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Connected Teens: Measuring the Impact of Mobile Phones on Social Relationships through Social Capital

Adolescentes conectados: La medición del impacto del móvil en las relaciones sociales desde el capital social

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ABSTRACT

Over the past twenty years, the high penetration of mobile phones as a means of interpersonal communication, especially among adolescents, has facilitated access to broader social environments outside their own family. Through the extension of their social environment, teenagers are able to establish new and more extensive relationships, while facing risks that may negatively affect their socialization process. The aim of this article was to find out how computer-mediated communication helps or obstructs the creation of social capital between teenagers, and what are the consequences of its use for this age group. To achieve this, an index of social capital was developed in the study, designed to determine the positive or negative impact of certain components of mobile mediated communication in the creation of this intangible resource. Questionnaires were distributed among Spanish adolescents of secondary and high school age, from different public and private schools of Navarre. Furthermore, the study considered the adolescents' own perceptions about the incidence of the use of mobile phones in their social relationships. As reflected in the results, to identify the components of mediated communication that significantly affect social capital it is necessary to conduct an objective measurement of this resource.

RESUMEN

La alta penetración del teléfono móvil entre los adolescentes y su uso como medio de comunicación interpersonal ha facilitado para este público el acceso, durante los últimos veinte años, a entornos más amplios, distintos al familiar. A través de la extensión de su ámbito social, estos son capaces de establecer nuevos vínculos y relaciones más extensas, al tiempo que se enfrentan a riesgos que afectan de manera negativa a su proceso de socialización. El objetivo de este trabajo fue conocer de qué manera la comunicación mediada por la tecnología favorece o no la creación de capital social entre las comunidades de adolescentes, y cuáles son las consecuencias que pueden resultar de su uso para este grupo de edad. Para ello se propuso un índice de capital social, que permitiera conocer el impacto positivo o negativo que tienen determinados componentes de la comunicación mediada por el móvil en la creación de este recurso. Se repartieron cuestionarios entre jóvenes españoles de la ESO y Bachillerato, en colegios públicos y privados de la Comunidad Foral de Navarra. Además, se tuvo en cuenta la propia percepción de los adolescentes, sobre la incidencia del uso de este dispositivo en sus relaciones sociales. Tal como reflejan los resultados, solo a través de una medición objetiva del capital social es posible identificar aquellos componentes de la comunicación mediada que afectan de manera significativa a este recurso.

KEYWORDS | PALABRAS CLAVE

Adolescents, mobile phones, screens, computer-mediated communication, social capital, relationships, communities, friendship.
Adolescentes, teléfonos móviles, pantallas, comunicación mediada, capital social, relaciones, comunidades, amistad.

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1. Introduction and statement of the question

Digital technology has achieved great importance among adolescents, and it makes up a large part of their daily activities in various contexts, including the family, education, and social settings. The mobile phone is of great importance in the world of technology because it is adaptable to specific social and consumer needs.

The impact of mobile phones on adolescent social relationships deserves particular attention because younger social groups use technology to a great extent, and mobile phones facilitate this process. The activities that adolescents engage in online and offline are challenging to disentangle and at the same time mutually influence one another (Boyd, 2014; Korchmaros & al., 2013). Mobile phones are worth studying because of their communication function, as well as the fact that adolescents are early adopters of this particular technology. The objective of this study was to understand how mobile phones influence communication mechanisms within adolescent social settings, as well as how it differs from face-to-face interactions.

The quality of relationships, specifically those that have been transported to online social networks and virtual communities, is still challenging to measure, and that is why it is advantageous to employ the concept of social capital. The intention of this study is to understand the potential positive impact that mobile phones have on the quality of adolescent social relationships by using the concept of social capital and its role in adolescent communities.

The hypothesis proposed is that the objective measure of social capital permits the identification of the components of communication conducted using mobile devices that significantly impact the social relations of adolescents.

1.1. Social capital

Many of the key motives for involvement in virtual communities or communication via internet are primarily intangible, such as, searching for information and opinions, friendships, support and confidence or the sense of belonging to a group (Baym, 2011; Jenkins, Ford, & Green, 2015; Korchmaros & al., 2013; Smith, Himelboim, Rainie, & Shneiderman, 2015). By means of this analysis and the benefits obtained through mobile phone communication, the concept of social capital emerges often. This term is understood as a series of resources that unites individuals in a community and enriches the relationships, as well as benefits the development of said relationships (Smith, 2014). The exploration of social capital has been the object of study for more than three decades (Bourdieu, 1980, 2002; Coleman, 1988; Bourdieu & Wacquant, 1992; Portes, 1998; 2014; Durston, 2000; Putnam, 2000, 2001; Neira, Portela, & Vieira, 2010). According to Bourdieu (1986: 248), the person who coined the term, social capital refers to "the aggregate of actual or potential links to stabilize social relationships that are relatively formal and where there is mutual awareness and acknowledgement".

Bourdieu (1986) grants this concept an active meaning, which highlights the benefits that individuals acquire through participating in groups and the deliberate building of relationships with the goal of creating and obtaining resources. He distinguishes between two elements of social capital: 1) social networks that permit members claim to or the ability to access distinctive resources, and 2) the quantity and quality of these relationships.

Years later, Bourdieu and Wacquant (1992: 119) defined social capital as, "the sum of the resources, real or virtual, that could reach another person or group via networks of relationships of mutual awareness and acknowledgement that are relatively institutionalized". In other words, the relationships can make the resources that are obtained vary in function and form.

Later on, Putnam (2000: 21) defined social capital as "social networks and norms that are reciprocated", and posed that this concept fell into different customs and dimensions in reference to different matters or problems. In his book "Bowling Alone" he describes how the civic participation in the United States underwent typical ups and downs in the twentieth century until finally plateauing considerably in the present time. This shifted the U.S. from a strong and active civil society to a more individualistic culture. Putman claims that social capital –the connection between families, friends, and neighbors– disintegrated and has led to the destitution of cities (Putnam, 2000). This author distinguishes between inclusive social capital or "bridging social capital" and exclusive social capital or "bonding social capital" to refer to the distinct quality of the different ties that are generated among people that form part of those networks. In other words, social capital may be voluntary or necessary. For insiders it tends to reinforce exclusive identities and homogenous groups; meanwhile, groups that are more open permit diversity but the ties are usually weaker (Putnam, 2000: 22).

In addition to exclusive and inclusive social capital, Ellison, Steinfield and Lampe (2007) analyze another type of social capital, which they termed "maintained" to refer to weak links that people sustain when they are physically apart and allow for relationship to continue in spite of the distance.

The extent and quality of the links that people form among each other, along with other environmental factors, can influence social capital in communities and society in general. Among these factors, technology emerges as a medium of interpersonal communication that facilitates access among adolescents in wider environments, different from the more familiar scope. For this reason, it is necessary to conduct an updated analysis in terms of internet usage and digital screens.

Numerous investigations have already addressed the relationship between adolescent participation in online social networks and the subsequent social capital generated (Ellison & Vitak, 2015; Hampton, Lee, & Her, 2011; Lambert, 2015; Liu & Brown, 2014; Sádaba & Vidales, 2015; Wu, Wang, Su, & Yeh, 2013; Xie, 2014). However, there is still a need to develop an adequate method to measure this intangible resource –social capital– to understand the influence that mobile communication has on adolescents' social relationships.

1.2. Measurement of social capital generated via communities

Putnam (2001) proposed some indicators to measure social capital in the United States. Previously, different scales were developed with the purpose of measuring social capital produced in social networking sites (i.e., internet) (Appel & al., 2014; Hooghe & Oser, 2015; Jiang & de-Bruijn, 2014). Williams (2006) investigated the quality or characteristics of online relationships and conducted his analysis using the Internet Social Capital Scale (ISCS). In addition, he proposed distinctions between the social capital constructed via the internet or technology and social capital constructed in a material environment.

> Mobile phones are worth studying because of their communication function, as well as the fact that adolescents are early adopters of this particular technology. The objective of this study was to understand how mobile phones influence communication mechanisms within adolescent social settings, as well as how it differs from face-to-face interactions.

As previously stated, mobile phones reinforce bonds among people. Schrock (2016) analyzes the different uses of Facebook by means of mobile phones and how this impacts individual social capital. His findings show that the principle emotional link is related to the frequency to which individuals create, edit, and publish images and videos as opposed to the type of content. Therefore, certain elements are offered as a result of mobile phones, distinguishing them from other technologies, and could influence the generation of social capital among communities in a special way.

In an attempt to understand the impact that the internet and mobile phones have on social capital among communities, Katz, Rice, Acorda, Dasgupta, and David (2004) analyze different communication mechanisms that could impact these resources: interactions over the internet and physical environment, the number of contacts, the composition of the communities, the frequency and spontaneity of communication, the local/global location of contacts, confidence, distance, speed, identify, and control. Their theory differs from those developed by Hooghe and Oser (2015), Jiang and de-Bruijn (2014) who focused on the general impact that the internet (as well as other traditional resources like television) have on social capital. In this study, there is special attention devoted to mobile phones' impact on adolescents' social relationships due to the scarce research dedicated to this area.

Even though Katz and colleagues (2004) developed ten communication mechanisms that influence social capital related to mobile phones, the scale is reformulated in this study because some of the components are vague and potentially consequences as opposed to elements of communication. For example, confidence, cooperation, institutional effectiveness, and mutual support could be considered consequences of social capital (Putnam, 2000:22).

Our research is in line with Papacharissi (2005), Schrock (2016: 8), who affirm that mobile social resources are not constituted by new environmental relationships; rather, they produce new forms of fine-tuning social contact, managing time, and expressing identity. For this reason, adolescents do not always distinguish between the virtual

world of the internet and the material world. The activities they engage in and the relationships they maintain with their peers are blended continuously in both contexts (Bauwens, 2012). However, Katz and colleagues (2004) believe that positive communication and relationships can only be established if the correct distinction is made between the virtual world and material world.

The next section describes the research conducted on how adolescents use mobile phones and how it influences their relationships.

2. Materials and methodology

The following research questions are investigated:

- Do mobile phones influence communication in adolescents' social relationships?
- What are adolescents' perceptions of the influence mobile phones have on their relationships?
- What relationship exists between perceived social capital and objective social capital generated in adolescent communities via mobile phones?

To respond to these questions and understand the impact that mobile phone usage has on adolescent social relationships, Katz and colleagues' (2004) theory of communication mechanisms was utilized. Using the same process used by the aforementioned authors, our study opted to measure the communication mechanisms using an indirect method to help explore the behavior of the adolescents with respect to each component. All ten of Katz (2004) components were considered in the creation of the questionnaire; however, only the components that clearly explained the impact of mobile phones on social capital were considered in the analysis. Table 1 shows questions 18-44 of the questionnaire paired up with the components.

Each one of these variables was translated into questions for the questionnaire, utilizing a Likert Scale ranging from 1 to 5, with higher numbers indicating higher frequency, quantity, or importance. Questions that helped define the technological profile of the adolescents, as well as demonstrated general usage of internet social networks, were also included in the questionnaire. The questionnaire had a total of 45 questions, most of which required a single response and only two allowed for multiple responses. The validation of the questionnaire was accomplished with a pilot study, which was a representative sample with significant data. This allowed for corrections and the elimination of two questions that did not generate relevant information.

2.1. Design of the sample

The distribution of the sample was proportional according to type of school, public or private, and academic level, including secondary and high school. The total population considered were secondary and high school students within the Community of Navarre (MEDC, 2016). The confidence interval used was at 95% with a margin of error of 5%. The minimum size recommended for our sample was 552 students. After adding 10% of

Table 1. Mechanisms of communication via mobile phones according to Katz and others (2004) and other variables

Mechanisms of CMC	Variables
Interactions online and the physical environment	- Frequency of accessing the internet using mobile phone - Importance of this space - Frequency of face-to-face activities
Number of contacts	- Number of contacts in main social network - Those who are most similar - Degree to which online friends are known in real life
Composition of communities	- Relationship via mobile phone - Relationship in physical environments
Frequency, spontaneity	- Frequency of communication using mobile - Active/passive position
Local/global	- Principle relationships by means of the mobile - Strong/weak relationship
Confidence	- Quantity of information shared via mobile - Basic/personal/both information - Open/private spaces - Face-to-face communication
Distance	- Closeness to friends by means of mobile - Remoteness to friends by means of mobile
Speed	- Speed of own responses - Speed of foreign responses
Identity	- Importance placed on comments made online social networks - Frequency of changing profile picture - Need to communicate what happens in your life or not - Frequency of using mobile when alone
Control	- Limits or prohibitions - Possibility of saying everything on your mind - Provide location

clustering effects for each school, and a 5% error collection, the total number of questionnaires collected was 674, and this covered 97% of the sample necessary to conduct a representative analysis.

2.2. Methods

The last question of the questionnaire was used to measure perceived social capital among adolescents. Respondents indicated whether they believe that their relationships were improved via mobile communication. These results were compared with an objective measure of social capital. For both types of social capital, an ordinary least squares (OLS) analysis was used to understand how each type of social capital depends on the variables of gender academic level, family structure, and other variables related to mobile usage.

The formula (in its simplest form) used for the analysis is as follows: $Y_i=\beta0+\beta1T_i+\beta2X_i+\beta3Ci+\varepsilon_i$.

Where Y_i is the dependent variable, T_i is variable of interest, X_i represents other important explanatory variables of interest, C_i represents all of the control variables (to mitigate omitted variable bias), and εi is the error term. Each regression was controlled for heteroscedasticity using the standard White method.

In the case of objective social capital, a social capital index was created using principle components analysis (PCA) in order to more clearly understand how the components positively or negatively impact the use of phones. There are four components that make up the social capital index: 1) frequency of communication via mobile phones, 2) frequency of in-person activities with friends, 3) the diversity amid the groups respondents communicates with using mobile phones, 4) the diversity amid the groups he/she communicates with offline (Table 2).

Table 2. Objective social capital index

Question	Description	Response
No. 26	Frequency of communication with friends using mobile phone	(1) Never, (2) Almost never, (3) Sometimes, (4) Almost always, (5) Always
No. 20	Frequency of activities with friends in person	(1) Never, (2) Almost never, (3) Sometimes, (4) Almost always, (5) Always
No. 24	Principal relationship online using mobile	(1) People from school, (2) Neighborhood, (3) Close family, (4) Other schools, (5) Other neighborhoods
No. 25	Principal relationship offline, in person	(1) People from school, (2) Neighborhood, (3) Close family, (4) Other schools, (5) Other neighborhoods

Once the online and offline components were separated, two types of objective social capital were analyzed: mobile social capital and physical social capital. Regression analyses were also conducted for these dependent variables to the degree that the significant variables were identifiable in the increase or decrease of the resources in a specific environment.

In addition, a linear regression analysis was conducted for both identity and confidence –both were considered as communication mechanisms for mobile phones by Katz and colleagues (2004); however, in this study they are analyzed separately because it is unclear whether they are independent of or a consequence of increased or decreased social capital. On the one hand, confidence was measured along one single variable. The linear regression analysis looked at the significant influence each variable has on the quantity of information the adolescents share and how that impacts their confidence in their social relationships.

On the other hand, identity was analyzed using an index like the one created for objective social capital, which was made up of two variables: 1) the importance adolescents place on the comments received via social networks, and 2) the frequency at which they change their profile picture. Principle components analysis (PCA) was also used as the method of analysis, with the goal of understanding the importance of each of the components that make up the index. Using linear regression analysis, variables that impact the construction of their personality were identified.

The self-image that adolescents develop via mobile resources could be considered an independent element, without being a cause or effect of social capital. The analysis permits further understanding of the impact certain variables related to communication mediated by mobile phones could have on the configuration of personality, keeping in mind that there are other non-virtual practices that influence the process.

3. Analysis and results

The results can be divided into three parts: 1) analysis of the variables that significantly influence social capital in adolescent communities, 2) analysis of the confidence generated using mobile phones, 3) analysis of the influence certain variables have on the construction of self-image.

As seen in Table 3, there is little relationship between socioeconomic demographics; the use of mobile phones, and the perception adolescents have regarding the influence of these screens in their social relationships. However,

the social capital index allows us to understand this dynamic in an objective manner by looking closely at variables such as, mediated communication, as well as other variables like sex, academic course, and family structure.

The results show that the number of contacts and the relationships with people from broader environments, different from their own neighborhood, positively influence social capital generated in both environments. Both gender and academic level positively affect the creation of this resource, which means growth can be greater for females (or young girls) and those who are at a higher academic levels. Also, the variable regarding people who have personal mobile phones resulted significant: the more personal (not shared) the greater the possibilities to expand social capital.

Table 3. Impact of the mobile device on community social capital

	Dependent variables			
	Perception	TotalSC	PhysicalSC	MobileSC
Independent variables	(Coefficient/ Standard error)	(Coefficient/ Standard error)	(Coefficient/ Standard error)	((Coefficient/ Standard error)
Constant	1.51* / (0.39)	82.65* / (29.01)	1.11*** / (0.67)	2.97* / (1.04)
Quality of contacts	-0.16 / (0.18)	1.88 / (16.22)	0.47** / (0.24)	0.19 / (0.49)
Number of contacts	-0.05 / (0.03)	9.84* / (2.62)	0.16* / (0.06)	0.33* / (0.08)
Main mobile relationship	-0.01 / (0.03)	-0.89 / (2.27)	0.03 / (0.03)	-0.04 / (0.04)
Speed of responses	-0.01 / (0.05)	2.69 / (3.84)	-0.03 / (0.08)	-0.03 / (0.13)
Speed of other responses	-0.01 / (0.06)	-2.11 / (4.03)	0.06 / (0.09)	0.10 / (0.12)
Neighborhood relationships	0.10 / (0.08)	-2.56 / (5.45)	0.59* / (0.13)	0.39** / (0.16)
City relationships	0.17 / (0.13)	26.18** / (11.50)	0.55*** / (0.30)	0.58*** / (0.33)
Autonomous community relationships	-0.07 / (0.08)	-7.43 / (6.39)	0.34* / (0.12)	-0.03 / (0.17)
Country relationships	0.14 / (0.09)	1.51 / (6.91)	0.21 / (0.14)	0.37*** / (0.20)
Control	-0.01 / (0.05)	2.57 / (3.23)	0.02 / (0.07)	0.04 / (0.09)
Course	-0.01 / (0.03)	9.23* / (1.92)	0.01 / (0.05)	0.13** / (0.06)
Sex	-0.09 / (0.09)	23.40* / (7.08)	0.54* / (0.14)	0.80* / (0.20)
Family structure	-0.09 / (0.12)	1.46 / (7.50)	-0.31** / (0.13)	-0.30 / (0.23)
Personal mobile	0.18** / (0.07)	10.32*** / (6.29)	0.11 / (0.18)	0.50** / (0.19)
Games	-0.19* / (0.06)	13.78** / (7.09)	-0.16 / (0.18)	-0.33 / (0.22)
R-squared	0.10	0.28	0.33	0.31
F-statistic	4.91	16.61	20.48	18.94

* Significant at 1%, ** Significant at 5%, *** Significant at 10%
Results Ordinary Least Squares (OLS).

With regard to physical social capital, made up of variables that have to do with the activities undertaken and the composition of the communities in this environment, variables such as the number of contacts and the quality resulted significant. The quality of the contacts consisted of a variable created by dividing the number of total contacts with which the adolescents communicate with using their mobile phone and the principle contacts. For all practical purposes, it can be said that the larger the number and quality of contacts, the larger is the impact of the use of mobile phones on physical social capital. Another significant variable was relationships with people from more diverse environments. Finally, gender and family structure influence these resources.

The number of contacts significantly influences mobile social capital. The indicators that served to measure this resource are the frequency of online communication and the composition of the communities in this environment. This resource is significantly impacted by the relationships with broader environments, aside from own neighborhood, including people from the city or country in general; sex and academic level are impacted in the same manner. In addition, the possession of a personal mobile phone especially influenced the creation of online social capital.

In closing, it must be noted that there was interest in the significant impact that certain applications, for example games, have on perceived and objective social capital. These results reflect the influence that online games have on more frequent communication and the interaction among greater diversity in a manner that warrants the growth of social capital in general.

As previously explained, the confidence generated via mobile communication is measured apart from the components mentioned by Katz and colleagues (2004). The results shown in Table 4 demonstrate that objective social capital positively influences confidence, which means that more information is shared using mobile phones. The type of space that is utilized to communicate, in terms of open mediums or private mediums, influences the creation of these resources. Finally, the results showed that adolescents who prefer to communicate face-to-face with other people have greater confidence and are more capable of enriching relationships.

The third and final analysis shown in Table 5 has to do with the variables that significantly impact the construction of self-image. In the case of sex, females (or young women) tend to be the ones who engage in practices such as changing profile pictures more frequently or giving greater importance to the comments received via mobile phones. The needs to communicate everything that happens to oneself and to check their mobile phone

when alone are variables that, in general, affect the process of self-image. Finally, among the applications, WhatsApp resulted especially significant, meaning that this could reflect the behavior of adolescents who need to construct their self-image by means of the Internet.

Table 4. Impact of mobile on confidence generated

Independent variables	(Coefficients/Standard error)
Constant	-0.29* / (0.63)
Objective social capital	0.01* / (0.00)
Information basic, personal, both	0.39 / (0.07)
Open or private spaces	0.25* / (0.08)
Face to face communication	0.65* / (0.19)
Sex	0.15 / (0.16)
Course	0.04 / (0.05)
Family structure	-0.13 / (0.23)
Personal mobile	-0.12 / (0.15)
Games	-0.04 / (0.18)
R-squared	0.45
F-statistic	59.45

* Significant at 1%, ** Significant at 5%, *** Significant at 10%
Results Ordinary Least Squares (OLS).

4. Discussion and conclusion

There are many conclusions that could be extracted from this study. First of all, the hypothesis is accepted, which states that the objective measure of social capital permits the identification of the communication mechanisms conducted using mobile phones, which significantly impacts social relationships among adolescents. The impact reflected in the results, using the social capital index, shows that there is a significant difference with perceived social capital among adolescents.

Among the most important socio-demographic variables that influence objective social capital is the academic course, which influences the relationships that are maintained online; meanwhile, family structure is significant for relationships outside the internet. Meanwhile, sex has a significant impact on total social capital.

Mobile phone communication positively influences social relationships of adolescents who have shown they are more capable of reconciling their activities both offline and online networks, for example, when they communicate with certain frequency via mobile, while at the same time maintaining the same or more contact with friends offline. This also occurs when the group of friends using these resources includes people from other schools, neighborhood, or cities, which permits greater diversity. Interactions online and relationships outside the internet complement each other as long as they do not yield a disequilibrium that negatively impacts social relationships.

The analysis conducted in both independent environments, inside and outside social networks, was possible with the creation of an index that took into account the frequency with which young people communicate and the diversity of groups they form. Results showed that the communication mechanisms by means of mobile phones, such as number of contacts and local or global relationships, significantly impact both types of social capital, and for this reason they need to be developed in a balanced way. Other variables, like the quality of the contacts maintained, significantly impact the relationships in offline environments, which appear to need maintenance and reinforcement. As Turkle (2011) and Baym (2011) explained, face-to-face contact is vital to ensure that mobile phones have a positive impact on adolescent social relationships. Therefore, aside from the capacity to differentiate between both online and offline spaces (i.e., to ensure positive communication), it is necessary to grow the number of contacts and maintain equilibrium by paying proper attention to physical and social elements that permit interactions with other people.

Table 5. Impact of mobile phone on the construction of self-image

Independent variables	(Coefficient/ Standard error)
Constant	1.76** / (0.98)
Communication of information or not	0.24* / (0.09)
Frequency of mobile use while alone	0.17*** / (0.10)
Sex	0.68* / (0.18)
Course	0.01 / (0.06)
Family structure	-0.29 / (0.24)
Personal mobile	-0.49 / (0.50)
WhatsApp	1.16** / (0.48)
Instagram	-0.10 / (0.21)
Facebook	-0.03 / (0.18)
R-squared	0.32
F-statistic	34.54

* Significant at 1%, ** Significant at 5%, *** Significant at 10%
Results Ordinary Least Squares (OLS).

The degree of confidence generated via communication was also analyzed and it was shown that, consistent with the results already discussed, relationships positively impact the social capital index. This supports the argument by Putnam (2000), who states that confidence is a consequence and not an element of social capital. The use of private spaces for communication and the possibility of doing it face-to-face shows the potential positive impact of these resources.

Finally, WhatsApp particularly impacts the construction of self-image via the use of mobile phones. Especially among females this is significantly related to the importance of comments received and the frequency of updating profile pictures on social networks.

Future researchers should place greater emphasis on exploring the relationship between self-image in online spaces and the impact it has on the quality of social relationships among adolescents. It would be worthwhile to research on how mobile phones can have a positive result without becoming an indispensable component of personal and social development. It would also be useful to understand the offline practices that counter the excessive dependence or unsuitable mobile use.

It would be valuable to implement these indices for other groups of adolescents in different geographic areas. Even though this work was conducted at the Community of Navarre, the use of mobile phones is a habitual practice among adolescents in different cultures (Campbell, Ling, & Bayer, 2014; Ling & Bertel, 2013; Mascheroni & Olafsson, 2016; Vanden-Abeele, 2016) and could generate different perceptions and uses that could impact different geographic social relationships in unique ways.

Notes

[1] This method is in alignment with the work of Vyas and Kumaranayake (2006) and it permits the calculations of certain values called "proper vectors" that are based on correlations between variables. These vectors are utilized as assigned weights for each variable in the index. This has the goal of identifying those variables that have the most influence on the direction of each vector. Even though these are ordinal variables, they have the same values and are significant in the same manner, which makes this method valid. In this case alone, the first variable of principle components analysis was utilized.

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