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Typologies of navigation on digital platforms: the case of students from southern Tamaulipa

Tipologías de navegación en plataformas digitales: el caso de los estudiantes del sur de Tamaulipas

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María Consuelo Lemus Pool*
http://orcid.org/0000-0001-8098-4182
Universidad Autónoma de Tamaulipas, Mexico

Rocío López González**
http://orcid.org/0000-0001-7597-5126
Universidad Veracruzana, Mexico

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ABSTRACT

This paper presents the results of research in the southern conurbation of Tamaulipas analyzing the types of internet browsing of some young Mexican students between the age of 15 and 29, to characterize the most significant variables in each type of navigation (such as sociodemographic and access), and contrast, in each one, digital skills, self-perceptions and experiences of using technology that describe each profile. The methodology used is quantitative, using a principal component analysis (PCA) that identified five types of navigation. Subsequently, a regression analysis was applied to present the variables that characterize each type of user. In the results, five types of navigation were identified: information search, collaborative, entertainment, communicative-playful and socializing, where the condition of access continues to be a crucial aspect. Although no differences were identified based on the age, educational level, or occupation of the young people, a strong gender component prevails. This work invites reflection on the importance of exploring and recognizing that not all young people navigate in the same way, and not with the same intensity or skills to face the new capacities that society demands to be functional and competitive in digital environments.

Keywords
Internet; youth; student; education and training; knowledge management

RESUMEN

En este trabajo se presentan resultados de una investigación realizada en la zona conurbada del sur de Tamaulipas, en la cual se analizaron las tipologías de navegación en internet de algunos jóvenes estudiantes mexicanos de entre 15 y 29 años, con la finalidad de caracterizar las variables más significativas en cada tipo de navegación (como las sociodemográficas y el acceso), y contrastar, en cada una, las habilidades digitales, las autopercepciones y las experiencias del uso de la tecnología que describen a cada perfil. La metodología empleada es cuantitativa y se desarrolla un análisis de componentes principales. Posteriormente, se aplica un análisis de regresión para identificar las variables que caracterizan a cada tipo de usuario. En los resultados se identificaron cinco tipos de navegación: buscador de información, colaborativo, entretenimiento, comunicativo-lúdico y socializador, en donde la condición del acceso continúa siendo un aspecto sustantivo. Si bien no se identificaron diferencias a partir de la edad, nivel educativo u ocupación de los jóvenes, sí prevalece un fuerte componente en materia de género. En general, este trabajo invita a reflexionar sobre la importancia de explorar y reconocer que no todos los jóvenes navegan de forma similar ni con la misma intensidad o habilidades para hacer frente a las nuevas capacidades que la sociedad demanda para ser funcional y competitivo en los entornos digitales.

Palabras clave
Internet; juventud; estudiante; enseñanza y formación; gestión del conocimiento

* PhD in Political and Social Sciences from the Universidad Nacional Autónoma de México. Master and degree in Communication. Member of the National System of Researchers of CONACYT. She is currently a professor and researcher at the Faculty of Law and Social Sciences, of the Universidad Autónoma de Tamaulipas. Member of the academic body Medios, sociedad, cultura y tecnología (UAT-CA-173). She has publications in the field of alternative, participatory and community communication, as well as the social appropriation of new technologies. Research ID: https://www.researchgate.net/profile/Maria_Lemus_Pool. E-mail: clemus@docentes.uat.edu.mx

** PhD in Pedagogy from the Universidad Nacional Autónoma de México. Master in Educational Innovation from the Universidad de Sonora. Degree in Education Sciences from the Instituto Tecnológico de Sonora. Researcher at the Center for Research and Innovation in Higher Education of the Universidad Veracruzana. She belongs to the National System of Researchers of CONACYT, level 1. Member of the academic body Educación, cultura y sociedad. Lines of interest: use of digital technologies and youth trajectories. Research ID: https://www.researchgate.net/profile/Rocio_Lopez_Gonzalez. E-mail: rociolopez@uv.mx

Introduction

In Mexico, the National Institute of Statistics and Geography (2019), through the National Survey on Availability and Use of Information Technologies in Households (ENDUTIH, by its acronym in Spanish), reveals that the three main activities of Internet users are focused on entertainment (91.5%), obtaining information (90.7%) and communication (90.6%). In the case of the studies identified among young students in this country on the appropriation of digital technologies, the results reiterate these three main areas of action within the network: entertainment, information and communication, with the addition of another age-specific activity: socialization (Crovi, 2016; Gómez, 2019; Ramírez-Martinell and Casillas, 2015).

Where and how the Internet is browsed is a key issue in the framework of school-based education, since it has been proven that these skills and knowledge coming from students' non-formal education have important components of intrinsic motivation in learning, collaboration with peers and self-learning processes through playful exploration (Pereira, 2019).

One of the strategies to learn about the complexity of levels regarding the use of digital technologies is the segmentation of profiles that serve as a basis for intervention and allow the construction of comprehensive typologies on the diversity of frequencies, activities and behaviors within digital environments (Brandtzæg & Heim, 2011). The construction of typologies has proven to be key in marketing studies (Krairit, 2018; Ortegón, 2013; Shipps & Phillips, 2013) for audience analysis (Al-Menayes, 2014; Callejo, 2016) and even in public health studies (Tzavela *et al.*, 2017), as they allow measuring and defining patterns of variation in use, as well as recognizing common behaviors amidst the heterogeneity of forms and applications of these tools.

In the field of education, multiple contributions have been generated to make visible the different patterns of use and appropriation of digital technologies (Eynon & Malmberg, 2011; Rahman, 2014; Torres-Díaz *et al*, 2016), especially to evidence that the differences are underpinned by the digital divide (i.e., unequal distribution in access to information and communication technologies [ICTs]), both in its first dimension, related to access, and in its second, linked to usage skills (Scheerder, Van Deursen & Van Dijk, 2017; Van Deursen & Mossberger, 2018; Van Deursen & Van Dijk, 2019).

In the dimension of access, the generalization of devices with internet connection (phones, tablets, computers, among others), as well as the multiplication of strategies to ensure universal access of the population to these resources, seems to be an advance to overcome social inequalities; however, it remains evident that, in addition to access to devices, it is necessary to address the growing difference in skills, types of uses and results on the internet (Van Deursen & Van Dijk, 2019).

It should be noted that studies linked to the digital divide have their limitations. Firstly, because a typology is generally never completely pure, since it is closer to the scope of the ideal types of action proposed by Weber (2002). Secondly, each research makes typology proposals based on the relationship of different variables, so it is not possible to find a generalized typology on how to classify Internet browsing.

Due to the above, Brandtzæg (2010) proposed a unified model of users (MUT) through a systematic review of literature between 2000 and 2010, in which he integrated 22 typologies where he used the variables frequency of use (high, medium, low and non-use) and the variety of uses (high, medium, low and non-use), resulting in six categories of users: advanced, instrumental, entertainment and socializing, spectators, sporadic and non-users. This model made an important contribution by making explicit that there are levels of use and that the profiles pass basic conditions of the digital divide, such as access to ICTs. However, it left pending to delve into other aspects such as digital skills (operational, formal, informational and strategic) and attitudinal variables (Van Deursen & Van Dijk, 2015b).

In this sense, this article is aimed to analyze the internet browsing typologies of students between 15 and 29 years old, belonging to the upper secondary and higher education level in southern Tamaulipas, Mexico, from public and private schools; the purpose is to characterize the most significant variables in each type of browsing and contrast the digital skills (instrumental, communication and collaboration, information management, problem solving and participation) (UNESCO, 2018), self-perceptions and experiences of technology use that describe each profile.

Construction of web browsing typologies

The studies that have been carried out on Internet browsing typologies comprise a large body of references that cover diverse fields of knowledge. The main purpose of establishing a typology is to reduce the information on usage variables to a series of indicators that make it possible to model the most typical behavior of users when browsing in digital environments (Brandtzæg & Heim, 2011). Thus, by establishing profiles with homogeneous characteristics, which represent the most frequent actions of broad heterogeneous groups of users, it has been possible to stratify the complexity of social interaction in digital environments. Due to the conceptual nature of typologies, various authors have linked them to the digital divide, in order to establish the conditions, characteristics and processes that these profiles present (Borg & Smith, 2018; Muñoz & Segovia, 2019; Van Deursen & Van Dijk, 2019).

One of the main advantages of establishing typologies lies in the strong explanatory power of behavior based on the categories of each type in order to subsequently characterize the conditions of each one with respect to their sociodemographic, socioeconomic, access

and use of technologies. Using the cluster analysis technique, Van Deursen and Van Dijk (2014) modeled the differences in Internet use in the Dutch population, which resulted in significant gender, age, educational level and experience variables to explain their typology. In that sense, they found that people with low levels of education and people with disabilities use the internet for more hours per day in their free time than populations with better education and employment conditions.

Blank (2013) identified the processes of content creation on the internet by performing a typology of the entire population of Great Britain, based on a principal component analysis. This study identified that there are three profiles of message production, named: "specialized content", "social and entertainment content" and "political content". From a multivariate logistic regression, it was identified that the low socioeconomic level is more ascribed to the production of social and entertainment messages, while the political type was almost exclusive to people with a high socioeconomic level; therefore, social class was linked to the cognitive skills for the generation of content on the Internet.

Other research conducted in the quantitative field has focused more on audience segmentation, but when looking at their results through the digital divide, they significantly underlie the importance of certain variables in explaining the types of Internet uses and users' browsing behavior.

Among the most prominent explanatory conditionals of behavior in digital environments are age and gender: first, younger users present browsing tendencies with a longer time of use, but with a lower number of activities (Borg & Smith, 2018; Hurtado & Fernández, 2014; Santín & Álvarez, 2017; Tzavela *et al.*, 2017). Second, in terms of access, in time and type of use, as well as in the level of digital skills, women reach lower levels compared to men (Blank, 2013; Blank & Groselj, 2014; Carbonai & Abdala, 2017; Krairit, 2018; Rahman, 2014). It should be mentioned that approaches to user typologies from a qualitative perspective are scarce (Fortier & Burkell, 2016; Meyen *et al*., 2010).

Regarding digital divide and schooling, there are some studies that propose that educational level is an explanatory variable of Internet activities (Blank, 2013; Blank & Groselj, 2014; Van Deursen & Van Dijk, 2014 and 2015b), since it is found that higher level users have greater social capital that allows them to perform more articulated actions within the network and have a larger repertoire of digital interactions (Shipps & Phillips, 2013). However, derived from the globalization of the current Western lifestyle, there is a debate regarding the weight of variables such as educational level, due to the widespread consumption of environments such as digital social networks (Giraldo, Tejedor & Carniel, 2017; Tejedor, Carniel & Giraldo, 2018).

Information-seeking and collaborative tools are specific to the context of students (Arribas, Islas & Gutiérrez, 2019; Gavilán, Martínez & Fernández, 2017; Gutiérrez-Porlán,

Román & Sánchez, 2018; Thomas *et al.*, 2017), as well as audiovisual consumption platforms such as videos, movies, and music (Azurmendi, 2018; Pedrero, Barrios & Medina, 2019; Pereira, 2019).

Therefore, the research questions that guided this study were: What are the navigation typologies that represent Internet browsing of young students in the southern suburban area of Tamaulipas? What is the incidence of sociodemographic profiles and access to digital technologies in each navigation typology? What are the digital skills, self-perceptions and diverse experiences in navigation that characterize each navigation profile? And, what are the digital skills, self-perceptions and diverse experiences in navigation that characterize each navigation profile?

Methodological strategy

To answer the questions posed, information was retrieved from data derived from a larger research, developed during 2019 in the municipalities of Tampico, Ciudad Madero and Altamira, in the state of Tamaulipas, Mexico, entitled "Youth and digital technologies. Diagnosis of the use and appropriation of digital platforms in the southern suburban area of Tamaulipas", in which a survey was designed and applied to evaluate the use and appropriation of various digital platforms (information, exchange or e-commerce, digital social networks, educational and learning, as well as entertainment).

It should be noted that, although there are several quantitative studies in Mexico on the use and appropriation of digital technologies among young students (Crovi, 2016, 2018; González-Lizárraga and López-González, 2015; Ortiz-Henderson, 2015), it was not possible to identify a previously validated questionnaire that suited the objectives of interest of the study,[1] as is the case of the construction of typologies of young people's web browsing on different types of platforms.

For this reason, an instrument was developed and validated in terms of content, criteria and construct based on an expert review. Subsequently, for its calibration and the validity of the reliability of the responses, a pilot test was carried out among 106 high school students, and the Cronbach's alpha statistic was applied to the results, in which an average score of 0.75 was obtained for the 57 items analyzed, thus guaranteeing internal consistency.

The sampling frame was prepared with a list of secondary and higher education institutions, and public and private schools in the southern metropolitan area of Tamaulipas (a region comprising the municipalities of Tampico, Ciudad Madero and Altamira). From the list, twelve institutions were randomly selected: six higher education institutions, three public and three private, one for each municipality studied, as well as six higher education institutions, three public and three private, one for each municipality (see table 1).

Table 1. Selected schools and data collection dates

Level	Type	Municipality	School name	Dates
High school	**Public**	Tampico	Centro de Bachillerato Tecnológico, Industrial y de Servicios No. 103	November 14th, 2018
		Madero	Centro de Estudios Tecnológicos, Industrial y de Servicios No. 109	November 29th, 2018
		Altamira	Centro de Bachillerato Tecnológico, Industrial y de Servicios No. 105	November 13th, 2018
	Private	Tampico	Preparatoria UVM (Universidad del Valle de México)	March 6th,2019
		Madero	Prepa Madero (Grupo Educativo Madero)	November 29th, 2018
		Altamira	Bachillerato Anáhuac (Instituto de Estudios Superiores de Tamaulipas)	February 4th, 2019
Higher education	**Public**	Tampico	Universidad Autónoma de Tamaulipas, Campus Sur	February 8th, 2019
		Madero	Instituto Tecnológico de Ciudad Madero	February 19th, 2019
		Altamira	Universidad Tecnológica de Altamira	January 29th, 2019
	Private	Tampico	Universidad del Valle de México	March 6th,2019
		Madero	Escuela Particular Normal Superior "Lic. Benito Juárez A.C."	February 26th, 2019
		Altamira	IEST Anáhuac (Instituto de Estudios Superiores de Tamaulipas)	February 15th, 2019

With this, the sample was statistically representative of the southern zone of Tamaulipas, with a 95% confidence level and a margin of error of +/- 2%. Based on this, it was estimated that 1,222 questionnaires would be collected, which allowed us to have a level of sample representativeness according to the type of school, public or private (+/- 300 questionnaires for each type) and the educational level, high school or higher education (+/- 600 questionnaires at each level).

Data collection within the higher education schools was incidental; that is, it was carried out in the common areas of the institution, such as the dining room or green areas, where students were asked to participate voluntarily, which ensured heterogeneity in the

schools and degrees represented. In the case of the high school level, where minors participated, a one-stage cluster sampling was carried out. Each school authorized three or four classrooms in each of the academic degrees and the questionnaire was administered (with informed consent from the parents). Table 2 shows the representativeness and distribution of the sample.

Table 2. Distribution and representativeness of the sample

Level	School type	Number of certificates applied			Total	Error range (%)
		School in Tampico	School in Madero	School in Altamira		
High school	Public	77	99	110	286	-4.6
	Private	79	106	110	295	-1.6
Higher education	Public	104	110	110	324	+8.0
	Private	118	91	108	317	+ 5.6
ZCST*	Total	378	406	438	1 222	+ 1.8

*Conurbated area of southern Tamaulipas.

In relation to data processing, descriptive and inferential analysis was carried out in the SPSS program and, subsequently, Stata was used to perform a principal component analysis (PCA) to identify the Internet browsing profiles of young students in the area. PCA is a technique for reducing the total variability observed in a data set to a minimum number of components, thereby generating a new set of observations that are ordered by the original amount of variance they describe (Maxim, 2002).

To determine the number of components, the variables of intensity of use (how frequently used) and level of interaction (I only visualize, forward information, participate, comment or forward content and elaborate my own content) were used for each digital platform evaluated, with which dummy variables were constructed and, from this result, five relevant components were obtained in the sedimentation graph, because their eigenvalues turned out to be greater than 1. With this, five profiles with particular characteristics were defined, i.e., five navigation typologies whose factor loadings identify certain common patterns of related activities in each of the components.

Subsequently, in order to comparatively characterize the incidence of different variables within each typology, an ordinary least squares regression was performed, in which user typology was used as the dependent variable. Independent variables related to:

1) Sociodemographic data such as age, sex, parents' schooling, type of school, educational level, occupation (studying and working), locality of residence.

2) Access, such as possession of internet at home, laptop or computer, cell phone, tablet and video game console.

3) Digital skills, such as having the skills to record and edit with a camera, producing one's own publications, considering oneself an influencer by having a certain number of followers, having relevance in a virtual community, considering oneself an activist, having the ability to discuss or argue in digital spaces, being able to systematize and share knowledge online, and considering oneself self-taught.

4) Diverse perceptions and experiences with new technologies regarding their potential for socialization, communication, efficiency, social transformation, influence in the public sphere and communication with institutions.

Results

The results obtained relate to 1 222 young people, 48% of which belong to the upper secondary level (n=581) and 52% to the higher level (n=641). As for the type of school, they are equally distributed according to the type of educational institution (public n=610 and private n=612). The average age of the participants was 18 years old, although the age range was between 15 and 29 years old. Very close to the population trend, the gender distribution is 54% female and 46% male. Regarding the socioeconomic characteristics of the participants, it is possible to observe that 65% of the young people belong to the two highest strata (AB and C+), according to the measurement methodology of the Mexican Association of Market Intelligence and Public Opinion Agencies (2018).

The five main components identified in this study show that there are groups of internet users whose browsing patterns follow common routes, according to the use of the various digital platforms evaluated. In relation to factor loadings identified in each variable, these five profiles were named in response to the type of environments which predominated in each component: information seeker, collaborative, entertainment, communicative-playful and socializing (see table 3).

For the first profile, the information search engine, it is the only one whose navigation is linked to all general information sites (blogs, news, opinion or media pages, commercial brand pages, institutional pages) as well as content and product exchange sites.

Table 3. Factor loads of principal component analysis

Platform type	Variables	Navigation typology				
		Information sarcher	Collaborative	Entertainment	Communicative-playful	Socializer
Information	Use blogs	0.4562				
	Use news, opinion or media pages	0.4537				
	Use trademark pages	0.4007				
	Use institution pages	0.4075		-0.1734		
Exchange	Use content download platforms	0.3870		0.1579		
	Use e-commerce platforms	0.2805		0.2493		0.1619
Digital social networks	Use Facebook				0.4649	0.1768
	Use Twitter					0.5348
	Use Instagram				0.1918	0.5757
	Use WhatsApp				0.5116	
	Use Snapchat		0.1745			0.4945
Educational	Use forums		0.4713		-0.1789	
	Use wikis or pages of collaborative construction of content		0.4545			
	Use educational / school websites		0.3528		-0.1594	
	Use academic search engines		0.3803		0.2725	
	Use tutorial or advice sites		0.4082			
Entertainment	Play video games			0.4295	-0.2262	
	Use free and free video or movie platforms		0.1788		0.4307	
	Use music platforms			0.5516		
	Use subscription video or movie platforms			0.5423	0.1745	

Note: Factorial loads after rotation of Varimax Normalization with Kaiser. N=1 222. Factorial loads less than 0.15 were omitted as not representative.

As for the second, collaborative, its navigation is defined by all educational platforms (forums, wikis or collaborative content construction pages, educational or school web pages, academic search engines, tutorial or advice sites), in addition to the use of the social network Snapchat and free and no-charge video or movie platforms.

The entertainment profile represents a user whose browsing is done on recreation and leisure platforms (video games, music and subscription-based videos or movies), as well as exchange (content downloading and e-commerce) along with institutional pages. In the communicative-playful profile, browsing on audiovisual entertainment pages is also relevant (video or movie platforms, both free and subscription-based), although some educational pages stand out (academic search engines, educational or school web pages and forums), as well as digital social networks Facebook, WhatsApp and Instagram.

The socializing profile shows navigation with greater centralization in social networks. Unlike the communicative-playful one, it is a user that focuses on Twitter, Instagram, Snapchat and, to a lesser extent, Facebook. E-commerce platforms acquire preponderance in this profile. Theoretically, it refers to a user who, although focused on playful communication in networks, shows the capacity for a deeper information evaluation in terms of digital security and own content creation (Establés, Guerrero-Pico and Contreras, 2019).

Examining the distribution of these profiles, we find that they are not mutually exclusive; the same young person can navigate in different ways depending on the intensity of use and the level of navigation deployed on each platform. However, as a whole, the socializing profile is the predominant one, although it is the one that integrates the least number of platforms into its navigation. Similarly, the entertainment profile has the lowest percentage of participation, but uses the largest number of platforms (see table 4).

Table 4. Distribution of navigation profiles

Navigation profile	Participation (%)	Number of platforms (average)
Information searcher	22.50	18.52
Collaborative	24.88	18.26
Entertainment	19.64	18.88
Communicative / playful	24.30	18.42
Socializer	27.17	17.84

Note: *Participation* is the percentage of people who use the platforms that make up each profile. The sum does not give 100, since the profiles are not exclusive. *Number of platforms* refers to the number of platforms that, on average, are used by those who are categorized in each profile. The maximum value is 20 platforms.

Viewing these results from the regressions, reading the characteristics of each profile shows several aspects to understand and deepen in each typology (see table 5).

Table 5. Characterization of user types

Variables	Navigation typology				
	Information searcher	Collaborative	Entertainment	Communicative-playful	Socializer
Sociodemographic					
Age	-0.0483	-0.0998***	-0.0247	-0.0216	0.0159
Woman	-0.0369	0.2091*	-0.1655*	0.2227**	0.2585**
College	0.0305	0.0604	-0.0380	-0.0133	-0.0995
Private school	-0.2672**	0.0279	0.0169	0.2708***	0.2114**
Work and study	0.0435	-0.0492	0.0219	-0.0198	-0.0705
Comes from a rural town	0.3998*	0.0488	-0.4053**	-0.1196	-0.2931
Access					
Internet at home	0.0969	0.1178	0.5694***	0.3938***	0.3378**

Own laptop	0.1702	0.0530	-0.0745	0.0249	0.0095
Own laptop and desktop	-0.2821	0.0601	-0.5538	0.0474	-0.5943
Own cell phone	0.5395	0.6054*	1.1542***	0.9899***	0.7254**
Own tablet	0.2019*	0.2263*	0.1777*	0.0587	0.2523**
Own video game console	0.4253***	0.2019*	0.5263***	0.0122	0.1593
Digital skills					
Has the skills to record with a camera, edit and elaborate a coherent narrative	0.0270	-0.0219	-0.0219	0.0669*	0.0047
Is considered an active producer of digital content	0.0225	0.0103	0.0463	0.0127	0.0633
Is consider as an influential person because have followers	0.0494	0.0344	0.0745	-0.0303	0.1094*
Is considered a relevant person in a virtual community	0.0123	0.0528	0.0373	-0.0556	0.0090
Is considered as an activist person	-0.0373	-0.0486	-0.0246	0.0133	-0.0595
Has the skills to discuss or argue in virtual spaces	0.0454	0.0168	0.0478	-0.0233	-0.0082
Has the skills to share knowledge on digital platforms	0.0264	0.0145	-0.0343	0.0009	0.0284
If don't know something, immediately look it up on the internet (self-study)	0.1025*	0.1317**	0.0519	0.0594	0.0787*
Perceptions and experiences of digital technologies					

Believes that the web allows relationships with family-friends at a distance	-0.0192	-0.0021	0.0193	0.0718*	-0.0248
Believe that people isolate themselves more	0.0097	-0.0394	-0.0119	0.0053	-0.0860*
Variables	**Navigation typology**				
	Information searcher	**Collaborative**	**Entertainment**	**Communicative-playful**	**Socializer**
Has suffered bullying	0.0158	0.0098	0.0491	-0.0795**	0.0055
Believe that people waste a lot of time on them	-0.0098	0.0310	-0.0236	0.1514***	0.0215
Believe that it is possible to achieve social change through them	0.0089	0.1275**	0.0943*	0.0612	0.0212
Believe that anyone can be an influential person or public figure without having many resources	0.0081	0.0156	0.0154	0.0285	-0.0282
Believe that you can create your own means of communication with them	0.0132	0.0341	0.0009	0.0271	0.0026
Believe that the information published on the internet is reliable	0.0751	0.0526	0.0107	0.0697	0.0769
Has used digital platforms to communicate with someone with a company, a television program or the government	0.1797***	0.1188**	0.0749*	0.0263	0.0354
Constant	**-1.1369**	**0.2007**	**-2.3756*** **	**-1.8766****	**-1.8683****
N	**1171**	**1171**	**1171**	**1171**	**1171**
R2 Adjusted	**0.0965**	**0.1071**	**0.2104**	**0.1452**	**0.0935**

Note: there are categories omitted because of their dichotomous character, which are man, high school, urban locality, public school, only studies, foreign. Coefficients are regressions of ordinary least squares. *p<0.05. **p<0.01. p<0.001.

Among the aspects that stand out in these results is the fact that employment status was not significant, which may be due to the fact that only a small number of people study and work (19%); this is a homogeneous group of students who dedicate themselves almost exclusively to their studies. On the other hand, the possession of computer equipment (own laptop and desktop) was not relevant either, which corroborates the increasingly widespread use of mobile devices as the main place of access (Gutiérrez-Rentería, Santana and Pérez, 2017; Pedrero *et al.*, 2019).

For the information seeker profile, it is noteworthy that neither the user's gender nor age has an impact. In terms of connectivity, it is likely that they do not have Internet at home. Those who fit this profile study in a public institution and come from a rural location. Likewise, these individuals have a tablet and a video game console, indicating the possession of a diversity of devices. In terms of digital skills, they are considered people who search the internet for what they do not know, which reflects the generalized tendency to self-learning (Boyd, 2014). Their perceptions and experiences with digital technologies indicate only a functional and pragmatic aspect of technology, since as tools they were only relevant to communicate with an institution. This profile is identified in several studies that conclude that these users possess the most basic and functional level of internet use (Blank, 2013; Blank & Groselj, 2014; Brandtzæg, 2010; Brandtzæg & Heim, 2011; Luchman, Bergstrom & Krulikowski, 2014; Van Deursen & Van Dijk, 2014).

In the case of the collaborative profile, the variables of sex and age are those that have the greatest weight, since the majority are women who meet this characteristic. In terms of age, the profile is more related to high school students (15-17 years old) than to university students. Another aspect is that neither the type of school nor the type of locality where they reside has any influence. The collaborative profile presents more access infrastructure, as they have internet at home, cell phone, tablet and video game console.

In terms of digital skills, they are also people who immediately search the Internet for what they do not know. Their perceptions indicate a more hopeful tone regarding these tools, as they believe that it is possible to achieve social change through new technologies, although they also focus on the functional aspect, since they only emphasize their use to contact an institution.

These characteristics are similar to those found by Fernández, Lazkano & Eguskiza (2018) in the context of Spain, as for activities focused on collaboration, women use more sources of complementary information for school use, and are also mostly from private institutions. The collaborative profile is linked to people who enter the network for two central activities: performing tasks associated with school and spending leisure moments, as indicated by other studies that also recognize this profile, where operational, formal and informational skills are reflected, and experiences derived from entertainment allow them to gain expertise in navigation (Borg & Smith, 2018; Rahman, 2014; Van Deursen & Van Dijk, 2015b).

The entertainment profile is the only one where the gender variable has a higher weight with respect to men. Likewise, they are by and large from the urban environment, although the type of school they attend does not have an impact. Users of the entertainment type are men with high levels of connectivity, since they have internet at home, cell phones, tablets and video game consoles. Like the collaborative type, they consider that it is possible to achieve social change through new technologies and have used them to communicate with an institution.

Fernández, Lazkano & Eguskiza (2018) find a similar result and point out that men tend to play in group modalities while women play alone. Callejo (2016) corroborates this profile among people under 25 years of age in the same country, as video game users are likely to be mostly male. This profile shows a strategic use of information, but very far from school browsing, as leisure platforms and virtual communities (for exchange or sales) prevail and only a specific use of information search is observed (Van Deursen & Van Dijk, 2015a).

In the communicative-playful profile, it is women who stand out in this profile regardless of age range. Likewise, they are more likely to attend private education schools regardless of the type of locality where they live. In terms of connectivity, they have internet at home and the use of cell phones is very relevant. In relation to digital skills, they have the skills to record with a camera, edit and prepare a coherent narrative, so the generation of their own content is also likely. In addition, they are people who do not consider having undergone harassment or bullying on digital platforms, but have an unfavorable opinion regarding the perception that people waste a lot of time on social networks.

This profile is the one that keeps a more functional balance between school, socialization and recreational activities. In other analyses, it has been found that this type of users is the most prevalent in the age group under study, between 16 and 29 years of age (Al-Menayes, 2014; Brandtzæg & Heim, 2011) and that, although many have operational, formal and informational skills, few reach the strategic ones (Livingstone & Helsper, 2007; Van Deursen & Mossberger, 2018; Van Deursen & Van Dijk, 2015b).

Finally, the socializing profile identifies women who attend private schools regardless of the locality where they reside. They have internet at home and use cell phones and tablets. In terms of their skills, they are considered influencers due to the number of followers they have on social networks and are self-taught. Their experiences refer to a potential for bonding, as they do not believe that new technologies isolate people. This profile is related to the findings of Brandtzæg's study (2010), which concludes that this profile is located in the middle of the level of skills and the number of activities, since operational and formal skills stand out.

Final considerations

Among the young people in this research, browsing the number of network environments follows complex patterns and routes, since the digital literacy of the students has heterogeneous levels and we cannot speak of a digital generation or digital natives who dominate the multiple Internet environments equally. In this sense, the main contribution of this work lies in establishing the diversity of experiences that occur when surfing the Internet, and situating this practice in the light of the most significant variables in each type of navigation.

Thus, it is found that differences in usage skills go hand in hand with aspects such as gender (Gray, Gainous & Wagner, 2017), location of origin (urban or rural) (Martínez-Domínguez & Mora-Rivera, 2020; Toudert, 2018), type of school, access to digital technologies (Scheerder *et al.*, 2017; Van Deursen & Van Dijk, 2019), and even motivation (Radovanović, Hogan & Lalić, 2015), as well as cultural and social capital (Blank, 2013; Blank & Dutton, 2019).

It stands out that the condition of access continues to be crucial, since the type of information-seeking browser, a functional and pragmatic user, but reflecting the most basic operational level skills, is linked to people who do not have internet at home, who attend public schools, who come mostly from a rural location and have more limitations of activities and experiences when using digital platforms.

The above corroborates the literature that indicates that it is not only enough to have access, but also the quality of the connection for the development of other capabilities and skills when browsing (Goncalves, Oliveira & Cruz-Jesus, 2018; Serrano-Cinca, Muñoz-Soro & Brusca, 2018; Van Deursen & Van Dijk, 2019). The school environment becomes a leveler of access opportunities and, in this sense, the public school in southern Tamaulipas evidences greater challenges when receiving students coming from rural populations in the surrounding region.

The other types of browsing, collaborative, entertainment, communicative-playful and socializing, are characterized by having access conditions resolved (they have internet at home, several devices of their own) and have skills at a basic and intermediate level to be functional in digital environments (Blank & Groselj, 2014; Brandtzæg, 2010; Eynon & Malmberg, 2011). In this case, their distribution is more homogeneous, both in public and private schools, so it could be considered that the type of school, when the student comes from the urban environment, does not have such a relevant incidence.

Regarding the importance of sociodemographic variables as predictors of the type of browsing, several studies indicate that the generalization of access and use of these tools causes them to lose their explanatory power (Borg & Smith, 2018; Castaño, Duart & Sancho, 2012); however, in this study, although there are no differences based on age,

educational level or occupation, a strong gender component prevails, with respect to the profiles linked to women (the collaborative, communicative-playful and socializing) and men (entertainment).

This can be explained from the results of previous studies, which identify the feminine attributes assigned to these activities (Al-Menayes, 2014; Rahman, 2014), as well as that the social capital that is negotiated in this type of communicative and socialization practices is bound to gain more opportunities for social and economic mobility (Blank & Groselj, 2014; Hargittai, 2010; Meyen *et al.*, 2010; Zillien & Hargittai, 2009).

The activities of male roles are strongly marked by their participation in virtual communities where they are recognized for their level of expertise, such as the case of video games (Callejo, 2016), or for the ability to participate, take the floor or negotiate (Carbonai & Abdala, 2017).

An approach that may have an impact on the weight acquired by the gender variable when classifying user typologies is the time of use, since the literature corroborating the gender digital divide suggests that men have more years of ICT use than women (Gray, Gainous & Wagner, 2017; Jiang & Luh, 2017). This factor has an impact on the experience acquired through practice (Van Deursen & Van Dijk, 2014), but also in the sense of outlining what purposes the technology is used for (Crovi, 2018).

These findings confirm that the three browsing typologies in which women have greater weight (the collaborative, communicative-playful and socializing profiles) are those that link browsing with communication, socialization and the search for information to be functional in the school environment, highlighting that none of the profiles stand out for achieving strategic skills as is the case of men.

All in all, it is considered that this study puts forward a proposal to classify the use of ICTs in educational institutions, by emphasizing the realization of diagnostics and the construction of typologies of web browsing that are well-known in their school contexts, which allows exploring and recognizing that not all young people navigate in a similar way or with the same intensity or digital skills, above all, to rethink relevant policies aimed at training processes and school practices of young people from their real needs and interests in terms of ICTs.

Among the main limitations of the study is the local regional focus of this research, as it is undoubtedly required an approach to these typologies and their behavior at the national level, and to work with more robust databases that allow a more generalized statistical inference.

Finally, it is possible to propose that the patterns of each browsing profile are defined by personal interests and purposes of use of the tools (Hargittai & Marwick, 2016;

Liikkanen & Salovaara, 2015; Scheerder, Van Deursen & Van Dijk, 2017). In this sense, we believe it is relevant to continue conducting studies that contribute to identify the heterogeneity of ICT access, use and appropriation among young people.

As is well known, the issue of technology appropriation is constantly changing, even more so in this pandemic currently experienced by Covid-19, where surely browsing types will be reconfigured from the new browsing realities, where the daily life of young people has moved to digital environments.

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[1] The systematic literature review was carried out using the Discovery Service of the National Autonomous University of Mexico. We searched all the university resources available in the EBSCO database, between 2015 and 2020, and used the Bolean key scale AND appropriation AND technology.