

---

## Miscellaneous

---

### Sonia Carcelén

<https://orcid.org/0000-0003-4166-5829>

[sonialca@ucm.es](mailto:sonialca@ucm.es)

Universidad Complutense de Madrid

---

### Montserrat Mera

<https://orcid.org/0000-0003-4702-9786>

[mmera@ucm.es](mailto:mmera@ucm.es)

Universidad Complutense de Madrid

---

### José Antonio Irisarri

<https://orcid.org/0000-0002-2651-8727>

[tonoirisari@gmail.com](mailto:tonoirisari@gmail.com)

Universidad Villanueva

---

### Submitted

November 29th, 2017

### Approved

July 20th, 2018

---

© 2019

Communication & Society

ISSN 0214-0039

E ISSN 2386-7876

doi: 10.15581/003.32.1.199-211

[www.communication-society.com](http://www.communication-society.com)

---

2019 – Vol. 32(1)

pp. 199-211

---

### How to cite this article:

Carcelén, S., Mera, M. & Irisarri, J.

A. (2019). Mobile phone use by university students in Madrid: a management-based typology during times of learning.

*Communication & Society*, 32(1), 199-211.

## Mobile phone use by university students in Madrid: a management-based typology during times of learning

### Abstract

The use of mobile phones by the so-called millennials (population under the age of 34) has resulted in behavioural changes, while also affecting how they approach their university experience. Despite the advantages of the invasion of ICTs in educational centres, many studies have examined the relationship between mobile phone use in classrooms and its effects on the student's academic performance. A quantitative study based on a questionnaire was conducted in person, using a sample of 580 students from public and private universities and in various degree courses, permitting the determination of a student typology based on how they perceive mobile phone use during learning periods and any possible repercussions on their academic performance. The results suggested the existence of two university student groups having distinct profiles, according to field of study (social science or experimental science), the university in which they were enrolled (public or private) and the degree of self-control and responsibility expressed by each student with regard to mobile phone use during learning periods (students who are more permissive with their use of ICT in the classroom and who do not believe that this use negatively affects their studies and, students who demonstrate a more conscious and responsible behaviour and claim to introduce more self-control mechanisms to limit mobile phone use while in the classroom and when studying).

### Keywords

**Mobile phones, university students, academic performance, learning, typology, self-control systems, ICT.**

### 1. Introduction

Over recent years, the Spanish university system has experienced major changes. New student habits with regards to the use of mobile telephones in and outside of the classroom, as well as educational demands derived from the introduction of new degrees as a part of the European Higher Education Area (EHEA) present constant challenges as to how to tackle (and take advantage of) the inevitable presence of information technology both in the classroom and while studying.

The use of mobile technology devices (such as laptops, tablets or mobile telephones) in the education process has generated two opposing streams of thought: one in favour and one against said usage. Some studies have suggested a positive impact of these devices on student learning, including increased motivation, collaboration, productivity and engagement, among others (Corbeil & Valdes-Corbeil, 2007; Kukulska-Hulme, 2007; Traxler, 2009; Roblyer & Doering, 2010). Furthermore, over recent years, various studies have been carried out using instruments such as the social media (specifically, the Facebook social network), applications or blogs, and these instruments have been found to improve student learning (Wang *et al.*, 2016; Kitchakarn, 2016; Morris *et al.*, 2016).

However, other authors have highlighted the potential negative effects of the use of these devices in the classroom, including distraction, cyber bullying, cheating, etc. (End *et al.*, 2010; Shelton *et al.*, 2011; Kuznekoff & Titsworth, 2013; Spitzer, 2014).

What is clear is that this technology is currently a reality in the classroom and its correct and successful use (with educational purposes) depends on a set of variables that some authors have begun to identify with study type or student characteristics, as well as with the profile of a professor that is capable of implementing said technology (Molina & Chirino, 2010; O'Bannon & Thomas, 2014; Fojtik, 2014).

Recent reports leave no room for doubt in this respect: 29.4 million Spaniards between the ages of 16 and 65 own a mobile phone (IAB Spain, 2017), some 88%, placing Spain in the global lead in terms of percentage of unique users owning one of these devices. Also, the penetration rate of tablets exceeded 75%. Furthermore, mobile phones are the most frequently used device in order to access the Internet (used by 94.6% of Spaniards), especially by the younger population, with 100% owning a Smartphone and 99% accessing the Internet on a daily basis from their mobile phone. Thus, this is the device that they spend more time with on a day-to-day basis (Ditrendia, 2017). This young generation is accustomed to using mobile technology in a constant and even, at times, abusive manner (Carbonell *et al.*, 2012).

However, it is interesting to note a change in trend, since young people believe that they may be using their Smartphone too frequently and they express the highest levels of concern: 75% of those aged between 25 to 34 and 72% between the ages of 18 to 24 report that they “definitely” or “probably” use their phone too much (Deloitte, 2017).

Therefore, limiting phone usage through some sort of self-control system is becoming a reality (38% make an effort and usually succeed, 17% try but it does not usually work, 12% would like to and 38% do not intend to). So, the top 5 steps taken to limit mobile usage are: keep the phone in handbag/pocket when meeting other people (38%), turn off audio notifications (32%), keep phone in bag/pocket when on my own (27%), delete apps (26%) and turn off phone at night (26%) (Deloitte, 2017).

So, the integration of mobile telephones in their daily routines –87% of the millennials state that they always have their phone at hand (Ditrendia, 2017)– has led to some major changes in how they relate to one another, access information and organize their academic learning. Thus, even though it is normal for students to believe that they are capable of performing several tasks at the same time, such as interacting with their phones while in class or studying, some studies have revealed a causal relationship between this behaviour and poor academic performance (Chen & Yan, 2016; Junco & Cotten, 2012).

However, no unanimous agreement exists amongst specialists and researchers as to whether or not the use of mobile devices in education improves student academic performance.

Some studies have demonstrated that their use in the classroom can be positive when it has a clear academic purpose, as found by Marcos *et al.* (2009) with portable mp3 players, which concluded that their use did not create any negative barrier to the student learning processes. Along the same lines was the experiment conducted by García-Valcárcel and Tejedor (2017) with university students, in which it was shown that those achieving more

academic success recognised that the use of ICT strongly assisted their learning processes, especially for activities such as: the preparation of assignments, organization of their academic activities, the reviewing of tasks, when working with classmates and during the search for resources.

Other studies have also been conducted on the various profiles of university students, in which experiments had been carried out on the use of social networks for academic purposes (specifically with Facebook). Accordingly, it has been verified that the benefits of their use can be applied to education, for example as: emotional support and to develop interpersonal skills (Greenhow & Robelia, 2009); to participate in communities that assist learning and to practice specific skills (Ahn, 2001); to promote information dissemination amongst students (Santillán *et al.*, 2012); to enhance the classroom setting, the relationship with teaching staff, the access to information and experiences gained during practical internships (Gutiérrez & Soto, 2012) and to contribute to student motivation, teamwork and the interaction between the classmates (Barajas & Álvarez, 2013).

Despite these positive experiences, for the most part, university students continue to use social networks more for their interpersonal relationships than for educational reasons. In fact, even though they are digital natives, they are unaware of the potential of the Internet and social networks in a more academic sense, so their use in this regard remains uncommon (Prendes Espinosa *et al.*, 2015).

Experts do appear to agree that the presence of mobile phones in classrooms without a specific educational use that has been previously established by the professors, tends to have negative effects. Gómez, Villareal and Nava (2015), for example, verified that said routines negatively affect both the students' academic results and personal lives. Also, Olufadi (2015) connects the use of mobile phones with poor academic results in young university students.

For Lepp, Barkley and Karpinski (2015), the mobile phone is a sort of temptation that invites one to browse the Internet, check the social networks, write and receive messages to friends, etc., having potential negative repercussions on student performance, since it takes time away from their studies and distracts them. And this is not only the case with those using these devices, since Campbell (2006) found that some mobile phone use also bothers other classmates.

Thomas, O'Bannon and Bolton (2013) found that the majority of professors warned about interruptions caused by mobile phone use during classes, although at the same time, they consider their use to be quite appropriate as a learning support tool (O'Bannon & Thomas, 2015). Since these devices are small and portable, containing multiple tools (clock, calculator, e-mail, photographic camera, Internet access, etc.), these authors compare them to the multi-functional Swiss army knives.

Now, it is relevant to ask: what are these uses and are they appropriate for the academic environment? As Ravizza, Hambrick and Fenn (2014) found, browsing the Internet while in the classroom, with non-academic purposes (using laptops and mobile phones) has negative repercussions on learning and this is clearly reflected in grades. They emphasize that the more Internet use for purposes that are unrelated to the area of study, the poorer the grades –regardless of the student's capacity–. Kuznekoff, Munz and Titsworth (2015) reached the same conclusion: the information that the students were capable of assimilating while engaging in this behaviour in the classroom was considerably decreased, leading to poorer results. Also, Junco and Cotten (2012) found that this repercussion in the grades indeed occurred.

And, why do students use mobile phones during classes and their study time? Studies indicate that, in general, they use them for non-academic purposes (Tindell & Bohlander, 2012; Junco & Cotten, 2012): to send and receive text messages, check Facebook, write emails and even to make and receive telephone calls. Despite warnings from professors, and in some cases –as in the experiment conducted by Ravizza, Hambrick and Fenn (2014)–, after seeing

how their grades suffered, students did not appear to be aware of how these habits may affect their academic performance and fail to take measures to limit mobile phone use during their learning time.

All of this appears to indicate that students do not perceive that the mobile phone, which has become a personal symbol (Ramos & Jiménez, 2007) that they carry with them at all hours –even during classes– may in fact have academic purposes; perhaps because, as Pettit and Kukulska-Hulme (2007) stated, they tend to associate phones with times of leisure, recreation and informal communication. However, as Cabero and Marín (2013) suggested, by using methodologies that are increasingly directed at strengthening the student's active participation in the class and promoting collaborative work and the use of ICT, mobile phone may become more than appropriate for the university academic dynamic. As Gómez, Roses and Farias (2012) declared, taking advantage of (for example) the attractiveness of the social networks between students for academic purposes continues to be a challenge for educators.

In this context, the perception, attitudes and habits of university students are fundamental for both detecting risks and designing strategies to help tackle the active presence of mobile phones in the classroom.

## **2. Objective and methodology**

Until now, studies appear to indicate that a relationship (mainly negative) exists between mobile phone use by students and academic performance. Following the lines of other authors, this study aims to determine if, over recent years, youth have changed their behaviour with respect to mobile phone use during their education time. As they themselves have recognized, their level of dependence on this device is very high, but, are they now more aware of the negative effects of the mobile phone on their academic performance?

One of the purposes of this study was to determine whether it is possible to establish a typology of students based on the somewhat responsible use of mobile phones in their academic life. So first, the aim was to examine whether the student profile (according to course, degree and type of University) shapes student perceptions regarding the consequences of using a mobile phone without any academic purpose during periods of learning (when in the classroom and when studying). And second, it intends to determine whether or not this level of awareness leads students to use some sort of self-control system that may mitigate the potential negative effects.

In order to obtain the information necessary to offer a response to the study objectives, a quantitative study was conducted through an online questionnaire carried out with a population between the ages of 18 and 24 who are pursuing a university degree in one of the public or private universities or centres offering official degrees in the Community of Madrid (Ministry of Education, Culture and Sports, 2015).

Fieldwork was conducted between the months of May and June of 2017 and after clearing through the database, 580 valid responses remained. Sample distribution (selected by convenience) was carried out by shares based on the degree and university type profile, attempting to be as representative as possible of the universe under study (see Table 1).

**Table 1:** Sample distribution based on degree and university types.

Profile of University Degree			University Type				
	Frequency	Sample %	Universe %		Frequency	Sample %	Universe %
Social Sciences	319	55.0	46.6	Public	380	65.5	66.4
Engineering / Architecture	104	18,0	24,0	Private	200	34,5	33,6
Health Sciences	69	12.0	12.4		580	100.0	
Arts and Humanities	55	9.4	10.3				
Sciences	33	5.6	6.7				
	580	100.0					

Source: Author's own creation.

For the gathering of the information, a questionnaire was completed in person by the researchers to ensure the highest quality of the data obtained from the statistical population.

In order to design the ad hoc questionnaire, several meetings were first held with students, in which the greatest quantity of information was sought so as to be used to propose the items to be included on the questionnaire. Once the questionnaire was formulated, it was validated through expert opinion, selecting a group of experts in communication, education and teaching to raise any issues regarding the significance of the items, the wording and style, order of presentation and to offer any other comments. Following its validation, the questionnaire was divided into the following parts:

- Identifiers (current course, degree course, name and type of the University, type of mobile currently owned and brand, for how long they have owned it and the number of times it had been renewed).
- The body of the questionnaire was broken into several segments: the first, being more general, was on mobile phone use during class time and off-campus study time, also considering any implementation of self-control mechanisms and, the second, consisting of 23 items, was related to student attitudes on the effects of mobile phone use on their learning time and final academic performance (using a 5-point Likert scale, from fully disagreeing to fully agreeing).

An analysis of the results was carried out using the SPSS statistics program and simple and cross tabulations were created, as well as basic and multivariable analyses (cluster analysis of conglomerates and factorial analysis of principal components).

### 3. Research results

#### 3.1. University student level of awareness regarding the impact of mobile phone use on academic performance

Our study highlights the fact that university students are increasingly aware of the consequences of mobile phone use on their academic performance, especially during study time (more so than during the class time), suggesting that their behaviour is beginning to change and that little by little, distinct mechanisms are being introduced to help alleviate these negative effects.

Almost half of the survey participants (45% of the sample) claim to agree with the following affirmation: "I fully depend on my mobile phone and could not be without it, even for one day." Regardless of this dependence, the majority of the university students (87%) are aware that "the responsible use of mobile phones depends on each person," who must be capable of knowing when and where they should not use it. So, 60% would reject the prohibition of using mobile phones during university classes and believe that its use should depend on the individual, and not on an external organism that makes the rules. But 20% of the sample (perhaps those who consider themselves to be the most vulnerable since they cannot control themselves) is not against the university placing limits on mobile phone use.

They support the idea of external regulation and are willing to accept the academic institution's express prohibition of mobile phone use during class time.

As for the consequences on academic performance that may arise from mobile phone use, once again, student perceptions are quite distinct depending on the specific moment under consideration. So, although it is not possible to conclude whether or not they believe that mobile phone use in the classroom actually affects performance, they do appear to be more aware of the fact that using it while studying is detrimental.

When asked about the relationship between classroom phone use and the academic results obtained, university students not only revealed distinct opinions but also somewhat polarized ones, allowing us to establish a differentiated student typology based on the consequences related to the negative effects of mobile phone use in their qualifications. So, 36% of the surveyed students believe that "the frequent use of mobile phones during classes results in the lower academic level of this group," 23% claims to fully disagree, while another 40% claim to be indifferent.

This trend is repeated when asking them to what degree they share the following affirmation: "if I did not have my mobile phone during class, my level of learning would be greater." Once again, the largest percentage (44%) is indifferent, 28% is in agreement and 26% disagrees.

Their vision is quite distinct when attempting to determine the consequences of the use of these phones while studying on their grades. In this case, the perception of its negative effects increases amongst the surveyed. Almost half (48%) of them claim to agree with the idea that "frequent use of the mobile phone while studying leads to poorer final grades;" almost 70% believe that "frequent use of the mobile phone while studying forces me to devote more time to memorizing the material;" 74% believe that "frequent use of the mobile phone while studying negatively influences my concentration" and 60% state that "if I did not have a phone while studying, my academic performance would be better."

### ***3.2. Perception of the effects of mobile phone use in the classroom and during study time***

Almost all youth have a mobile phone for their personal use that they carry with them every day when attending university. Furthermore, as found in other studies, the use of these phones by university students is quite high, and this may be extrapolated to when they are in class or their study time.

Our study reveals that an increased use of the mobile phone by university students, both in the classroom and during their study time, is linked to the use of social networks, although it is found that the behaviour experiences a slight decrease when leaving the classroom and when studying. During study time, students are not as involved in the social networks as they are during the classes, and the percentage of time spent viewing websites related to the area of study increases.

So, we find another important piece of information: their behaviour indicates that they are increasingly aware of the distractions resulting from mobile phone use in their learning process. This leads them to use them less frequently during study time, so as to concentrate and take more advantage of this time, or to use them for more academically-related purposes (as opposed to social ones).

But generally speaking, mobile phone behaviour, in terms of the distinct uses of the phone, is quite homogenous. The survey sheds light on some different results, according to whether they are seeking degrees in the social (Communications, Arts and Humanities, Philosophy, etc.) or experimental (Medicine, Engineering, Sciences, etc.) sciences. It is found that those in the former group use mobile phones more frequently during classes (as compared to the latter) and, specifically, there are statistically significant differences in the

checking of social networks and the reading of the news, with social science students having much higher levels.

In order to group together the different uses of mobile phones by university youth, a principal components analysis was conducted. It identified 4 factors that explain 64.78% of the variance. The first factor, which we call “Communicative uses,” (explains 24.34% of the variance) groups together all uses that are related to basic actions in terms of relating to one another or contacting others, such as email and the making or receiving of phone calls. The second factor, the so-called “Social uses,” (explaining 17.22% of the variance) refers to interactions in the social networks of Facebook, Instagram, Snapchat and LinkedIn. The third, “Informative uses,” (13.04% of the variance) includes activities related to the search for information, either via Twitter or LinkedIn or the search for content on specific websites. And finally, the fourth, the so-called “Organizational uses,” (10.18% of the variance) makes reference to the uses related to the checking of time management and work applications, such as the clock and calendar.

### **3.3. Systems of self-control for the use of mobiles by university students**

Although almost half of those surveyed recognize that they constantly review their mobile phone during classes (48.8%) and one third of them declare that they also check it frequently during their study time (34.1%), a high percentage of the sample is more aware of the negative effects that this causes and declares that they also use some sort of control system to avoid being so conscious of their phone.

These control mechanisms are mainly put into place during the study time (65.9%), but also –to a lower percentage– when attending class (51%). In this way, the surveyed university students attempt to avoid the distractions that may prevent them from taking better advantage of their time and improving their academic performance.

The following are some of the most frequently used control systems, both in the classroom and during their study time: silencing the phone (40% assure that they do so in the classroom and 48% do so when studying), so that no sound may alert them of messages, calls, etc. However, even though this is the most popular method used, the youth recognize that this is not as effective as they would like, given that, since they tend to leave the phone on the table, even without sound, this does not prevent them from checking it every now and then.

The most effective forms of control are those used by the minority of students: turning it off and putting it away until the end of class (2%) or until finishing studying (13%), removing it from the place where they are studying and leaving it in another place (15%) or giving it someone to hold until finishing their task (2%). Once again, study time is found to be perceived by university students as being more valuable as compared to class time; therefore, these control systems tend to be more drastic in the former case as compared to in the latter.

Regarding this (the way of controlling their attention to the mobile phone while studying), no statistically significant differences were found between the students from the different degrees. However, differences do exist when it comes to the classroom: social sciences students are more likely to frequently check their phones, while the engineering and science students are more likely to introduce more systems to control their use. The latter, along with the science students, also tend to use the most effective control methods, such as silencing and putting away the phone (in the case of the former) or turning it off (in the case of the latter).

Social science students are, therefore, as occurred with the uses– the students that reportedly use the fewest control measures. And when they do use them, they choose those that are less effective, such as silencing their phone but keeping it in their view, usually on top of the work table, which does not prevent them from frequently reviewing the phones.

### 3.4. Student typology based on perceptions and attitudes towards mobile telephones

In order to determine if we can establish a student typology based on whether they are more or less aware of the repercussions of mobile phone use (both during the class as well as during study time) on academic performance, a cluster analysis was performed, revealing two groups with very distinct perceptions and attitudes. The study results reveal that there are two different groups of youth having distinct perceptions regarding the effects of mobile phone use on academic performance (see Table 2).

The first group, which we call “the unconscious/thoughtless,” includes those youth who are not very conscious of the damage that using mobile phones(both in the classroom and during study time)may cause on their academic performance and subsequent final grade. This group makes assessments that are far below the mean for the damage that may be caused by these devices (such as distraction, difficulty in concentrating, poorer grades, etc.).And, they positively view the use of mobile phones in the classroom, believing that their use may increase student participation and motivation, provide a better understanding of the subject material and increase collaboration between professor and student.

The second group, the so-called “conscious/responsible,” consists of those students that are much more aware of the dangers associated with the use of the mobile phone on their academic performance. So, their scores are above the mean for items related to the negative aspects that these devices may have and they relate them very directly to their final grades. Furthermore, they do not clearly see the benefits of using mobile phones for academic purposes, since they do not believe that they help them to better understand the subject material, obtain higher grades or, least of all, motivate or increase their classroom participation.

**Table 2:** Cross tabulation of means and standard deviations of the variables in the generated groups (With Snedecor’s F-test / ANOVA table).

	Total Sample	Groups created by the partition		
		Group 1	Group 2	
No. of members:	580	214	366	
Identification of the variables	Mean	Lowest mean	Highest mean	Snedecor’s F
The use of the mobile phone during class distracts me	2.45	2.13-	2.64+	F(1,578)= 59,92 p=0,0000
The use of the mobile phone during class makes it hard for me to understand the subject matter	2.09	1.66-	2.33+	F(1,578)= 98,61 p=0,0000
The use of the mobile phone during classnegatively influences my final grade	1.66	1.27-	1.89+	F(1,578)= 77,69 p=0,0000
The use of the mobile phone during clasdecreases my learning capacity	1.99	1.48-	2.29+	F(1,578)= 150,60 p=0,0000
The use of the mobile phone while I study distracts me	2.73	2.43-	2.90+	F(1,578)= 43,06 p=0,0000
The use of the mobile phone while I study forces me to spend more time studying the material	2.52	2.09-	2.77+	F(1,578)= 84,23 p=0,0000



**Mobile phone use by university students in Madrid: a management-based typology during times of learning**

The use of the mobile phone while I study negatively influences my final grade	2.10	1.54-	2.43+	F(1,578)= 150,20 p=0,0000
The use of the mobile phone while I study reduces my learning capacity	2.16	1.62-	2.48+	F(1,578)= 150,08 p=0,0000
The use of the mobile phone for academic purposes increases student motivation	1.88	2.03+	1.80-	F(1,578)= 12,07 p=0,0006
The use of the mobile phone for academic purposes increases the level of collaboration between professor and student	1.84	2.00+	1.75-	F(1,578)= 9,07 p=0,0027
The use of the mobile phone for academic purposes increases student participation	1.76	1.97+	1.64-	F(1,578)= 19,51 p=0,0000
The use of the mobile phone for academic purposes increases student academic performance	1.66	1.91+	1.52-	F(1,578)= 36,96 p=0,0000
The use of the mobile phone for academic purposes helps improve understanding of the subject material	2.12	2.28+	2.02-	F(1,578)= 13,10 p=0,0003
I am fully dependent on my mobile phone and cannot be without it even for a day	2.99	2.67-	3.18+	F(1,578)= 23,52 p=0,0000
The responsible use of the mobile phone during class time depends on each individual	4.37	4.16-	4.49+	F(1,578)= 16,51 p=0,0001
Frequent use of the mobile phone during the classes lowers the academic level of the class	3.13	2.37-	3.57+	F(1,578)= 231,10 p=0,0000
Frequent use of the mobile phone when studying lowers the final grades	3.17	2.16-	3.76+	F(1,578)= 461,40 p=0,0000
Frequent use of the mobile phone when studying forces me to spend more time memorizing the material	3.64	2.84-	4.10+	F(1,578)= 276,16 p=0,0000
Frequent use of the mobile phone when studying negatively influences my concentration	3.77	3.07-	4.18+	F(1,578)= 208,23 p=0,0000
Universities should prohibit the use of mobile phones during classes	2.27	1.98-	2.44+	F(1,578)= 17,78 p=0,0000
If I did not have a mobile phone during class, my level of learning would be higher	2.92	2.18-	3.36+	F(1,578)= 231,52 p=0,0000
If I did not have a mobile phone while studying, my academic performance would be improved	3.42	2.52-	3.95+	F(1,578)= 409,38 p=0,0000
The general use of the mobile phone in class or while studying negatively influences my academic record	3.00	2.09-	3.53+	F(1,578)= 411,21 p=0,0000

Source: Author's own creation.

After identifying the two groups, three variables were found that allow us to situate the students in one group or another: type of university where they study, profile of the degree that they are pursuing (more social sciences or experimental science studies) and whether or not they use a self-control system in order to be less conscious of their mobile phone.

So, group 1 (the “unconscious/thoughtless”) has a higher proportion of students from public universities than group 2 (the “conscious/responsible”), with the presence of students from private universities being higher. Also, differences were found with regards to the profile of studies, since group 1 consists of more students pursuing degrees in the Social Sciences and Arts and Humanities, while in group 2, there is a larger number who study Engineering, Health Sciences and Sciences.

Finally, the members of group 2, more conscious of the negative effects on academic performance that may result from using the mobile phone, recognise introducing more self-control systems as compared to the members of group 1. Beyond the potential self-control systems, the more effective ones (such as turning off the mobile phone, putting it away, leaving it somewhere else or with another individual or turning off the data connection) are more commonly used in the “conscious/responsible” group as compared to the other group (“the unconscious/thoughtless”), which prefers to apply mechanisms that, ultimately, will not prevent them from frequently checking their phone during the class or while studying (silencing it and leaving it in view on the top of the table).

#### 4. Conclusions

The data obtained in our survey corroborate that the use of mobile phones by Spanish university students is highly abusive (especially in regards to the checking of instant messages and social network interactions). However, certain changes have been observed in these youth who are increasingly becoming more aware of the negative effects of very frequent phone use; they believe that phones may distract them, cause them to lose concentration, force them to devote more time to their studies, lead to their receiving lower grades and have negative repercussions on their academic record.

This negative perception displayed by almost half of the surveyed students leads them to use self-control systems to ensure a more rational and responsible use of mobile phones during class time and in their study time. However, despite these good intentions, it is clear that many of these systems are simply that –good intentions– and while many students claim to silence their phone while in class or studying (30% and 42% respectively), this does not prevent them from checking the phone –as they note– when a message is received or an alert sounds.

Therefore, it has been observed that there is a large concern over the consequences of mobile phone use, although this concern is not equal according to the time of its use. Students appear to believe that study time is more valuable and influential on academic performance than the time spent in the classroom. This perception leads to a slightly decreased mobile use while concentrating on studying, with the students not only utilizing more self-control systems but also more effective ones (turning off the phone, storing it out of sight or leaving it in another place). So, while 65% of the surveyed students recognize that they are stricter in the application of the self-control mechanisms when studying, 51% do the same when listening to professor explanations.

The study results also reveal that not all students behave in the same way, given that the type of university and degree may somewhat condition their attitude regarding the use of mobile phones in their learning process. Social science students and those studying in public universities are more permissive with their use of technologies in the classrooms and they do not believe that this use negatively affects their studies. Experimental science students and those studying in private universities however, demonstrate a more responsible behaviour and claim to utilize more self-control mechanisms to limit the use of the mobile phone in the

classroom and when studying; furthermore, they do not believe that learning with these devices offers an advantage as compared to the traditional system.

However, we believe that these factors are not decisive in establishing a typology that is significant in terms of explaining the behaviour of youth regarding mobile phone use during their university phase. It appears that the responsible use of mobile phones in and out of the classroom depends on each person (as declared in the study) and their level of commitment to their studies. So, it is necessary to identify subjective criteria to help explain the reasons behind this behaviour.

It may be necessary to clearly and responsibly determine the foundations of this relationship with ICT in schools, educating children so that once they attend university they are the ones (not the institution or professor) who know when their use is appropriate.

This study is part of the research project that was approved by the Community of Madrid PROVULDIG-Program of activities on digital vulnerability (H2015/HUM3434).

## References

- Ahn, J. (2011). The effects of social network sites on adolescents' social and academic development: current theories and controversies. *Journal of the American Society for Information Science and Technology*, 62(8), 1435-1445. <https://doi.org/10.1002/asi.21540>
- Barajas, F. & Álvarez, C. (2013). Uso de Facebook como herramienta en la enseñanza del área de naturales en el grado undécimo de educación media vocacional. *Pixel-Bit. Revista de Medios y Educación*, 42, 143-156.
- Bisquerra, R. (2004): *Metodología de la investigación educativa*. Madrid: La Muralla.
- Cabero, J. & Marín, V. (2014). Posibilidades educativas de las redes sociales y el trabajo en grupo. Percepciones de los alumnos universitarios. [Educational Possibilities of Social Networks and Group Work. University Students' Perceptions]. *Comunicar*, 42(XXI), 165-172. <https://doi.org/10.3916/C42-2014-16>
- Campbell, S. W. (2006). Perceptions of Mobile Phones in College Classrooms: Ringing, Cheating, and Classroom Polices. *Communication Education*, 55(3), 280-294. <http://dx.doi.org/10.1080/03634520600748573>
- Carbonell, X., Fúster, H., Chamarro, A. & Oberst, U. (2012). Adicción a Internet y móvil: una revisión de estudios empíricos españoles. *Papeles del psicólogo*, 33(2), 82-89. Retrieved from <http://www.papelesdelpsicologo.es/pdf/2096.pdf>
- Chen, Q. & Yan, Z. (2016). Does Multitasking with Mobile Phones Affect Learning? A review. *Computers in Human Behavior*, 54, 34-42. <http://dx.doi.org/10.1016/j.chb.2015.07.047>
- Corbeil, J. R. & Valdes-Corbeil, M. E. (2007). Are you Ready for Mobile Learning? *Educause Quarterly*, 30(2), 51. Retrieved from <http://er.educause.edu/~media/files/article-downloads/eqmo726.pdf>
- Deloitte (2017). Global Mobile Consumer Survey. Retrieved from [www.deloitte.com/us/mobileconsumer](http://www.deloitte.com/us/mobileconsumer)
- Ditrendia (2017). Informe Mobile en España y en el mundo. Retrieved from [www.amic.media/media/files/file\\_352\\_1289.pdf](http://www.amic.media/media/files/file_352_1289.pdf)
- End, C. M., Worthman, S., Mathews, M. B. & Wetterau, K. (2010). Costly Mobile Phones: the Impact of Cell Phone Rings on Academic Performance. *Teaching of Psychology*, 37(1), 55-57. <http://dx.doi.org/10.1080/00986280903425912>
- Fojtik, R. (2014). Mobile Technologies Education. *Procedia-Social and Behavioral Sciences*, 143, 342-346. <http://dx.doi.org/10.1016/j.sbspro.2014.07.417>
- García-Valcárcel, A. & Tejedor, F. J. (2017). Percepción de los estudiantes sobre el valor de las TIC en sus estrategias de aprendizaje y su relación con el rendimiento. *Educación XXI*, 20(2), 137-159. <https://doi.org/10.5944/educXXI.13447>

- Gómez, M., Roses, S. & Farias, P. (2012). El uso académico de las redes sociales en universitarios [The Academic Use of Social Networks among University Students]. *Comunicar*, 38(XIX), 131-138. <https://doi.org/10.3916/C38-2012-03-04>
- Gómez, L. A., Sánchez, V. V. & Cruz, F. N. (2015). Analysis of Use and Dependence on Cell Phone in the Students of the Faculty of Management and Accounting of the Uadec. Paper presented at *Global Conference on Business & Finance Proceedings*, 10(2), pp. 2349-2396. San José, Costa Rica: Institute for Business & Finance Research.
- Greenhow, C. & Robelia, B. (2009). Old communication, new literacies: Social Network Sites as Social Learning Resources. *Journal of Computer Mediated Communication*, 14, 1130-1161. <https://doi.org/10.1111/j.1083-6101.2009.01484.x>
- Gutiérrez, I. & Soto, F. (2012). Conectados: una experiencia de uso de Facebook con estudiantes de Pedagogía. *Los retos de la competencia digital: el cambio metodológico*. Actas de las IV Jornadas Nacionales TIC y Educación.
- Hernández Pina, F. (2001): *Bases metodológicas de la investigación educativa*. Murcia: Diego Marín.
- IAB (2017). Estudio Mobile 2016. Retrieved from [http://iabspain.es/wp-content/uploads/estudio\\_anual\\_de\\_mobile\\_marketing\\_2016.pdf](http://iabspain.es/wp-content/uploads/estudio_anual_de_mobile_marketing_2016.pdf)
- Junco, R. & Cotten, S. R. (2012). No A 4 U: The Relationship between Multitasking and Academic Performance. *Computers & Education*, 59(2), 505-514. <http://dx.doi.org/10.1016/j.compedu.2011.12.023>
- Kitchakarn, O. (2016). How Students Perceived Social Media as a Learning Tool in Enhancing their Language Learning Performance. *TOJET* 15(4). Retrieved from <http://tojet.net/articles/v15i4/1546.pdf>
- Kukulska-Hulme, A. (2007). Mobile Usability in Educational Contexts: What Have We Learnt? *The International Review of Research in Open and Distributed Learning*, 8(2). <http://dx.doi.org/10.19173/irrodl.v8i2.356>
- Kuznekoff, J. H. & Titsworth, S. (2013). The Impact of Mobile Phone Usage on Student Learning. *Communication Education*, 62(3), 233-252. <http://dx.doi.org/10.1080/03634523.2013.767917>
- Kuznekoff, J., Munz, S. & Titsworth, S. (2015). Mobile Phones in the Classroom: Examining the Effects of Texting, Twitter, and Message Content on Student Learning. *Communication Education*, 64(3), 344-365. <http://dx.doi.org/10.1080/03634523.2015.1038727>
- Lepp, A., Barkley, J. E. & Karpinski, A. C. (2015). The Relationship Between Cell Phone Use and Academic Performance in a Sample of U.S. College Students. *SAGE Open* (January-March), 1-9. <https://doi.org/10.1177/2158244015573169>
- Marcos, L., Tamez, R. & Lozano Monterrey, A. (2009). Aprendizaje móvil y desarrollo de habilidades en foros asincrónicos de comunicación [Mobile Learning as a Tool for the Development of Communication Skills in Virtual Discussion Boards]. *Comunicar*, 33(XVII), 93-100. <https://doi.org/10.3916/c33-2009-02-009>
- Ministerio de Educación, Cultura y Deporte (2015). "Datos y cifras del sistema universitario español. Curso 2014-2015". Retrieved from [www.mecd.gob.es](http://www.mecd.gob.es)
- Molina, A. & Chirino, V. (2010). Mejores prácticas de aprendizaje móvil para el desarrollo de competencias en la educación superior. *IEEE-RITA*, 5(4), 175-183.
- Morris, N. P., Lambe, J., Ciccone, J. & Swinnerton, B. (2016). Mobile Technology: Students Perceived Benefits of Apps for Learning Neuroanatomy. *Journal of Computer Assisted Learning*, 32(5), 430-442. <http://dx.doi.org/10.1111/jcal.12144>
- O'Bannon, B. W. & Thomas, K. (2014). Teacher Perceptions of Using Mobile Phones in the Classroom: Age Matters! *Computers & Education*, 74, 15-25. <http://dx.doi.org/10.1016/j.compedu.2014.01.006>

- O'Bannon, B. W. & Thomas, K. M. (2015). Mobile Phones in the Classroom: Preservice Teachers Answer the Call. *Computers & Education*, 85, 110-122. <http://dx.doi.org/10.1016/j.compedu.2015.02.010>
- Olufadi, Y. (2015). A Configurational Approach to the Investigation of the Multiple Paths to Success of Students through Mobile Phone Use Behaviors. *Computers & Education*, 86, 84-104. <http://dx.doi.org/10.1016/j.compedu.2015.03.005>
- Pettit, J. & Kukulska-Hulme, A. (2007). Going with the Grain: Mobile Devices in Practice. *Australasian Journal of Educational Technology*, 23, 17-33. <http://dx.doi.org/10.14742/ajet.1271>
- Prendes Espinosa, M<sup>a</sup>. P., Gutiérrez Porlán, I. & Castañeda Quintero, L. (2015). Perfiles del uso de redes sociales: estudio descriptivo con alumnado de la Universidad de Murcia. *Revista Complutense de Educación*, 26, 175-195. [http://dx.doi.org/10.5209/rev\\_RCED.2015.v26.46439](http://dx.doi.org/10.5209/rev_RCED.2015.v26.46439)
- Ramos, M. & Jiménez, G. (2007). Jóvenes y móviles. Estrategias de los operadores de telefonía en España. [Strategies of Telephone Companies in Spain]. *Comunicar*, 29(XV)m 121-128.
- Ravizza, S. M., Hambrick, D. Z. & Fenn, K. M. (2014). Non-academic Internet Use in the Classroom Is Negatively Related to Classroom Learning Regardless of Intellectual Ability. *Computers & Education*, 78, 109-114. <http://dx.doi.org/10.1016/j.compedu.2014.05.007>
- Roblyer, M. D. & Doering, A. H. (2010). Integrating Educational Technology into Teaching (5<sup>th</sup> Ed.). Boston, MA: Allyn and Bacon/Pearson.
- Santillán, A., Cornejo, C. & Ausín, S. (2012). Las Fan Page de Facebook como medio de difusión de la Enfermería Basada en la Evidencia. *Enfermería Global*, 28, 74-81. Retrieved from [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1695-61412012000400006&lng=es&nrm=iso](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1695-61412012000400006&lng=es&nrm=iso)
- Shelton, J. T., Elliott, E. M., Lynn, S. D. & Exner, A.L. (2011). The Distracting Effects of a Ringing Cell Phone: an Investigation of the Laboratory and the Classroom Setting. *Journal of Environmental Psychology*, 29(4), 513-521. <http://dx.doi.org/10.1016/j.jenvp.2009.03.001>
- Spitzer, M. (2014). Information Technology in Education: Risks and Side Effects. *Trends in Neuroscience and Education*, 3(3), 81-85. <http://dx.doi.org/10.1016/j.tine.2014.09.002>
- Thomas, K., O'Bannon, B. & Bolton, N. (2013). Cell Phones in the Classroom: Teachers' Perspectives of Inclusion, Benefits and Barriers. *Computers in the Schools*, 30(4), 295-308. <http://dx.doi.org/10.1080/07380569.2013.844637>
- Tindell, D. & Bohlander, R. (2012). The Use and Abuse of Cell Phones and Text Messaging in the Classroom: A Survey of College Students. *College Teaching*, 60(1), 1-9. <http://dx.doi.org/10.1080/87567555.2011.604802>
- Traxler, J. (2009). Current State of Mobile Learning. In M. Ally (Ed.), *Mobile Learning: Transforming the Delivery of Education and Training* (pp. 9-24). Canada: Athabasca Press.
- Wang, Y. S., Li, C. R., Yeh, C. H., Cheng, S. T., Chiou, C. C. & Tang, T. I. (2016). A Conceptual Model for Assessing Blog-based Learning System Success in the Context of Business Education. *The International Journal of Management Education*, 14(3), 379-387. <http://dx.doi.org/10.1016/j.ijme.2016.09.002>