Teens' Behavior Patterns on the Web: Surfing or Wrecking?

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Summary

Adolescents' relationship with technology is controversial both because of the possibilities it offers and because of the risks it entails, even being perceived by them as a real need. In order to improve the knowledge about it, a non-experimental research of transversal style has been carried out using a methodology based on data mining. 1,048 students of Secondary Education participated and answered a questionnaire about their use of the Internet and social networks. Six factors were identified, which could be recognized as patterns of behavior in the network. They are grouped around: (1) the communicative and informative dimension of the resources; (2) the one related to the security in the network; (3) the risk and vulnerability; (4) the specialized information both general and specific, (5) the transfer and acquisition of goods; and (6) the leisure and parental surveillance. The main findings show that their habits are mostly oriented towards the transfer and transaction along with the maintenance of security, avoiding situations that could involve risk and vulnerability in navigation. The identification of these subgroups is timely to develop training and digital literacy actions.

Keywords

adolescents; digital behavior; digital practices; social networks; Internet

1. Introduction

The Internet generalization in the daily life of adolescents, the democratization of access to information as well as the revolution that devices and applications have undergone, have caused a real transformation in the patterns of use and consumption of the Internet by this group (Pastor et al., 2019). The Internet is an important part of the daily life of our adolescents and plays a crucial role in their routine. Their use of the Internet has grown exponentially. According to the INE (2019), the evolution of digital consumption by children between 10 and 15 years old from 2006 to 2019, shows that 92.90% use the Internet and 90% use social networks, data that reflects the increase in the frequency of use. Although they basically carry out an individual and private Internet practice, it is combined with a more public use, in groups of friends (Sendín et al., 2014).

This increasingly everyday use has been described in various studies, and it has been found that the presence of the Internet in everyday life has a double side, with benefits, but also with disadvantages. The friendly side means advantages in the personal, family, social and educational sphere of the adolescent, as a means to access information, training, entertainment and socialization. The dark side implies disadvantages related to an exaggerated and problematic use (García-Oliva et al., 2017; Rial et al., 2015) or an addiction and dependency to the Internet (Bakioğlu, 2020; Díaz & Gómez-Torres, 2019; Vega-Almeida & Arencibia-Jorge, 2019). This excessive and compulsive use that adolescents develop on the Internet has negative personal, professional, or social consequences for both themselves and their environment, which in the worst case as Ferreira et at. (2017) point out, can lead to suicidal behavior.

In this complex scenario, students of Secondary Education do not recognize that there is inadequate use of social networks (Ballesta et al., 2015), even though a lack of self-regulation in the use of the Internet is confirmed at this age (Cuesta & Gaspar, 2013; Chóliz et al., 2009) and is associated with sleep disorders and excessive daytime sleepiness (Ferreira et al., 2017).

One of the main uses that adolescents make of the web is communication with their peers, being at the same time the most valued, as Pastor et al. (2019) state. Their study developed with minors between 13 and 17 years old, also reveals that their digital behavior corresponds to an incidental consumption of news, together with a low valuation of the media credibility. At the same time, this type of Internet usage habits, considering the gender variable, shows significant differences. For instance, Kim et al. (2016) confirm that male students tend to seek greater stimuli on the net, while female students are more oriented towards interpersonal relationships. Golpe et al. (2017) identify that teenage boys are more likely to use the Internet for gambling (Ak et al., 2013), downloading, accessing pornographic websites (Mesch, 2009) and online gambling (Wong & So, 2014; Critselis et al., 2013; Olason et al., 2011). Nevertheless, female teenagers use the Internet to look for information (Ak et al., 2013) and for using various social applications, including instant messaging, email or social networking (Pujazon-Zazik & Park, 2010). In this new context, girls (46.3%) are considered more vulnerable than boys (31.8%) according to Baz-Rodríguez et al. (2020) study with 165 adolescents aged to 10-16. However, Popadić et al. (2020), researching with a sample of 863 Serbian adolescents aged 11-17 years, confirms that intensive use of the Internet is more characteristic among girls, adolescents with a tendency to antisocial behavior, those who think they have advanced digital skills, and those whose parents did not apply restrictive forms of mediation.

On the other hand, the assiduousness in the connection is not directly related to the quality, since the increasingly frequent use of Internet does not necessarily imply a domain in the responsible and safe handling, but it can be directly associated to certain dependency and problematic use. Hence, this issue has become a concern for a growing number of researchers. In particular, Muñoz et al. (2003) state that specific studies on the patterns of use of the network are becoming increasingly necessary. Also, Scherer et al. (2017) show that in research it is more important to distinguish between subgroups of students than to report on average use. These same authors, using a person-centered approach and data provided by 2,426 Norwegian students aged 14-16,

identify two latent user profiles based on the frequency of use outside of school hours: 1) infrequent, intermittent use for school and study-related tasks, and 2) constant, frequent use for different purposes and in various settings. Both profiles differ significantly in the frequencies of use for leisure and free time, social communication, and information exchange.

Focusing not on the continuity of connection, but on the media, the study by Kim et al. (2016) considers six patterns of problematic Internet use with a sample of 653 Korean middle and high school students. These patterns are classified according to the substitution and/or complementarity relationship established between the network access devices. According to the authors, some users may show high levels of problematic Internet use only when using a smartphone, while others may manifest it when using both the computer and the smartphone.

Particularly, one of the most evident problems is the violence exercised in digital environments, be it verbal or psychological. On this aspect, the study developed by González-Ramírez & López-Gracia (2018), with 287 students between the ages of 13 and 17, identifies violence as a variable of special interest on which to intervene, above all, when violence is in the form of threats that the participants exercise through social networks. In this case, women appear once again as the most vulnerable to such dependence to menage unpleasant feelings (Chóliz et al., 2009).

Beyond the possible problematic uses is the users' perception of the possible danger of the network. In this sense, Ramos-Soler et al. (2018) studied the risk perception understood as the ability to detect, identify and react to problematic situations when surfing the net. These authors typify in a sample of 865 minors between 10 and 17 years old in the Autonomous Community of Madrid, seven different groups: the prudent, the sociable and self-confident, the control, the connected and independent, the "hooked on the mobile", the confident players, and those always connected with their friends. The study confirms that:

> Minors with a greater perception of risk on the Internet have more ability to protect themselves against the online dangers, and at the same time are those who have a more favorable educational upbringing from their parents, and who also have healthier practices on the Internet. (Ramos-Soler et al., 2018, p. 77)

This work is developed with the purpose of increasing knowledge and understanding about the relationship that adolescents establish with technology. Particularly it contributes to deepening knowledge about the use and habits they have when surfing the net. It mainly gives answers to two research questions: what are the behavior patterns of adolescents on the Internet and social networks? and can some differentiated groupings be established according to gender?

II. Methodology

The purpose of this study is to find out whether there are common (routine) web surfing practices among adolescents that allow different groupings to be established regarding these habits. Researching on the behavior patterns of teenagers in online environments is fundamental for designing and developing training and literacy initiatives, involving both the educational and family spheres. At the same time, it will allow to promote a self-regulated, responsible, and critical use, improving user profiles and optimizing these tools as educational resources. The main objectives are as follows:

- To verify the existence of risk behaviors of adolescents in the network.

- To identify patterns in these behaviors and to find out if the gender of the adolescents is an influential variable.

Thus, the methodological design follows the parameters of non-experimental, cross-sectional research, given that no variables are manipulated and there is a time limit on data collection

(Hernández et al., 2014), using an analysis methodology based on data mining. We understand data mining in the first sense of the term used by Berry & Linoff (1997) as a process of exploring and analyzing, by supervised and unsupervised means, large quantities of data with the aim of identifying and obtaining significant patterns and attempting to extract underlying, a priori unknown and potentially useful information (Witten & Frank, 2017). The use of this method is making headway in the field of education as recent works have shown. As an example, can be cited research on educational performance (Timarán-Pereira et al., 2019; Podestá & Cuatiá, 2014), learning styles (Gamarra et al., 2018; Camana & Torres, 2017), the use of the tablet in education (Agila-Palacios et al., 2017), the critical thinking of students (Martínez-Romera, 2018) or their addictive behaviors (Gervilla et al., 2009), among others.

The population targeted by the study is made up of secondary school students from 13 schools in the city of Pontevedra (Galicia, Spain) who are participating in the project "Sentidiño na Rede"[1] (Raposo et al., 2019) concerned with ensuring responsible use of mobile devices and positive participation of minors on the Internet and social networks.

The sample was intentionally selected (Otzen & Manterola, 2017) among 6 educational schools that accepted to join the study, determining a maximum of 2 groups per course (grade-level). The total number of students was 1.048, which guarantees both the sufficiency and the representativeness of the sample. Figure 1 shows the sample size for a 95% confidence level, with values of p= .50, p= .75 and p= .90. With the final sample (1.048 subjects) the margin of error, for p=q=0.5 and with a 95% confidence level, would be 2.5%, an assumable error.
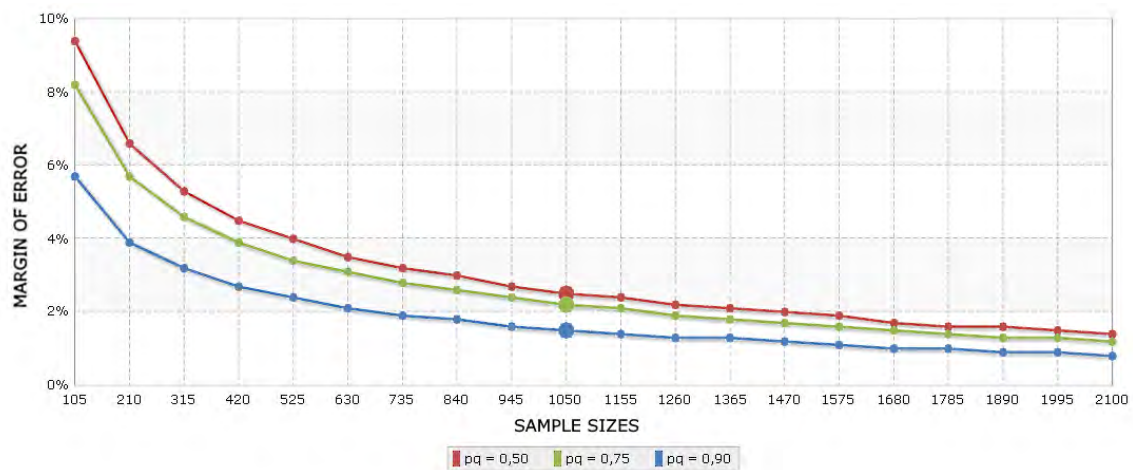
Graph 1. Sample sizes and margin of error
Source: own elaboration

Regarding representativeness, it was take as a reference the geographical location of the 13 Secondary Education centers existing in the municipality and the 6 participants in the study (represented with squares). As it can be seen in image 1, their radius of influence, represented by the ellipse, covers a large part of the population of Pontevedra, both urban and semi-urban.

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[1] Galician expression meaning "with sense on the net". This project has been submitted to the Ethics Committee of the Faculty of Education and Sports Sciences in the Pontevedra Campus (University of Vigo) for approval.
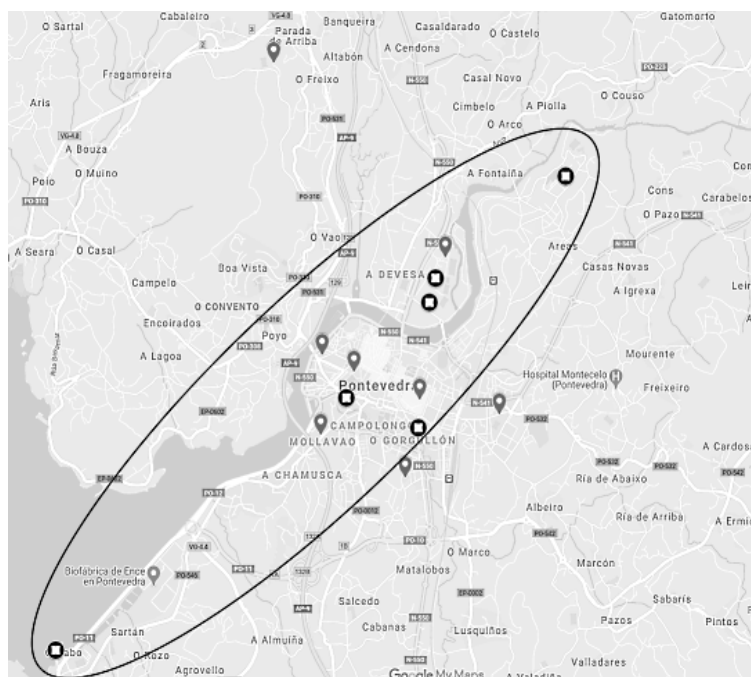
Image 1. Zone of influence of the participating centers
Source: own elaboration

The characteristics of the 1.048 secondary students in the sample are described in the following table.

Variable	Sub-variable	N (%)
Gender	Male Female	569 (54.3%) 479 (45.7%)
Age	12 years 13 years 14 years 15 years 16 years 17 years 18 years	101 (9.6%) 253 (24.1%) 225 (21.5%) 215 (20.5%) 148 (14.1%) 58 (5.5%) 17 (1.6%)
School year	1st Compulsory Secondary Education (ESO) 2nd Compulsory Secondary Education 3rd Compulsory Secondary Education 4th Compulsory Secondary Education Learning and Performance Improvement Programs (LPIP) Basic Vocational Training (BVT)	200 (19.8%) 366 (34.92%) 149 (14.22%) 289 (27.58%) 30 (2.86%) 14 (1.34%)

Table 1. Characterization of the participants

It can be seen that participation considering gender, is quite equitable, although slightly higher in the case of boys (54.3% versus 45.7%). In terms of age, 65.6% of the participants are between 13 and 15 years old, with the upper (17-18 years old, 7.1%) and lower (12 years old, 9.6%) age limits being almost anecdotal. The distribution among the courses of secondary education is somewhat uneven, with 2nd ESO being the most frequent (34.92%) and the least Basic Vocational Training (1.34%) and Learning and Performance Improvement Programs (2.86%).

The level of expertise that the participants possess, both as an Internet user and in terms of security and privacy on the network, was evaluated by them by identifying how they perceived themselves on a three-grade scale: expert, beginner, inexperienced. Most of them consider themselves to be "experts" (44.6%) in the use of the web, 36% define themselves as "beginners" and only 14.5% consider themselves "inexperienced". In terms of their mastery of security and privacy on the Web, more than 50% consider themselves "experts" (53.8%), compared to 23.4% "beginners" and 18.2% "inexperienced". Nevertheless, the distributions of responses between the two questions are significantly different. A relevant percentage of the sample (19%) consider themselves to be beginners as users, but experts in security and privacy issues.

The instrument used to collect information was a questionnaire, since the first phase of the project "Sentidiño na rede" was to make a diagnosis of the situation, exploring the perceptions and habits of use that children have on the Internet and social networks. As indicated by Sapsford & Jupp (2006), survey designs are very common in the field of education because they are applicable to multiple problems and allow information to be collected on many variables.

The questionnaire is made up of 5 dimensions with 29 questions that make up a total of 95 variables. This article analyzes the subdimension of habits in web surfing, which is made up of 21 items that are answered with a four-point likert frequency scale (*always*= every day; *frequently*= 3 to 5 times a week; *sometimes*= 3 to 5 times a month; *never*= any day). To facilitate the collection of information, the questionnaire was presented in paper and electronic format (in a Google Forms form) and in two-language versions (Galician and Spanish) since two co-official languages coexist in the area of study.

For its validation it was submitted to a pilot application with 10 adolescents and a consultation with 10 experts. The Cronbach's Alpha obtained in the general questionnaire is 0.849, while in the studied dimension it is 0.77, which means that the reliability of the instrument and the studied dimension is guaranteed.

The data collection was carried out during the 2018-2019 academic year with direct application of the instrument by the researchers. The length of the questionnaire and the high number of subjects in the sample make it difficult to interpret the information obtained in its raw form. For this reason, the methodology adopted for the analysis of the collected data is based on data mining, using the IBM SPSS Statistics 25 package. It was developed following three different phases (cluster analysis, exploratory factor analysis and classification and interpretation analysis) that we explain below:

- Phase I: in which all available information is used to identify groups, profiles and patterns of subjects or elements of analysis. In this first phase, the statistical technique used is cluster analysis (biphasic), increasing the validity of the results using two different algorithms: one of partition (K-means) and another hierarchical (Ward).

- Phase II: once the groups have been identified, a phase of "loss" of information and selection of the most relevant information is carried out to facilitate the understanding of the data. The data reduction technique used is exploratory factor analysis (AFE), trying to make the extracted factors independent from each other to make the results more interpretable.

- Phase III: the last phase is classification, pattern identification and interpretation through data mining algorithms (profiling and semantic injection).

In this research, to facilitate understanding of the complex methodological structure, instead of presenting all the analyses performed in a single statistical section, these analyses were integrated into the discourse sequence. In so doing, we hope to maximize clarity in the explanation of each analytical phase. Given that the methods are used simultaneously (cluster analysis using two algorithms) and successively (after the cluster analysis, the factorial analysis and classification by

data mining), it was considered more appropriate to maintain this structure in the development of the methodology and results section.

III. Results

The results obtained from the data collected and analyses performed are presented below according to the phases of the study.

Phase I: Grouping data

As detailed above, all the information from the questionnaire was considered in this phase. Three methods were used to form the groups: two-stage cluster, k-square and Ward's method. When applying the two-stage cluster analysis algorithm, a border profile is shown that defines two opposing groups: the first one with 456 students (43.51%) presents low-risk behaviors, uses the Internet and social networks to inform itself about specific and academic topics and does not pose any weaknesses. The second, with 567 adolescents (54.10%) has totally opposite values in these terms.

The results obtained with the K-media method were similar, since a first set grouped 602 students (57,44%) and another 421 (40,17%) even when they have certain differentiating shades. One of the profiles shows unsafe behavior on the Internet, while its use is mainly for informal communication and information with friends, and it is not used for the transfer and acquisition of goods. It also shows high-risk behavior with vulnerabilities and does not use the network to gather information of a specific or academic nature. The second group has scores contrary to this one.

Using Ward's hierarchical method, four groups were extracted. Group 1 (274 students, 26,14%) does not use the Internet ot social networks to communicate informally or for recreational and audiovisual content. They do use them to acquire specialized or academic information but not to obtain goods. It presents high levels of security. Group 2 (323 teenagers, 30,82%) is not interested in specific or academic information and it is interested in communicating informally with their friends. The fact of not assuming risks or avoid vulnerable situations is the fundamental characteristic of group 3 (316 subjects, 30,15%). Finally, group 4 (110 persons, 10,49%) does not assume risks nor is susceptible to them, it presents a high security and does not carry out transfers or acquisition of goods.

To check the relationship between the results of the three methods, a correlation analysis was performed, which showed significant relationship between all of them ($r = -0, 841$ between two-stage and K-means, $r = -0,398$ between two-stage and Ward and $r = 0, 398$ between K-means and Ward).

Phase II: Setting up factors

According to Lloret-Segura et al. (2014), at present it is difficult to justify the use of the "Little Jiffy" pack proposed at the time by Kaiser (1958), which applies the main component analysis with Kaiser's rule and Varimax rotation method. This is why Oblimin has been used as a rotation method.

In the habit dimension analyzed in this article, KMO values= 0.743 and in the Bartlet sphericity test, sig.= .0000 have been obtained, which indicated a good suitability for exploratory factor obtained for the habit dimension and their factorial loads analyzed by AFE:

- Factor I, it groups the items related to the communicative and informative dimension of the resources: the use of social networks, instant messaging, and informative websites.

- Factor II, it brings together those issues related to security: the perception of a safe place, the relationship with strangers and the sharing of passwords.

- Factor III, it associates elements linked to risk and vulnerability: the feeling of harassment, awareness of sensitive data and the provision of a private profile.

- Factor IV, it bonds items that deal with specialized information both general (news and current affairs) and specific (sport, health, school issues…)

- Factor V, it binds together elements associated with the transfer and acquisition of goods: downloading and sharing files, recommended websites, and purchases.

- Factor VI, it concentrates the items related to leisure (online games, videos) and *parental surveillance*.

The change in sign of factors III (risk and vulnerability) and IV (specialized information) is significant with respect to the rest. This result indicates that the students who score high in groups I (communication and information), II (security), V (transfer and acquisition of goods) and VI (leisure and parental supervision) present low values in groups III and IV. The same occurs conversely, if they score high in factor III and IV, they will be low in the rest of the factors.

What are your Internet habits?	Communication and information	Network security	Risk and vulnerability	Specialized information	Transfer and acquisition of goods	Leisure and parental supervision
Using social networks	,780	,128	-,154	-,121	,128	
Sending or receiving messages	,658		-,152	-,308		,154
Uploading photos to your social network for anyone to see	,634	,305			,352	
Visiting websites about movies, TV series, music…	,541	-,195		-,181	,483	,106
Can social networks be considered a safe place for children?	,295	,614	,101		,159	
If you receive an invitation on your social network from an unknown adult, will you accept him/her as a friend?	,158	,608	,289	,116	,250	,201
Do you share your passwords with anyone else (parents, siblings, friends, …)?		,571	-,180	-,259		-,114
If you have felt harassed on the Internet, have you told your parents?			-,718			
You are aware of the data that must be taken care of, that must not be given on the Internet	,117		-,656			
Your profile on social networks is private	,254		-,577		,114	-,319

Getting information on news and current events	,311			-,736	,126	
Accessing to information about health, diets, sports…	,148	,104	,112	-,666	,269	
Consulting information to solve duties			-,253	-,663		-,201
Downloading podcast	,149				,644	
Uploading videos to your own channel	,101	,225	,130		,605	,157
Visiting websites that your parents recommend	-,136	,121	-,180	-,422	,574	-,189
Buying products on the Internet	,359	,251			,487	,299
On-line games		,152			,173	,754
Watching videos from open and collaborative platforms (e.g. YouTube)	,430	-,165	-,147	-,127	,140	,534
When you surf the Internet, does your family or an adult watch what you do?	-,298	,325	-,383	-,229	,231	-,484
Your parents tell you which social networks you can sign up for	-,105	,206	-,414	-,268	,258	-,448

Table 2. Factors and factor loads related to the habit dimension. Oblique rotation.

Phase III: Identifying patterns

As we have seen, the first phase began with 95 variables and a sample of 1048 students, which would be equivalent to 95 * 1,048 = 99,560 units of analysis. During that phase, three different cluster analysis methods were identified (two, two and four, respectively). Subsequently, in the second phase and by means of AFE, the 21 variables were reduced to 6 factors, with which the number of analysis units was considerably reduced, providing greater comprehensibility to the results. In this third phase, patterns are identified as they can respond to the aims of the work. For this purpose, a classification algorithm implemented in the WEKA statistical package is used, more specifically the Simple logistic algorithm (Summer et al., 2005) and as classification variables the groupings obtained in phase I.

The following are the results of the classifier where the high level of discrimination is observed, above 95% in the groupings resulting from the two-stage and K-media methods. The fact that only one of the groups appears in the first two methods is due to the fact that the results of group 2 would be speculative of group 1.

Simple logistic classification algorithm:

Two-stage cluster:

Group 1: -0.37 + [V_58] * 0.08 + [FAC1_5] * 0.09 + [FAC3_5] * -0.51 + [FAC4_5] * -0.17 + [FAC5_5] * 0.06 + [FAC6_2].

Corrected students classified in their group 96.8391

K-Stockings Cluster:

Group 1: 0.65 + [V_58] * 0.11 + [V_60] * -0.07 + [FAC1_5] * 0.13 + [FAC2_5] * -0.18 + [FAC3_5] * 0.29 + [FAC4_5] * 0.15 + [FAC5_5] * -0.27

Students classified in their group 97.7517 %.

Hierarchical with Ward:

Group 1: -0.38 + [V_54] * -0.44 + [V_58] * 0.15 + [FAC1_5] * -0.22 + [FAC2_5] * -0.15 + [FAC4_5] * 0.15 + [FAC5_5] * -0.3

Group 2: -0.28 5 + [FAC1_5] * 0.64 + [FAC4_5] * 0.5

Group 3: -0.41 5 + [FAC3_5] * -0.14

Group 4: -1.03 + [FAC2_5] * -0.18 + [FAC3_5] * -0.21 + [FAC5_5] * -0.28

Students correctly classified in their group 73.5093%

As a final part of this third phase of analysis and recapitulating the two previous ones, the results obtained are presented in table 3. In each column, are collected those factors and variables, ordered by degree of influence, which present different profiles in the groups obtained in this phase and belonging to the domains dimension.

Two-stage cluster		K-Stocking Cluster		Hierarchical cluster	
Factor / Variable	Descriptor	Factor / Variable	Descriptor	Factor / Variable	Descriptor
FAC3_5	Risk and vulnerability	FAC5_5	Transfer and acquisition of data assets	FAC1_5	Communicate and inform yourself
FAC4_5	Specialized information	FAC2_5	Network Security	FAC2_5	Network Security
		FAC1_5	Communicate and inform yourself	FAC3_5	Risk and vulnerability
		FAC4_5	Specialized information	FAC4_5	Specialized information
		FAC3_5	Risk and vulnerability	FAC5_5	Transfer and acquisition of data assets
				FAC6_5	Leisure and parental supervision

Table 3. Factors and variables with different profiles

Finally, and with the intention of addressing the difference in patterns with respect to gender, we proceed in the same way as with the groups in phase III, using membership in one of the two groups as a classification variable. Table 4 is obtained by applying the Simple logistic classifier.

		Male Student	Female Student
	Constant	0,14	-0,14
FAC1_5	Communicate and inform yourself	-0,43	0,43
FAC3_5	Risk and Vulnerability	0,08	-0,08
FAC2_5	Network Security	0,14	-0,14
FAC6_5	Leisure and parental supervision	0,47	-0,47

Table 4. Classifier results according to gender

It is observed that students follow habits related to communication and information, are aware of the dangers of the Internet and avoid risky behaviors or those that make them more vulnerable. The same does not happen with students who are less cautious when surfing the Internet and put themselves, probably unconsciously, in a risky situation.

IV. Discussion and conclusions

Adolescents' relationship with the Web is extensive and intense, so it is not without controversy. The most negative part of the expansion and widespread use of the Internet is associated with the new scenarios, problematic uses and risks they face. The users, particularly the youngest ones, lack mainly of knowledge and skills that allow them to make responsible, rational and critical decisions about their online practices, without discerning for instance what is "immediate" from "adequate", "attractive" from "superfluous" or "real" from "artificial".

Following the path analyzed by other authors (Pangrazio & Cardozo, 2020; Pastor et al., 2019; Sendín et al., 2014) our findings not only identify how developed the digital practices of adolescents are and their level of expertise, but also typify them. By distancing ourselves from the classifications made by Kim et al. (2016) that focus on complementary or substitutive use of devices; by Scherer et al. (2017) directed towards the out-of-school employment; or by Ramos-Soler et al. (2018) focused on the individual (cautious, social, connected…), we have defined what are the patterns of behavior of adolescents on the Internet and social networks. Through three differentiated analytical phases, a set of groupings and a series of response patterns have been established according to groups of belonging, whether these are associations set up a priori, as is the case with gender, or by means of statistical grouping techniques. We have therefore identified six fundamental sets of digital actions: (1) those aimed at communicating and informing oneself with the use of social networks, messaging and information websites; (2) the ones related to the use of the Internet as a safe place; (3) those linked to risk and vulnerability; (4) the ones identified with consulting both general and specific information; (5) those associated with the transfer and acquisition of data and goods (files, purchases…); and (6) those related to leisure and parental supervision. In particular, a common pattern could be established among adolescents in their online and social networking behavior.

Data confirms that a generalized conduct is the use of social networks that constitute, for both boys and girls, the main reason for connection to the Internet and for informal communication. Nevertheless, regarding the perception of security and privacy on the network, a paradoxical factor

arises that combines the feeling of security with a "high risk" behavior. The same paradox occurs when considering safety experts and beginners at the user level. The risk and vulnerability factor is related to the previous one because it has negative factorial loads that, in this case, are indicative of risky and highly vulnerable behavior. These paradoxes are what inspire the initial metaphor of the title, considering that rather that "surfing the net", participants in the study may be "shipwrecked" by engaging in potentially vulnerable and risky behaviors in this context.

On the other hand, it is clear that current news and more specific and academic information are not important issues in the use of the Internet and social networks. These data coincide with the results shown by Pastor, Martín & Montes (2019) who confirm that minors between 13 and 17 years old have an anecdotal consumption of news. Finally, with less presence, two factors related to the transference are identified, the acquisition of material and cultural goods, leisure and parental surveillance.

Other clear conclusion of this study is related to Internet access from the gender perspective (second question raised). The findings of the study reveal that there are no significant differences. The results achieved are similar to those of other studies (Rial et al., 2015) which point out that adolescents, whether boys or girls, do not differ in terms of access to the Internet, noting a decrease in the digital sex gap (Golpe et al., 2017). But if we analyzed according to gender-differentiated digital behavior, we can see that contrary to what some research has predicted (Chóliz et al., 2009), our study found gender differences in the digital behavior. In this research teenage girls tend to adopt habits related to communication and information, are aware of the dangers of the Internet and they avoid risky behaviors or those that make them more vulnerable. The same does not happen with male adolescents who are less cautious when surfing the Internet and put themselves, probably unconsciously, in a risky situation. Already Kim et al. (2016) informed us that male students tend to seek further incentives from the network, using games more than social networks, while female students are more relationship-oriented, so they use social networks more than games. These findings allow us to discuss certain interpretive keys from a gender perspective and to affirm with Scherer et al. (2019) gender involves differences so that "students do not equally exploit the opportunities offered by the almost complete availability of digital resources" (p.496).

The research presented could constitute the basis from which to develop effective prevention and/or intervention strategies in the formative curricula as key competences of future generations. The protectionist discourse of cybersecurity (Pangrazio & Cardozo, 2020) needs to be overcome by one educative. We agree with Pangrazio & Cardozo (2020) with the proliferation of mass user platforms and artificial intelligence, schools need to educate students on how to manage and protect their personal data and motivate them to think and analyze more critically about the digital media they use, the habits they have as well as the digital footprint they imbue.

In addition, as said Scherer et al. (2017) and our own study suggest, by training teachers in recognizing the different patterns of student use, teachers can identify opportunities for improving students' digital competences through the Internet and other technological resources. With this training teachers will also be able to map potential risks (e.g., extremely frequent use outside of school without any guidance or purpose, potential risk of social isolation) thus creating an awareness of students' specific needs.

The developed study offers new possibilities of research overcoming the limitations that it has derived from the cross-sectional character, in a certain moment, without considering the trajectory, experience and previous relation of the participants with the technologies. At the same time, an approach to the object of study using a mixed methodological approach, in which the data from the questionnaire are contrasted with those obtained through interviews or discussion groups with a group of participants, would allow a more contextual and detailed understanding of it. Finally, this study offers an important variety of data and a general overview of the digital behavior of adolescents on the net. It can be considered as a reference for future studies aimed at explaining each of the identified digital behaviors. This could be a challenging frame to understand the factors or variables that determine to a greater extent such differences between each pattern.

Acknowledgments

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