

Article

# Factors Contributing to Mobile Phone Dependence amongst Young People: Educational Implications

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**Abstract:** The use of mobile devices facilitates access to knowledge and is at the base of the education of the future. Although the digital society has contributed a number of benefits, however, it has also been associated with worrying behaviours. The study design consisted of a quantitative approach that was descriptive, inferential and ex post-facto in nature. Its purpose was to better understand the opinion of young people regarding mobile phone use and describe dependence deriving from regular use. The sample was formed of 420 students from the Faculty of Education at the University of Granada. Results indicate that mobile phone use has displaced use of other technologies such as the television, and is associated with communication and recreational activities. In addition, a profile was identified for young people at greater risk of developing a dependence on their mobile devices. This profile constituted females, mobile phone users with recreational motives and individuals who exceeded mobile phone use by more than six hours a day. To improve the educational use of mobile phone, prevention and intervention plans must be designed which ensure correct management of this device, taking advantage of the benefits it offers whilst avoiding problems derived from inappropriate use.

**Keywords:** Information and communication technology, mobile phones, dependence, youth.

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## 1. Introduction

Information and communication technologies (ICT) have expanded at a dizzying speed within young people across the world, having an important impact on their habits. From the year 2000 onwards, popularisation of the internet led to coining of the new term “digital natives”. This term refers to the youth population born in the 21<sup>st</sup> century who employ new technologies in a natural way [1]. Transcendence of ICT in contemporary society is such that it has led to the emergence of new dynamics in communication and access to information. These practices have transformed social relations and production, causing a rethink of the way an individual interacts in all spheres within which they exist [2, 3, 4, 5, 6].

The quantitative scope of these changes has been documented by Santana, Gómez and Feliciano [7] who reported that 92.4% of the population, aged between 10 and 15 years, had incorporated such changes into their daily life for communicative and academic purposes [4]. Within

this phenomenon, an availability factor has been outlined, with the number of homes in Spain with access to the internet being higher than 80%. Cloquell [2] posits that, given this backdrop, it is useful to evaluate the impact of ICT and, especially, internet access amongst young people and the social imperative its use may invoke. On the back of this, pros and cons can be identified, which may strengthen or detract from outcomes, respectively.

Nowadays, internet access is fundamentally provided through mobile devices. Amongst these, telephones are the most commonly used [7]. Mobile phone use has expanded for a number of purposes, principally, those that are professional and communicative in nature [8, 9, 10]. Europe is the continent in which this technology is most embedded at all age ranges [11]. For this reason, contemporary society is referred to as a “smartphone society” [12], characterised by the fact that 93% of the population has access to a personal smartphone. Mean usage of these devices exceeds 20 hours a week in the Western world. In agreement with [13], mobile phone use as a personal device is typically initiated in Spain at ten years old and is completely integrated into adolescents’ routines by the age of thirteen. From there, use progressively increases with age.

In agreement with Herrera, Gil and Acuña [8], mobile phone use has led to a break with traditional processes of interaction and socialisation. This generates what Polo, Mendo, León and Felipe [14] identify as “virtual spaces”, constituting a phenomenon that needs to be investigated in order to understand what other possible changes could arise. Such changes could include the substitution of communicative elements for emotions or the sub-culture associated with technology use. Along the same lines, Ruiz [13] explains that mobile phones are associated with a differentiated use of the applications available through technological devices. These include social networks and games, and their use differentiates the kind of leisure engaged in by contemporary youth, from that of previous generations.

Positive aspects connecting mobile phone use, such as the ubiquity of information access and infinite communicative possibilities, have given it a central role in multiple daily processes: purchasing, training, other [12, 15]. Nevertheless, use of this tool is not free from debate due to the risk factors it entails. There is an existing social concern regarding the development of pathological behaviours. Such risks include addiction to this device and problems associated to excess use or other dangerous practices of technology use [11, 12, 16].

In accordance with Carbonell et al. [16], concern about the potential addiction that can be generated by inappropriate mobile phone use has been a troubling problem in research for more than a decade. This coincides with the point at which studies began to investigate the prevalence of problematic use. Amongst the various risk behaviours, the most harmful consists of feelings of dependence and addiction towards the mobile phone. Despite interest in investigating this phenomenon further in adolescents and young people as they constitute the population most exposed to this technology, the majority of studies have focused on the adult population [16].

Authors such as Kuss et al. [12] suggest that there are a number of reasons for investigating potential dependence behaviours developed by individuals, however, one of the most important is the need to better understand which characteristics may constitute problematic use. From this, research will be able to articulate evidence for appropriate prevention.

## **2. Methods**

### **2.1. Aims**

The present study centres on mobile phone use amongst young university students. A quantitative approach was taken which was descriptive, inferential and ex post facto in nature. This

permits us to study a broad set of individuals and analyse each one of the proposed variables in both an isolated and combined way [17]. An instrument was designed for the present study through which to deepen understanding of young peoples' opinions about mobile phone use, whilst also detecting potential dependence behaviours derived from its use.

In relation to mobile phone usage patterns, the following personal characteristics of students were analysed: Sex, age, qualification being undertaken and registered year of study. In respect to these characteristics, the following usage patterns were analysed: Mobile phone use for videogames, problems derived from using the mobile phone to consult the internet or visit social networks, places and situations in which mobiles can be used, frequency of use, and responsibility for paying the service bill.

Objectives of the present study were to determine factors associated with mobile phone dependence in young university students and estimate the risk potential of each factor. To achieve this, a binary logistic regression model was estimated following a two-step process. Firstly, a stepwise logistic regression model was constructed according to statistical likelihood ratios. This identified factors which significantly influenced the likelihood of having mobile phone dependence. Secondly, a hierarchical logistic regression model was developed to establish the contribution of each factor to the aforementioned probability.

## 2.2. Participants

Data was produced from a sample which was formed by 420 students from the Faculty of Education Sciences and the University of Granada. The sample was recruited through probabilistic intentional sampling, this enabled us to select accessible cases who agreed to be included in the study.

The sample is constituted by 84.8% females and 15.2% males. These gender differences correspond to the elevated presence of females within the reference population. Average age of the young participants in the present sample was 20.83 years, with the youngest being 17 years and the oldest being 44 years old. Standard deviation was 3.391.

Attending to the studies being undertaken by respondents, percentages were distributed as presented below:

Table 1

*Frequencies for the variable describing the qualification being undertaken*

		Frequency	Percentage	Valid percentage
Valid	Primary education	50	11.9	11.9
	Infant education	47	11.2	11.2
	Pedagogy	172	41.0	41.0
	Social education	114	27.1	27.1
	Master	37	8.8	8.8
	Total	420	100.0	100.0

The qualification with the greatest representation is pedagogy, with this being undertaken by 41% of participants, followed by social education with 27.1% and, finally, teaching in primary education and infant education, with similar percentages (11.9% and 11.2%, respectively).

The 79% are students undertaking the first year of their course, whilst 21% were enrolled on the fourth year of their course.

### 2.3. Instrument

An ad hoc questionnaire was elaborated for data collection by selecting and adapting items from other previously standardised instruments. 14 Items came from the instrument developed by Labrador and Villadangos [18]; 9 from the instrument of Ordóñez, Urbano and Esparrell [19]; and, the 12 remaining items were taken from the instrument described by Roberts [20]. Thus, our instrument included a total of 35 items, of which only 31 scale items were considered for the validation process.

In order to ensure content validity of the instrument, opinions of a group of nine professionals were taken into consideration. All professionals were experts in research methodology and the ambit of information and communication technology.

As nine experts were consulted, a numerical rating scale with a degree of adjustment was used. The scale ranged from 1 to 4, with 1 being 'nothing' and 4 being 'totally'. Thus, the highest score that could be obtained from the items was  $9 \times 4 = 36$ . We established the cut-point of  $9 \times 3 = 27$ , considering 1 and 2 as negative, and 3 and 4 as positive. Of the 31 items subjected to validation by the expert panel, 3 were eliminated, leaving 28 in the final version of the instrument. Respondents were required to respond to these items along a four-point Likert scale: Never, sometimes, frequently and always.

Internal consistency of the questionnaire was calculated via the reliability Cronbach alpha coefficient, obtaining a value of  $\sigma = .92$ . Analysis confirmed that, in all cases, the reliability coefficient values observed were sufficiently high to validate the inferences and conclusions made in the present research study.

Finally, four identification variables were added to the instrument, these being: Sex, age, qualification undertaken and course year.

### 2.4. Procedure

Participants were informed about the purpose of the research, with participation being entirely voluntarily. All members of the sample were provided with a link to Google docs. in order to fill out an online application. Anonymity of participants was respected and ethical principles of social science research were followed.

Completed questionnaires were collected and we proceeded to digital coding, sorting and recording of responses in a database for its later statistical treatment. Following this, analysis of quantitative results was performed through the statistical analysis program SPSS.

## 3. Results

### 3.1. Behavioural patterns

We found that 99.3% of respondents use an internet diary. The same percentage also used a mobile phone diary to consult social networks. Nevertheless, only 46.5 % of those surveyed reported watching the television every day and 9.3% of participants played video consoles or videogames every day.

Above all, internet use was considered to be a problematic activity by participants at least some of the time. 43.1% considered it to be problematic sometimes, 14.3% frequently and 5.2% always. A total of 9% reported the problems sometimes occurred when playing the console, 1.4% said they occurred frequently and only 0.5% stated that problems always occurred. In contrast, 16.7% of the sample considered the television to sometimes be problematic, 4.5% of the sample considered related problems frequently, with 2.6% perceiving it to always be problematic.

The 19% of the sample reported that they always spent more time than necessary surfing the internet, 33.1% reported this to occur frequently and 42.4% stated this only sometimes.

The 50% of participants sometimes felt bad when they could not use the internet, whilst 12.4% reported this malaise frequently and 6.9% reported always feeling bad because of internet use. 17.4% sometimes had discussions with their friends about internet use, whilst 8.6% sometimes lied to their family or friends about the number of hours they spent using the internet. 29.5% sometimes stopped doing another activity in order to use the internet, whilst 4.8% did so frequently and 0.7% always abandoned other activities to use the internet.

The 56.7% of the sample reported relaxing some of the time when they used the internet, 16.7% reported relaxing frequently and 5.7% reported always relaxing. Nevertheless, 30.1% sometimes feel nervous when they cannot use the internet, 7.2% frequently do so and 0.5% always feel nervous without the internet.

Only 21.7% of participants paid their telephone bill with their own resources.

The 89.3% used the internet more than six hours a week, 36.5% used it more than six hours a day, followed by 28.6%, who used it between five and six hours a day. 86% of the sample used a mobile phone more than six hours a week, 30% used it more than six hours a day and 25% invested between five and six hours a day using a mobile phone.

The 39% always check their mobile phone to see if somebody has written to them or called them, with 37.1% doing so frequently. 24.5% lose all notion of time when they are connected, with 11% of the sample stating that this always occurs. 20.3% frequently feel bad for investing too much time into being online, with 8.6% always feeling bad for the same reason. 11.7% report having reduced their mobile phone use frequently because they believed they were addicted, with 4% always limiting their use for the same reason.

The 33.7% of those surveyed reported frequently using their mobile phone in class, with 18.4% always using it in class. 12.6% believe that it is frequently easier to express their emotions with emoticons, with 7.4% stating this to always be the case.

The 56.4% interact with their mobile phone as soon as they wake up. 18.3% report frequently considering that they invest increasingly more time into their mobile phone, with 7.4% feeling that they always do this. A total of 8.8% of the sample reports frequently being anxious if they do not use their mobile phone, with 1.4% always having this feeling. 14% of participants report sometimes using their mobile phone whilst driving, 2.9% do so frequently and 0.7% report always engaging in this behaviour.

### **3.2. Logistic regression**

Results obtained through stepwise logistic regression indicated that sociodemographic factors had little influence on the likelihood of having a dependence on mobile phones, with sex being the only variable to be statistically significant ( $p=0.04$ ). Factors associated with the places and situations in which young people employ their mobile phones were also discarded. With respect to factors related to mobile phone use and the problems derived from this, a significant influence was found with the use of these devices to play ( $p=0.014$ ) and problems created by them when consulting networks ( $p<0.001$ ). With regards to the frequency of use, the number of daily hours spent with the mobile phone was found to be significant ( $p<0.001$ ). Whether the young person themselves, or their parents, paid the telephone bill did not demonstrate any relationship with device use or dependence.

Following this, a hierarchical logistic regression model was estimated in which variables were introduced in three blocks: Sociodemographic (sex), different types of use and the problems derived (mobile phone use for playing, problems created by mobile phone use for consulting social networks) and frequency of use (number of daily hours). In this way, the extent to which each block explains the probability of mobile phone dependence could be estimated. The following table shows the results from this hierarchical logistic regression model. The end of the table also includes results from the tests of model fit for each block, alongside the Nagelkerke R<sup>2</sup> and the Cox and Snell R<sup>2</sup>. This outlines the contribution of each factor type to the final model.

Interaction terms between variables were not identified. As can be observed from the table, important changes were not produced in the magnitude or direction of the odds ratio as each factor was introduced into each block.

Table 2

*Hierarchical logistic regression. Risk factors for mobile phone dependence*

<i>Factors</i>	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	<i>Odd ratio (CI 95%)</i>	<i>p</i>	<i>Odd ratio (CI 95%)</i>	<i>p</i>	<i>Odd ratio (CI 95%)</i>	<i>p</i>
<i>Gender</i>	2.649	0.045	3.420	0.019	3.172	0.030
<i>Female</i>	(1.023-6.863)		(1.229-9.522)		(1.122-8.972)	
<i>Mobile phone use for playing<sup>a</sup></i>						
<i>Sometimes</i>			2.414	0.013	2.477	0.014
			(1.202-4.845)		(1.202-5.104)	
<i>Frequently/always</i>			2.784	0.008	3.059	0.005
			(1.313-5.903)		(1.403-6.673)	
<i>Problems from mobile phone use for consulting social networks<sup>a</sup></i>						
<i>Sometimes</i>			1.754	0.134	1.682	0.178
			(0.841-3.659)		(0.789-3.586)	

<i>Frequently/always</i>		7.696	<0.001	8.569	<0.001
		(3.656-16.202)		(3.911-18.778)	
<i>Num. daily hours of mobile phone use<sup>b</sup></i>				4.061	<0.001
<i>More than 6 hours a day</i>				(2.268-7.272)	
<i>Chi-squared model</i>	5.027	49.567		72.510	
<i>Sig. Change -2 log. verisimilitude</i>	0.025	<0.001		<0.001	
<i>Cox y Snell R<sup>2</sup></i>	0.012	0.112		0.159	
<i>Nagelkerke R<sup>2</sup></i>	0.020	0.167		0.246	

Source: developed by the authors.

<sup>a</sup> Reference category: never

<sup>b</sup> Reference category: 1 to 6 hours a day

From the aforementioned results, a profile can be deduced of young people at greater risk of developing dependence on mobile phones, it is as follows:

- Female (3 times more likely than males).
- Mobile phones are used always or frequently to play (3 times more likely than those who respond that they never use a mobile phone to this end).
- Daily device usage greater than 6 hours (4 times more likely than those who use mobile phones for between 1 and 6 hours).
- Frequently or always has problems due to using a telephone to consult social networks (8.5 times more likely than those who respond that they never have this type of problem).

The set of factors studied is capable of explaining approximately between 16% and 25% of the probability of suffering from a dependence on mobile phones. The factors with greatest weight in this explanation were those related with the type of use attributed to mobile phones and the problems associated with this. These in themselves explained only between 10% and 16% of variance in the dependent variable. The factor with the second greatest importance was frequency of mobile phone use, with this contributing between 4.7% and 7.9% to the explanatory capacity of the model. In contrast, sex was the only sociodemographic variable that showed an association with dependence on mobile phones, though it only explained between 1.2% and 2% of the likelihood of young people developing mobile phone dependence.

#### 4. Discussion

In relation to internet use, it is notable that 19% of young people considered that they always spent more time than necessary online, whilst 16.7% considered themselves to frequently use the internet for a more prolonged time than necessary. The 42.2% only sometimes admitted to this extensive technology use. Of all participants, 24.5% referred to sometimes losing track of time when navigating the web and 11% reported never being aware of the length of their usage whenever they used their device. In line with research conducted by Ruiz [13] these data highlight that usage plays a hugely important role in the life of young people. Nevertheless, this does not mean that all use is concerning and, as stated by Ruiz [13], mobile phone use is controlled in the majority of cases and does not invoke harmful behaviour.

In quantifying this usage, we see that 89.3% of the sample were situated in the category of surfing the internet on mobile devices for more than six hours a week. This being said, attention must be drawn to the fact that 28.6% engage in this practice for more than six hours a day. This is more than seven times the average weekly use of participants overall. These young people are engaging in a potentially abusive use of technology in that they reflect a far greater investment of time in mobile phone use than their peers. For this reason, they must constitute the focus of interest from a prevention perspective.

These data are somewhat different from those obtained by Aljomaa et al. [21] who reported that 48% of students participating in their study were addicted to their mobile phone. Faced with these data, our study identified a risk profile which was characteristic of a much smaller proportion of the present sample. This could be explained by the different methods employed in both studies and the different research context.

Another aspect that catches attention is the finding that 50% of participants sometimes feel bad when they do not have any possibility of accessing the internet. This dropped to 12.4% of participants, who indicated frequently feeling bad when faced with this situation and 6.9% who stated always.

Of all participants it was further detected that 17.4% tended to have discussions with others about their internet use, whilst 8.6% sometimes lied about their internet use, tending to under-represent the hours of their use when discussing it with relatives or friends. On the other hand, another notable aspect was that 29.5% of participants had stopped engaging in some other activity on at least one occasion in order to use the internet, whilst 4.8% frequently did so and 0.7% reported always doing so.

Of those surveyed, 56.7% sometimes feel relaxed when they use the internet. The 16.7% frequently relaxed online and, finally, 5.7% always relaxed surfing the web. These data contrast with the feelings expressed by the remaining participants in relation to internet use: 30.1% sometimes feel nervous when there is no internet connection available, 7.2% is frequently nervous when this occurs and 0.5%, always. Further, 8.8% admit frequently feeling anxious when they do not use their mobile phone and 1.4% always feel this sensation. In agreement with Samaha and Hawi [22], these data highlight a link between mobile phone use and variables related with mental health. These variables should be measured in other similar research studies, alongside others that are implicated in the prevalence of emotional disorders amongst university students.

As another aspect, the study outlines elevated mobile phone use amongst participants. The daily rate of mobile phone use exceeded averages reported in other research studies [11, 12] which could indicate a rising trend towards this behaviour in the present day. In accordance with authors



such as Rahim et al. [23] and Herrera, Gil and Acuña [8], a new trend regarding technology consumption that connects this overuse of mobile phones amongst young people must be considered. This trend has been documented and implies that, for university students, the acquisition of mobile technologies is one of the most characteristic consumption behaviours of contemporary society.

Further, according to Demirci, Akgönül and Akpınar [24], it is necessary to offer a detailed examination of mobile phone use amongst young people because potential addiction is correlated with sleep problems, anxiety and behavioural disorders. This requires an approach that is directed by a multi-disciplinary perspective, in which the health and educational systems participate in order to achieve better results. The desired result is full control over the potential pathologies that may be suffered as an outcome of technology use. In connection with this, Gökçearsan, Mumcu, Haslamani and Cevik [25] have explained that it is necessary for educational institutions to delegate time to better understand the various profiles of mobile phone use amongst their students. From this context, they will then be able to design proposals for more appropriate interventions.

The present study evidences that mobile phone use has seen an increase in detriment to other technologies, such as the television and videogames. For the young people surveyed, it is a reference device in their daily lives. This, in agreement with Herrera, Gil and Acuña [8], brings with it a new need which must be satisfied – the need to acquire new mobile phones with increasing functionality and stimuli, in this way quenching the thirst for interaction. Of all participants, 39% always check their telephone to see whether they have new notifications, with this action being frequently carried out by 37.1% of participants. In line with these data and in agreement with Vorderer, Krömer and Schneider [26], it is highlighted that it is more important to young people that they are connected than to use the functionalities of their devices. In other words, they use the telephone as a means to demonstrate social availability towards others, for this reason they are constantly updating their connections. This situation leads to a great deal of worry in cases where young people find that their device cannot connect to the network for a number of reasons [26].

In accordance with this research, mobile telephone use by young university students exceeds leisure time, thus also being carried out during their class schedule, with 33.7% reporting frequently engaging in this practice and 18.4%, always. Dependence on different daily actions for young people with regards to this device is also evident whilst driving, with 2.9% referring to frequently using their phone whilst driving and 0.7%, always. Although these rates are not very high, it must be considered that it concerns a legally sanctioned behaviour in Spain and can have very serious consequences, thus, ideally, this percentage should be zero. In accordance with Ruiz (2016), this behaviour may show compulsive mobile phone use, characterised by an absence of physical barriers to the use of this resource. In this way, individuals will register identical behaviour relating to their mobile phone in the various spaces in which they find themselves throughout the day. In agreement with Ruiz [13], the low percentage of individuals using mobile phones in such circumstances is reassuring and implies that the majority of young people are conscious of the uses for which this device is designed.

When communicating with others, these young people seek emotional support in order to channel their emotions, with this modality being frequently or always considered by some (12.6% and 7.4%, respectively) as an easier route to achieve this.

The present study gives pause for thought in that participants do not typically pay their own internet bills, with only 21.7% taking personal responsibility over this expense.

In relation to potential awareness regarding excessive use of these devices, 20.3% reported that they frequently feel bad for investing too much time in using their device and 8.6% stated that this was always the case. These data point to recognition on the part of users that they may be losing control in the management of their personal time due to technology, although this is not connected with other types of actions through which they could limit excessive use [27].

The present study identified a profile of young people at risk of developing dependence on their mobile device. This profile constitutes females, those using their mobile phones for entertainment purposes and individuals who exceed a mobile phone use of more than six hours a day. Finally, a notable risk factor is the emergence of problems associated with using mobile phones to consult social networks. This profile corroborates those identified by Ruiz [13] and Polo et al [14]. For these authors, despite there being no risk of having more problems from developing a mobile phone dependence *per se*, the existence of behavioural and emotional problems is a variable that influences this dimension. Given that prevalence of these disorders is higher in females, we predict that females are likely to face a greater chance of using this technology in a maladaptive way as it offers users a new route through which they can connect with others and establish affective relationships, which may not be possible in another setting.

For Polo et al. [14] risk is more notorious within university students of a younger age (18 to 20 years). This is because communicative and emotional conflicts are stronger, and the mobile phone is now considered to offer a route through which these challenges can be overcome.

On the other hand, Aljomaa et al. [21] add the status of being single as another risk factor. For these researchers, this is a component that conditions abusive technology use, with this being evidenced by both a higher number of daily hours of usage (this exceeding 4 hours) and more money being invested in technology.

In consideration of the characteristics of young people at greater risk and in agreement with Boumosleh and Jaalouk [28], interventions and prevention plans should be designed which ensure correct management of this device, whilst enabling individuals to take advantage of its benefits without suffering problems derived from mobile phone misuse. Kim and Kim [29] highlight that, together with behavioural and emotional problems, musculoskeletal problems associated with telephone use should also be tackled. This should begin with a thorough analysis which, in practice, remains a neglected aspect in research despite its obvious interest.

## 5. Conclusions

The most relevant factors leading to dependence of young people on mobile phone use were identified. These related to the type of mobile phone use practiced (for playing games and consulting social networks) and problems resulting from this, in addition to another factor that was related with the frequency of use. Finally, sex, to a lesser extent, was found to be another component in the explanation of the likelihood of young people developing a dependence on mobile phones.

We consider education to constitute a route through which individuals can be supplied with full knowledge about the potential uses of the tools at their disposition, equipping them to comprehend the opportunities and risks within their reach. ICT has revolutionised communicative, training and work processes [30]. It is an auspicious ally for accessing information and resources which are highly positive for the individual and, with suitable control, can make the “mobile phone society” a social setting unmatched in history with regards to knowledge concerns.

Teachers should offer this type of training to students with the aim of enabling them to consciously optimise their resources and, in this way, steer them away from problematic and risky behaviours [31, 32]. This will also offer them a route through which to report potential harmful use or request help when necessary. As a consequence, responsible technology use requires knowledge of its dangers and the possibility of it impacting upon problem prevention, leading to a completely secure digital space.

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