






# Problematic uses of ICT among young people in their personal and school life

Usos problemáticos de las TIC entre jóvenes en su vida personal y escolar

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## ABSTRACT

Studies on ICT use in education usually focus on ICT's contribution to training processes. However, scarce research has concentrated on the problematic use of ICT among young people in the school context, and most of it approaches the problem from a psychopathological perspective. The purpose of this paper, in contrast, is to analyse problematic ICT use among young people in their personal and school setting. The methodology involved applying a questionnaire to a sample of 1,052 youths aged between 12 and 18 years old. The study starts with a univariate and bivariate descriptive analysis. Subsequently, three Poisson regression models were developed to evaluate the contribution of several predictor variables to the three types of problematic uses identified in their sphere, learning processes and classroom relationships. Results show a relationship between problematic ICT use in personal and school settings, with older youths who use smartphones (the) most likely to engage in this type of behaviour. The use of mobile technology largely explains the problematic behaviour in the use of ICT among young people in personal and school contexts, which justifies the need to promote actions contributing to more responsible use of this type of technology in all areas of their personal, school and social life.

## RESUMEN

Los estudios sobre el uso de las TIC en educación suelen analizar su contribución a los procesos formativos. Son escasas las investigaciones centradas en los usos problemáticos de las TIC que realizan los jóvenes en el contexto escolar y, la mayoría, lo abordan desde una perspectiva psicopatológica. El propósito del presente artículo es analizar los usos problemáticos de las TIC entre jóvenes en su ámbito personal y escolar. La metodología consistió en la aplicación de un cuestionario a 1.052 jóvenes de entre 12 y 18 años. El estudio se inicia con un análisis univariante y bivariante. Posteriormente, se desarrollan tres modelos de regresión de Poisson para valorar la contribución de diversas variables predictoras sobre tres tipos de usos problemáticos identificados en: el ámbito personal, los procesos de aprendizaje y las relaciones de aula. Los resultados muestran una relación entre los usos problemáticos en el ámbito personal y escolar, siendo los chicos de mayor edad y que utilizan intensivamente los «smartphones» los que más probabilidades tienen de incurrir en este tipo de comportamientos. El uso de la tecnología móvil explica en gran medida las conductas inadecuadas en el uso de las TIC en los ámbitos personal y escolar entre los jóvenes, lo que justifica la necesidad de promover actuaciones que contribuyan a un uso más responsable de este tipo de tecnología en todos los ámbitos de su vida personal, escolar y social.

## KEYWORDS | PALABRAS CLAVE

ICT, young people, digital behaviour, mobile devices, school, learning, personal relationships, quantitative analysis.  
TIC, jóvenes, comportamiento digital, dispositivos móviles, escuela, aprendizaje, relaciones personales, análisis cuantitativo.



## 1. Introduction

Information and communications technology (ICT) and, in particular, the Internet and mobile devices (mobile phones and tablets) are part of young people's lives, both in the school context and beyond (Lenhart, 2015). The Survey on the Equipment and Use of Information and Communications Technology in Homes in 2016 conducted by the National Statistics Institute (INE) indicates that 98.4% of young people (98.6% of males and 98.2% of females) aged between 16 and 24 years old use the Internet, representing a 17% increase compared to figures recorded in 2006. In the case of children aged between 10 and 15 years old, the INE establishes that in 2016, 94.9% used a computer every day, 95.2% tended to use the Internet, and 69.8% had a mobile phone. Studies analysing ICT use among young people are abundant, and indicate that the main personal uses are associated with watching video clips, instant messaging, participation in social networks, videogames and exchanging photos, videos and music, among others (Stald & al., 2014). Thus, for example, common research topics are the analysis of safe Internet use (Valcke, De-Wever, Van-Keer, & Schellens, 2011), the role of the family in the development of young people's behaviour and attitudes towards ICT (Aesaert & Van-Braak, 2014), mobile technology (Vincent, 2015) and the influence of social networks (Manca & Grion, 2017) and certain types of videogames on their behaviour (Muros, Aragon, & Bustos, 2013).

In the educational context, studies tend to analyse the contribution of technology to teaching and learning processes (Perez-Sanagustin & al., 2017). Among other aspects, this research explains how ICT modify classroom practices, improve students' motivation, commitment and results, increase the interaction between teaching staff and students, and foster more student-oriented didactic processes (Biagi & Loi, 2013; Chen, 2010; Comi, Argentin, Gui, Origo, & Pagani, 2017). Lastly, although to a lesser degree, we can also find contributions which, in addition to classrooms and learning processes, study the incorporation of ICT into the school context. This type of studies tends to focus on structural aspects, such as Internet access, technical-administrative support for teaching staff (Wastiau & al., 2013) and policies on ICT (Meneses, Fabregues, Jacovkis, & Rodriguez-Gomez, 2014). Other research has highlighted collaboration and participation in the educational community (Dias-Fonseca & Potter, 2016) and the professional use of ICT among teaching staff (Meneses, Fabregues, Rodríguez-Gómez, & Ion, 2012).

As indicated by Selwyn (2016) and Sureda-Negre, Comas-Forgas & Oliver-Trobat (2015), the majority of contributions on the use of technologies in the educational context tend to highlight their neutral or even beneficial nature. However, little research has focused, from a comprehensive perspective, on the unethical, problematic, inappropriate and dysfunctional uses young people make of ICT in the educational context (Lau & Yuen, 2014). Although there are some analyses that examine very specific elements such as plagiarism (Gomez-Espinosa, Francisco, & Moreno-Ger, 2016), academic copying (Byrne & Trushell, 2013) and the distracting element of technology (Xu, 2015), the majority of studies tend to tackle the problematic uses of ICT among young people from a psychopathological perspective (Selwyn, 2016), for example, studies on the consumption of online and offline pornography among adolescents (Rivera, Santos, Cabrera, & Docal, 2016), sexting (Atwood, 2016), the academic impact of online games (Floros, Paradisioti, Hadjimarcou, Mappouras, Karkanioti, & Siomos, 2015) and Internet addiction (Salmela-Aro, Upadyaya, Hakkarainen, Lonka, & Alho, 2017). Most notable among these are the studies on cyber-bullying (Kowalski, Giumetti, Schroeder, & Lattanner, 2014), which document and analyse, among other aspects, its nature and impact on young people (Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008) or the personal characteristics and the social, family and school contexts of those bullied and of bullies (Ortega, Buelga, & Cava, 2016).

The use of ICT entails an evident risk for young people who must face new challenges and situations for which they probably lack the knowledge and experience required to discern and make the correct decisions (Livingstone, Haddon, Görzig, & Olafsson, 2011). Problematic ICT use, regardless of the context in which it occurs, leads to repercussions that go beyond the specific use of ICT and affect other dimensions of the psycho-emotional and social development of young people (Hatzigianni, Gregoriadis, & Fleer, 2016). It is essential to shed light on the problematic use young people make of ICT in the school context in order to adopt organisational, advisory and training measures that improve their potential as a tool in the educational context. In this regard, the aim of the present study is to analyse the problematic use of ICT among young people in their personal and school life.

## 2. Method

This study was conducted in the framework of the project "The use and abuse of new information and communications technology in adolescents" (Gairín & al., 2014). The fieldwork consisted of the application of a

self-administered questionnaire (on paper, during an hour-long class and in the presence of a researcher and the group tutor) to a non-representative sample of 1,052 young people aged between 12 and 18 years old who were in compulsory and post-compulsory secondary education. 48.1% of the young people were female, and their average age was 16.81. The survey, created on the basis of a bibliographic review and the opinion of experts, underwent an assessment of content and served to collect sociodemographic information, as well as information about the relation between young people and ICT in different contexts of their daily life, particularly, the frequency and type of ICT use, their satisfaction, and self-regulation and self-protection mechanisms.

## 2.1. Measures

The predictor variables used in this study are gender, age, and frequency of ICT use at school and home and the use of smartphones. The criterion variables are problematic use in the personal context, in learning processes and classroom relationships (Table 1).

The age variable was recodified in five categories (11-12 years, 13-14 years, 15-16 years, 17-18 years, and over-18), thereby respecting the usual vertical grouping in regulated studies. The variables of frequency of ICT use at school and home, as well as the use of smartphones, were included in the study since

this type of measure is one of the key factors to explain the relationship between young people and technology (Fraillon, Ainley, Schulz, Friedman, & Gebhardt, 2014). These three variables contain five categories that provide information about the amount of time that, from Monday to Friday, young people devote to ICT: none, less than 1 hour, 1-3 hours, 3 to 6 hours, more than 6 hours).

Lastly, as regards ICT use, information was collected from a list of twelve problematic uses that young people made during the last academic year. This information was codified using twelve dichotomous variables (presence vs. absence) which served to perform an exploratory factorial analysis that helped to classify problematic ICT use in three categories ranging from 0 to 4, where 0 means that no type of problematic behaviour was performed and four means that four types of bad uses were made. Figure 1 shows the twelve uses considered and the percentage of young people who performed them during an academic year: problematic uses in the personal context (using the personal data of other people such as for example, photos, videos, passwords, etc., using others' identities on platforms such as "Facebook", "WhatsApp", "Line", etc., offending other people by recording and sending images of them without their permission and sharing photos or videos related to other people without their consent", problematic uses in the learning process (copying classmates' homework, sharing others' homework to copy them, copying other people's work and copying during exams), and problematic uses in the classroom (wasting time they could dedicate to learning, becoming distracted during class, distracting their classmates and bothering them).

The principal components analysis (PCA) with oblimin rotation<sup>1</sup> showed an acceptable structure (KMO=.849 and a significant Barlett test,  $p=.000$ ), which explains 74.21% of the total variance observed and which shows rotated factorial loads that oscillate between .864 and .906 for the first component (problematic uses in the personal context), between .649 and .962 for the second (problematic uses during learning processes), and .523 and .903 for the last (problematic uses in classroom relationships). Likewise, the reliability analysis showed a Cronbach  $\alpha$  of .936, .929 and .880, respectively. Based on this classification, three independent counts of inappropriate behaviours were developed for each of the young people's spheres of daily activity.

**Problematic ICT use, regardless of the context in which it occurs, leads to repercussions that go beyond the specific use of ICT and affect other dimensions of the psycho-emotional and social development of young people. It is essential to shed light on the problematic use young people make of ICT in the school context in order to adopt organisational, advisory and training measures that improve their potential as a tool in the educational context.**

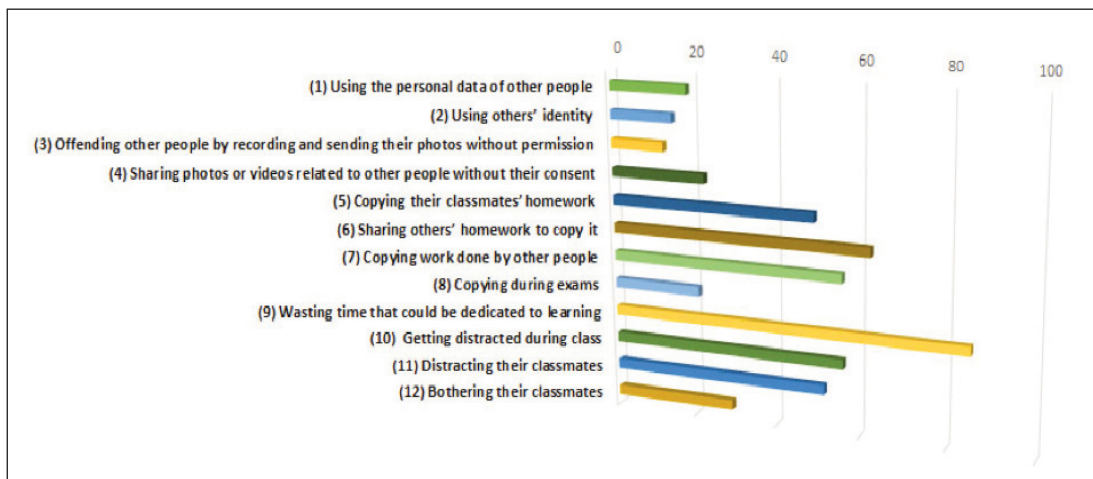


Figure 1. Problematic uses of ICT among young people in secondary education during an academic year (%).

## 2.2. Statistical analysis

The first approach to the available data begins with a descriptive and bivariate analysis. According to the nature of the variables considered, appropriate tests were applied to assess the degree of association between them<sup>2</sup> and their corresponding significance levels were obtained (Table 1).

Below, three Poisson regression models were performed, a multivariate type of analysis from the family of the general linear model specifically developed to assess the contribution of various predictor variables, simultaneously and, therefore, monitoring the effect of the other variables considered, in a criterion variable based on a count. This type of analysis is chosen when, as is the case of the count of the number of problematic uses of ICT made by young people, the assumptions on which the linear regression model is based are violated (Cohen, Cohen, West, & Aiken, 2003; Cox, West, & Aiken, 2009).

The models were calculated and assessed, verifying that the assumption of equidispersion established by the Poisson regression was not breached. The Pearson goodness of fit chi-squared test showed indices of over-dispersion in the case of the count of inappropriate behaviours in the personal context ( $X^2$  value/degrees of freedom = 1787.141/1016 = 1.759) and, therefore, in this case, the binomial, negative regression model was used as an alternative. The suitability of this decision was corroborated by the global adjustment indicators from the new model which, as was expected, showed lower values in accordance with the Akaike information criterion and the Bayesian information criterion.

Table 2 shows the results of this analysis, presenting the parameter estimations, the standard errors and the corresponding Wald tests to assess their significance, as well as the global significance of the models (likelihood ratio) and the indicators required to assess their adjustment. To facilitate the interpretation of the results, the values of the estimated marginal means were also calculated, which serve to illustrate the differences in the count of the problematic uses of ICT once the effect of the rest of the model variables has been monitored.

## 3. Results

The data shown in Table 1 indicate that, although problematic uses of technology among young people are occurring, these uses are practically non-existent in the personal context (e.g., use of others' data, use of others' identity, offending others by recording and sending photos and sharing videos, links, about without permission) with a mean in the sample of .67 ( $dt=1.14$ ). However, the problematic uses appear to occur more frequently in classroom relationships ( $m=2.22$ ,  $dt=1.26$ ) and during learning processes ( $m=1.88$ ,  $dt=1.42$ ).

As expected, although the three types of uses analysed are related, with correlations that oscillate between  $r=.318$  and  $r=.513$  ( $p=.000$ ), indicating the association existing between personal behaviour and school behaviour, the most consistent relation is found between those uses associated with the classroom and the learning processes ( $r=.513$ ,  $p=.000$ ).

As regards the explanatory variables, while in the case of gender the most distinct relation occurs with problematic uses in the personal context ( $r_{pb}=.196$ ,  $p=.000$ ), age correlates to a greater extent with problematic

uses during learning processes ( $r_s=.152$ ,  $p=.000$ ). Likewise, the scarce correlation existing between gender and inappropriate uses during learning processes is notable ( $r_{pb}=.061$ ,  $p<.05$ ).

If we now observe the use of ICT and smartphones in the variables, we observe how the hours of “smartphone” use is the predictor variable which, compared to the rest, presents a stronger relation with the three types of problematic uses analysed: inappropriate behaviours during the learning processes ( $r_s=.141$ ,  $p=.000$ ), inappropriate behaviours in the personal context ( $r_s=.077$ ,  $p<.05$ ) and inappropriate behaviours in classroom relationships ( $r_s=.203$ ,  $p=.000$ ).

ICT use, both at school and at home, shows a pattern of very similar relations, where the most frequent use of ICT is associated with more inappropriate behaviour in classroom relationships ( $r_s=.128$  and  $r_s=.114$ ,  $p=.000$ ,

**Table 1. Means, typical deviation and correlations between the variables observed**  
( $p<.05$ ;  $^b p<.01$ ;  $^c p<.001$ ;  $^d p=.000$ )

	M	DT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Problematic uses in the personal context (1)	.67	1.14	-							
Problematic uses in the learning process (2)	1.88	1.42	.318 <sup>d</sup>	-						
Problematic uses in classroom relationships (3)	2.22	1.26	.332 <sup>d</sup>	.513 <sup>d</sup>	-					
Gender (4)	.57	.49	.196 <sup>d</sup>	.061 <sup>a</sup>	.126 <sup>d</sup>	-				
Age (5)	2.28	1.10	.101 <sup>c</sup>	.152 <sup>d</sup>	.115 <sup>d</sup>	.114 <sup>d</sup>	-			
Frequency of ICT use at school (6)	1.43	1.30	.046	.047	.128 <sup>d</sup>	.103 <sup>c</sup>	.071 <sup>a</sup>	-		
Frequency of ICT use at home (7)	1.94	1.19	.046	.074 <sup>a</sup>	.114 <sup>d</sup>	.074 <sup>a</sup>	.080 <sup>b</sup>	.341 <sup>d</sup>	-	
Frequency of use of smartphones (8)	2.37	1.38	.077 <sup>a</sup>	.141 <sup>d</sup>	.203 <sup>d</sup>	.113 <sup>d</sup>	.124 <sup>d</sup>	.005	.112 <sup>d</sup>	-

respectively) and, on the contrary, it does not present significant differences as regards inappropriate behaviours in the personal context.

Once the bivariant relations have been analysed, Table 2 shows three Poisson regression models which serve to examine the number of problematic uses (criterion variables) according to the available predictors<sup>3</sup>.

In relation to the model generated for problematic ICT use in the personal context ( $lr=95.058$ ,  $p=.000$ ), once the effect of the rest of the variables has been controlled, we observe that this type of use is statistically greater among males ( $Exp(B)=2.037$ ,  $p=.000$ ) aged between 17 and 18 years old ( $Exp(B)=2.006$ ,  $p<.05$ ). Specifically, the data indicate, on the one hand, that males make a mean of .7186 ( $dt=.06066$ ) problematic uses per academic year in the personal sphere, compared to the .3529 ( $dt=.03983$ ) problematic uses per academic year made by females and, on the other hand, that teenagers aged between 17 and 18 double the problematic uses in the personal context ( $mme=.7874$ ,  $dt=.08002$ ) than those young people aged between 11 and 12 ( $mme=.3926$ ,  $dt=.10991$ ).

Unlike what occurred in the bivariant analyses, the use of ICT at school presents a significant effect on problematic use in the personal context. Those youths who make moderate use of ICT at school (between 1 and 3 hours), recognise making 35.4% ( $p<.05$ ) more problematic uses in the personal context than those youths who say they have not used ICT at school ( $mme=.4335$ ,  $dt=.04935$ ). On the contrary, if we focus on the frequency of the use of smartphones, teenagers who spend more than 6 hours weekly on these devices are more likely to make problematic use of ICT in the personal context ( $Exp(B)=1.482$ ,  $p<.05$ ).

If we now focus on the models that are more associated with the school context, and that explain the problematic uses of ICT during learning processes ( $lr=63.291$ ,  $p=.000$ ) and in classroom relationships ( $lr=65.652$ ,  $p=.000$ ), we see how the sample variables used (gender and age) present unequal behaviour. In the case of gender, only when the problematic uses are analysed in the classroom relationships is the effect significant. As occurred in the first model developed (problematic uses of ICT in the personal context), males presented a slightly higher number of problematic uses in classroom relationships ( $mme=2.2315$ ,  $dt=.07775$ ) than females ( $mme=1.9405$ ,  $dt=.08382$ ). On the contrary, when we analyse age, the significant effects only appear to be associated with the problematic use of ICT in learning processes, with young people aged more than 15 years old making the greatest number of problematic uses. It is important to point out that the probability of problematic use increases with age, being, compared to teenagers aged 11 to 12 years old, 45.5% ( $p<.05$ ) greater for those teenagers between 15 and 16 years old, 56.0% ( $p<.001$ ) greater for young people aged between 17 and 18 years old and 60.6% ( $p<.01$ ) greater for young people aged over 18.

The use of ICT at school appears to be not only associated with problematic uses in classroom relations, with youths who most use ICT (more than 6 hours weekly) recognising a greater number of inappropriate behaviours

(21.2% more than those young people who do not use ICT at school). In any case, the frequency of “smartphone” use once again presents a more consistent effect in both models. In accordance with that mentioned above for problematic uses in the personal sphere, those young people who use smartphones for more than 6 hours weekly recognised a higher number of problematic uses, both in learning processes ( $mme=1.9914$ ,  $dt=.09730$ ), and in classroom relations ( $mme=2.4459$ ,  $dt=.10954$ ).

#### 4. Discussion and conclusions

This article has tackled the analysis of the problematic uses young people make of ICT in the academic context of secondary education. This type of use does not tend to be studied from the perspective of the school context

(Selwyn, 2016) and yet, it is an essential element to understand the use young people make of ICT, complementing more traditional approaches that tend to only focus on training processes and practices (Perez-Sanagustin & al., 2017).

The results reveal that problematic ICT use among youths tends to be associated to a greater extent with learning processes and classroom relationships and, to a lesser extent with the purely personal context. In any case, as indicated in previous research (Gronn, Scott, Edwards, & Henderson, 2014; Kent & Facer, 2004) there is a clear link between the use, in this case problematic, made of technology in the personal and school contexts.

The bivariant analyses show

Table 2. General linear models for the problematic use of ICT among young people in secondary education (*p<.05; **p<.01; ***p<.001; ****p=.000)									
	Problematic uses in the personal context (1)			Problematic uses in the learning process (2)			Problematic uses in classroom relations (3)		
	B (S.E.)	Exp(B)	Wald	B (S.E.)	Exp(B)	Wald	B (S.E.)	Exp(B)	Wald
<b>Intercept</b>	-1.541 (.337)	.214	20.928 <sup>e</sup>	.073 (.155)	1.075	.221	.293 (.137)	1.340	4.577 <sup>a</sup>
<b>Gender</b>									
Male	-	-	-	-	-	-	-	-	-
Female	.711 (.113)	2.037	39.468 <sup>d</sup>	.092 (.047)	1.096	3.776	.140 (.045)	1.150	9.699 <sup>b</sup>
<b>Age</b>									
Between 11 & 12 years	-	-	-	-	-	-	-	-	-
Between 13 & 14 years	.038 (.304)	1.038	.015	.187 (.138)	1.206	1.843	-.009 (.118)	.991	.006
Between 15 & 16 years	.302 (.295)	1.352	1.044	.375 (.134)	1.455	7.794 <sup>a</sup>	.121 (.115)	1.128	1.105
Between 17 & 18 years	.696 (.294)	2.006	5.589 <sup>a</sup>	.444 (.135)	1.560	10.820 <sup>c</sup>	.164 (.116)	1.178	2.004
Over 18 years	.209 (.314)	1.233	.446	.474 (.141)	1.606	11.345 <sup>c</sup>	.069 (.123)	1.071	.313
<b>Frequency of ICT use at school</b>									
None	-	-	-	-	-	-	-	-	-
Less than 1 hour	.232 (.150)	1.261	2.385	.069 (.066)	1.072	1.122	.100 (.062)	1.105	2.569
Between 1h and 3h	.303 (.144)	1.354	4.462 <sup>a</sup>	.083 (.062)	1.087	1.806	.112 (.060)	1.118	3.524
Between 3h and 6h	-.021 (.180)	.979	.014	.020 (.076)	1.020	.067	.134 (.072)	1.144	3.520
More than 6h	.235 (.198)	1.265	1.404	.014 (.088)	1.014	.024	.193 (.081)	1.212	5.639 <sup>a</sup>
<b>Frequency of ICT use at home</b>									
None	-	-	-	-	-	-	-	-	-
Less than 1 hour	-.169 (.183)	.845	.846	-.009 (.082)	.991	.013	.021 (.078)	1.021	.072
Between 1h and 3h	-.195 (.173)	.823	1.271	-.027 (.078)	.974	.118	.056 (.074)	1.058	.582
Between 3h and 6h	.072 (.193)	1.075	.140	.084 (.087)	1.088	.948	.109 (.083)	1.115	1.74
More than 6h	.010 (.210)	1.010	.002	.103 (.094)	1.108	1.204	.081 (.089)	1.084	.820
<b>Frequency of "smartphone" use</b>									
None	-	-	-	-	-	-	-	-	-
Less than 1 hour	.083 (.214)	1.086	.150	.008 (.956)	1.008	.007	.079 (.092)	1.082	.747
Between 1h and 3h	.159 (.182)	1.173	.769	.004 (.080)	1.004	.003	.107 (.077)	1.113	1.923
Between 3h and 6h	.151 (.185)	1.163	.670	.120 (.080)	1.127	2.236	.212 (.078)	1.237	7.479 <sup>b</sup>
More than 6h	.393 (.173)	1.482	5.194 <sup>a</sup>	.207 (.075)	1.229	7.511 <sup>b</sup>	.302 (.074)	1.352	16.773 <sup>c</sup>
<b>Model summary</b>									
Likelihood ratio			95.058 <sup>e</sup>			63.291 <sup>c</sup>			65.652 <sup>d</sup>
Pearson chi-squared test (gl.)			1113.539 (1016)			1095.677 (1039)			686.425 (1005)
Akaike information criterion			2211.716			3658.688			3.380
Bayesian information criterion			2300.658			3748.026			3468.749
Sample size			1034			1057			1023

than males and youths in their last teens recognise a greater number of dysfunctional uses or inappropriate behaviours in the three contexts analysed (in the personal context, in learning processes and in classroom relationships). However, these differences are slightly reduced in the multivariate analyses, when other variables are introduced such as ICT use at school and home, and the use of smartphones. These results are consistent with those studies that, from a more complex perspective, place the emphasis on the digital inequalities of young people (Davies, Coleman, & Livingston, 2014; Robinson & al., 2015), considering not only their sociodemographic characteristics, but also their attitudes, motivation and skills using technology, as well as the time dedicated and the frequency and typology of uses.

The frequency of use and access to technology are two of the factors usually associated with the attitudes and typology of uses made by users. Thus, for example, Rohatgi and others (2016) establish a clear relationship between ICT use, self-efficacy, and digital literacy. As regards attitudes, Fraillon and others (2010) indicate that students with greater access to and use of ICT at home and school are more confident about their digital skills. The results of this study demonstrate that, although there is a certain relation between the number of hours spent using ICT, both in and out of school, when we monitor the effect of other variables (the use of smartphones and sociodemographic variables), ICT use at school only shows some significant differences in problematic ICT use, with those young people who make a moderate to intensive use of ICT being the ones who have a higher number of inappropriate behaviours in the personal sphere and their classroom relationships (Figure 2). Under no circumstances is the frequency of use associated with inappropriate behaviours during the learning processes (e.g., copying homework, sharing materials from others to copy them, copying work done by others and copying during exams).

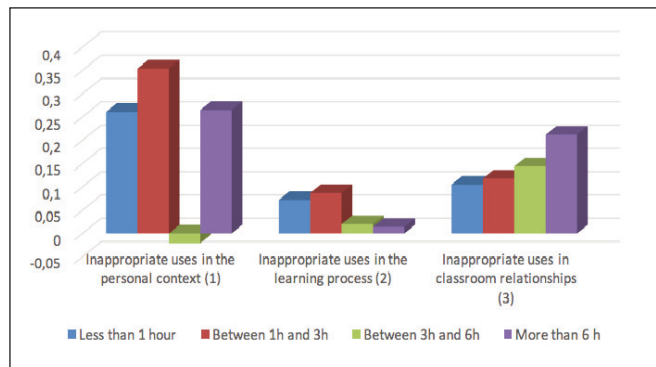


Figure 2. Influence of the frequency of ICT use at school on problematic ICT use among young people (variation in likelihood).

The study presented herein shows how the frequency of “Smartphone” use by young people is the best predictor of problematic ICT use in all the contexts analysed (Figure 3). Likewise, our results reveal a behaviour pattern that is much more consistent with previous studies, in which, for example, it is established that people with more access to the Internet tend to have more developed digital skills and explore a greater range of mobile technology possibilities (Hargittai & Kim, 2010).

In short, this study contributes to complete, from a multi-dimensional perspective, the previous conceptual framework on the use young people make of ICT. In agreement with previous studies, we observe how the use of technology in the school context and, specifically, of mobile devices (Atwood, 2016; Festl, Scharkow, & Quandt, 2015; Kauffman & Young, 2015) are essential elements to understand the inappropriate behaviours of young people when they use ICT both in the school context, and in their daily life.

Nevertheless, this study presents some limitations that suggest interpreting the results as an initial exploration of the dysfunctional uses of ICT among young people in the school context. Thus, for example, more specific measures should be considered (e.g., digital literacy, attitudes, access, equipment, socioeconomic situation) that will help us to gain a better understanding of the use young people make of ICT, thereby facilitating the development of proposals that can contribute to reducing those uses considered to be problematic. Likewise, it would be fundamental to promote studies that specifically analyse the use young people make of mobile technology, in and out of the school context, from the perspective of all the agents involved. In this vein, some research has highlighted the importance of tackling the discussion on ICT use among young people from a more comprehensive and contextual approach (Valcke & al., 2011).

In addition, an approach using a mixed methodological approach, combining questionnaires and interviews, would provide us with a better understanding of the phenomenon (Tashakkori & Teddlie, 2010). The qualitative data will provide more contextual information on why problematic uses during learning processes appear to be the least conditioned by technology use and specify, in addition to the frequency of use, how digital literacy and the type of use being made of ICT is associated with the dysfunctional uses that we have tackled here.

To conclude, the use of mobile technology largely explains the inappropriate behaviours in ICT use among youths in the personal and school contexts. Educational centres, as a reference context for these young people, instead of avoiding the use of mobile technology, should foster actions that contribute towards responsible use of this technology by young people in all areas of their personal, school and social life.

### Notes

<sup>1</sup> Given the dichotomous nature of the variables used for the count, the programme Factor (Lorenzo-Seva & Ferrando, 2006) was used to perform the PCA analysis with the polychoric correlation.

<sup>2</sup> In accordance with the metrics of the pairs of variables, the Pearson  $r$  test was used for continuous variables, the Spearman correlation range ( $r_s$ ) between ordinal and pair variables comprising quantitative and ordinal variables, the point-biserial ( $r_{pb}$ ) for quantitative and dichotomous variables, and the phi ( $r_{\phi}$ ) for pairs of ordinal and dichotomous variables.

<sup>3</sup> The graphs, showing the influence of gender, age and ICT use at home on problematic ICT use among young people are available at Figshare (<https://goo.gl/a38AFs>). The graphs corresponding to the frequency of ICT use at school and the frequency of "smartphone" use are directly included in the text.

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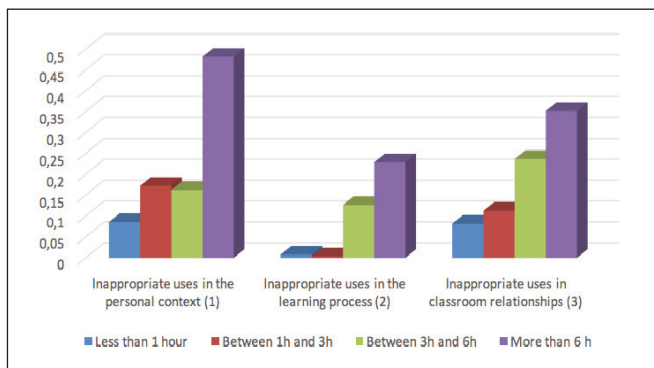


Figure 3. Influence of the frequency of "Smartphone" use at school on problematic ICT use among young people (variation in likelihood).



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