.246
To take pictures	9 (8.41)	8 (9.63)	11 (8.80)	.24	.887
They think that their academic performance has been negatively affected by the use of mobile phones	47 (43.92)	64 (77.10)	94 (75.20)	31.98	$< .001$

Discussion

In the entire group, 6 out of 10 students reported some level of problematic use with the mobile; this group was mainly characterized by reporting more time of use in social networks and less use to take notes related to academic content, than students without problematic use. This is probably related to the fact that a similar proportion reported that their academic performance has been negatively affected by the use of mobile phones. This effect of mobile use on academic performance without an intentional process of its use as an educational strategist has also been reported in the United States in university students, even after adjusting for demographic variables, self-efficacy for self-regulated learning and academic average (Lepp, Barkley, & Karpinski, 2015). In Nigeria, a large proportion of students surveyed at the polytechnic level attributed their poor academic performance to the indiscriminate use of mobile phones and believed that the biggest problem is the addiction to the use of social networks and the low use of mobile phones to identify and use academic content (Soyemi et al., 2015).

Considering that the CERM questionnaire items are based on the DSM-IV criteria for substance abuse and pathological gambling, more than an addiction, this study evaluates a maladaptive pattern of mobile use leading to a failure to fulfill major role commitments at school (or at work according to the specific population), or continued use despite showing persistent social or interpersonal problems related to the behavior. Some of the explanations for this maladaptive pattern of mobile use are that the mobile phone represents an attraction that is difficult to resist for the use of its various functions, such as surfing the Internet and accessing social networks (one of the activities mostly reported by this group of students), use video games, contact friends, explore new applications or participate with any number of recreational activities, which they do not resist even during academic activity schedules. This generates a decrease in the attention of the students while they are in formal academic activities either in a classroom, in distance education, or reduction of time spent and uninterrupted to study. In addition, young people are part of specific groups of the population that have characteristics that make them susceptible to mobile abuse, manifesting themselves as insecurity without mobile, avoiding places without coverage, and preferring telephone relationships over face-to-face (Beranuy, Carbonell, Jordania, Rosell, & Chamarro, 2006). But, other variables such as type of families (Sharma, Rao, Benegal, Thennarasu, & Thomas, 2017), educational levels of the parents, mental health, home and school environment (Roser, Schoeni, Foerster, & Röösl, 2016) have been related to problematic mobile phone use in different populations of adolescents and young.

Nonetheless, mobile phones can also improve the efficiency of study activities by allowing students to continuously search for related information and facilitate teamwork by sharing such information and favoring the interaction of their analysis (Chen & Yan, 2016; Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2013). Furthermore, it has been reported the digital scenario in general as a mediator and modulator of individual and collective identities for social ties (Beltran, 2016).

Interestingly, in the group with a CERM score <16 regardless of the time of mobile use, the proportion of its use for taking scholar notes was higher but lower the consideration of the affectation of academic performance and its use to access to social networks. Therefore, more than the time of use of the mobile, the important approach seems to be the type of use, which is reinforced by previous studies that indicate that the time connected to the mobile is not a good indicator for the problems derived from its use (Carbonell et al., 2012), so that educational applications and digital platforms, in addition to the skills of critical reading and other protector factors for healthier behaviors seem to be transcendent in the effective use of the mobile phone, such as the role of personality and self-esteem (Ehrenberg, Juckes, White, & Walsh, 2008). In several educational institutions, although instructors see the value of mobile devices as a learning tool, they do not know how to incorporate them into their teaching, and even see them only as a distraction.

In the present study, women reported in general a higher total CERM and communicational and emotional scores than men. Although discrepancies have been reported about sex and mobile phone abuse (Aljomaa, Al.Qudah, Albursan, Bakhiet, & Abduljabbar, 2016; Roser et al., 2016; Sharma et al., 2017), this could be related to the report that women have a tendency to have less self-confidence (Crandall, 1969; Elliot & Harackiewicz, 1994), while men appear to be less self-critical than women. Also, stress and mental health patterns worldwide indicate that young women report more problems than boys and young men (Moksnes, Rannestad, Byrne, & Espnes, 2011; Sweeting, West, & Der, 2007; Torsheim et al., 2006). In Latin-American university students, anxiety and depression have also been reported higher in women than in men (Agudelo-Vélez, Casadiegos-Garzón, & Sánchez-Ortíz, 2008), and literature supports that mobile phone use is associated with the development of depressive symptoms in adolescents (Bickham, Hswen, & Rich, 2015).

Furthermore, there is increasing evidence in humans and animals to consider sex differences in molecular, neuroanatomical and functional addiction behavior focus on hormonal, chromosomal,

and epigenetic organizational influence into the brain (Becker & Chartoff, 2019). However, although some possible explanations for excess psychological distress in women consider biological variables such as sex (Becker & Chartoff, 2019), gender role orientation, and self-image (Cyranowski, Frank, Young, & Shear, 2000; Nolen-Hoeksema & Girgus, 1994, Sweeting et al., 2007), in a study with students from 29 countries, gender differences in health complaints were stronger in countries with a low level of gender development. This supports the perception that macro-level factors such as education, income, labor and political power participate in gender differences in health complaints including psychological health (Torsheim et al., 2006) and behavior.

In recent decades, many measures of progress in women have been reported in some developed countries, indicating that opportunities have expanded both in education and in the workplace. Also paradoxically, less happiness has been reported for women in the industrialized world (Stevenson & Wolfers, 2009). This seems to be related to the increase in hours worked by women who have maintained a large part of household chores regardless of those in the market and the still persistent lower salary granted to women compared to men for similar work activities. Also, the one that women could want quickly, to achieve the well-being and achievements of men in working life. In addition, although both men and women have had a growing educational achievement, these changes have been more pronounced for women in the last decades, who probably still do not achieve “adaptation”, creating stress. But other factors have also to be considered for their relationship with the degree of mobile phone addictive behavior, such as social status and scholar degree (Alijomaa et al., 2016).

It is necessary to carry out future studies of longitudinal type adjusting the differentiated use of the mobile to variables such as emotional intelligence, school motivation, family environment, anxiety, depression or even other addictive behaviors. Also to evaluate the effect of formal mobile use programs on students of various academic degrees on their academic performance and the maladaptive pattern of its use.

As limitations of this study, the results were obtained through a cross-sectional design so that the measured association between mobile phone use and sex could reflect a variation in unobserved personal characteristics, such as intelligence, general capacity and motivation, which could affect its use. Furthermore, we must be aware of the political and social contexts surrounding this population.

As a conclusion this study found differences in the use and perception of affectation of the mobile according to the sex in university students and argue the need to systematize and guide its use for academic purposes and healthier behaviors.

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