

Factors Related to the Academic Use of the Internet in Higher Education

Factores relacionados con el uso académico de Internet en educación superior

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Abstract

The following article aims to establish what academic activities higher education students carry out with the internet and determine which factors explain the differences in the use of internet for these activities. In order to carry out the research, a survey was applied to 435 higher education students in Temuco, La Araucanía, Chile. The results show that students use the internet frequently for activities associated with their studies. Among these, the most frequent are collaborative activities, such as the preparation of group reports, asking classmates for study materials, or requesting help to solve exercises or understand some activity. On the other hand, the variables that best explain the gaps in the academic use of the internet are cultural capital and the type of higher education institution that students attend.

Keywords: cultural capital, digital divides, higher education students, Internet academic uses.

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Resumen

El artículo sintetiza las actividades académicas que los estudiantes de educación superior realizan con Internet para determinar cuáles son los factores que explican en mayor medida las diferencias en su uso. Para llevar a cabo la investigación se aplicó una encuesta a 435 estudiantes de educación superior de la ciudad de Temuco, Región de La Araucanía, Chile. Los resultados muestran que los estudiantes usan Internet frecuentemente para actividades asociadas a sus estudios, donde las más recurrentes corresponden a tareas colaborativas como la elaboración de informes grupales, conseguir material de estudio con los compañeros, o bien, pedir ayuda para resolver ejercicios o entender alguna actividad. Entre las variables que explicarían en mayor medida las brechas en el uso académico de Internet son el capital cultural y el tipo de institución de educación superior a la que asisten los estudiantes participantes del estudio.

Palabras clave: brechas digitales, capital cultural, estudiantes de educación superior, usos académicos de Internet.

Introduction

The frequent use that young people make of Information and Communication Technologies (ICT), in conjunction with the massification of a series of labels, such as “digital natives” (Prensky, 2001) and “millennial generation” (Howe & Strauss, 2000; Oblinger, 2003), among others, has led them to be considered as a homogeneous group that is characterized by having innate digital skills and which makes varied and innovative use of ICT. However, research has shown that adolescents and young people show somewhat limited use of these tools (Kennedy, Judd, Dalgarnot, & Waycott, 2010; Sahin 2017; Thompson, 2015). In this regard, the activity that they carry out most frequently is using social media, while they use the internet to perform academic activities less often (Rashid, Cunningham, Watson, & Howard, 2018; Thang, Jaafar, Nambiar, Amir, & Wong, 2014; Thang et al., 2016), and rarely conduct activities that involve high cognitive levels or creative processes (Engel, Coll, Membrive, & Oller, 2018).

Similar, their digital skills are tenuous (Bennett, Maton, & Kervin, 2008; Fraillon, Ainley, Schulz, Friedman, & Gebhardt, 2014; Pérez-Rodríguez, Delgado-Ponce, García-Ruiz, & Caldeiro, 2015) and there is no homogeneity in the way in which they interact with ICT. In this context, some authors propose that the metaphor of digital natives and immigrants be replaced with digital *residents* and *visitors* (White & LeCornu, 2011), focusing attention on the relationship that people have with the internet and technological devices and not necessarily on the age group or generation to which they belong.

Indeed, research has shown that significant digital divides persist among young people depending on the geographical area of origin, their socioeconomic status, or cultural capital (Fraillon et al., 2014; Hargittai, 2010; Varela-Candamio, Novo-Corti, & Barreiro-Gen, 2014). It has also been found that there are differences in the usage patterns of high school and higher education students, since, in the case of the latter, use of the internet is related to academic requirements, using ICT to study or conduct learning activities for a larger number of hours compared to schoolchildren (Margaryan, Littlejohn, & Vojt, 2011; Wang, Luo, Gao, & Kong, 2012; Wang, Hsu, Campbell, Coster & Longhurst, 2014).

Nevertheless, some studies intended to investigate the internet use of higher education students assume that they are homogeneous groups, with similar cultural capital, who have managed to overcome socioeconomic disadvantages (Bennett & Maton, 2010; Wang et al., 2014). However, and as Bourdieu and Passeron (2003) explain, for students from households with low cultural and economic capital—who have managed to avoid elimination from the education system—the initial disadvantages have evolved, transforming social divides into educational deficits, poorly informed decisions, or a lack of strategies to address the new academic demands. In this context, it seems logical to consider that the digital divides that affect new generations are also present among young people in higher education. In addition, and as Hargittai (2010) states, age and educational level are important predictors of these digital inequalities, so working with a population where both variables are controlled allows other factors to be analyzed.

The objective of this study was to identify the gaps that are related to the academic uses of the internet by higher education students, in order to answer the following research questions:

- Which academic activities do higher education students carry out using the internet?
- What factors best explain the differences in academic use of the internet?

Literature Review

Use of digital technologies

The new generations are regular consumers of digital technologies: they mainly use cell phones and, to a lesser extent, computers to connect to the internet (Sahin, 2017; Yong & Gates, 2014), spending at least four hours a day consuming digital media (Abu-Shanab & Al-Jamal, 2015; Eger, 2015; Moussa & Seraphim, 2017), which are primarily reserved for using social media, browsing, and listening to music or watching videos (Livingstone, Haddon, Gorzig, & Olafsson, 2011; Manasijevic, Zivkovic, Arsic, & Milosevic, 2016).

As we can see, social media are the most popular digital resource among young people and are mainly used to: maintain friends and make new ones, communicate with peers, share documents and spend time reviewing their own profile or those of other contacts (Junco, 2012; Manasijevic, Zivkovic, Arsic, & Milosevic, 2016). In this regard, some research has shown that young university students use social media compulsively, particularly Facebook (Eger, 2015; Jafarkarimi, Sim, Saadatdoost, & Hee, 2016; Zaremohzzabieh, Samah, Omar, Bolong, & Kamarudin, 2014), which produces adverse effects on academic performance (Feng, Wong, Wong, & Hossain, 2019).

On the other hand, using computers for productive or creative activities is what young people do least (Jones, Ramanau, Cross, & Healing, 2010; Karamti, 2016; Sahin, 2017), and despite the frequency with which these they use technological devices to access the internet, the range of technological tools that university students use is somewhat limited (Corrin, Lockyer, & Bennett, 2010; Jones et al., 2010; Thang et al., 2016; Thompson, 2013), focusing on rapid communication tools and on the web: communication tools are limited to the use of Facebook and sending messages, while web tools are used to watch videos, listen to music, or find information, according to Thompson (2013), based on a study conducted in the United States, and Thang et al. (2016), based on data collected in Malaysia. Similar findings have been made in recent studies (Karamti, 2016; Rashid et al., 2018), which conclude that the most frequent activities conducted are making calls, sending messages, and accessing the internet, primarily with a social purpose, all done using cell phones.

Use of digital technologies for academic activities and their impact on learning

Although young people prefer to use the internet for entertainment activities rather than academic activities (Margaryan et al., 2011; Thang et al., 2014; Thang et al., 2016), it has been shown that higher education students frequently use computers to study and conduct academic work (Rashid et al., 2018; Venkatesh et al., 2015). In this case, the activities they carry out for educational purposes most frequently are sending emails and instant messages, mainly to organize group work and for communication with classmates and teachers (Hrastinski & Aghaee, 2012; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010), for which they mainly use cell phones (Rashid et al., 2018).

Similarly, some studies have also researched the use of virtual platforms, showing that at least half of university students access the materials and resources available in their university systems (Humanante, García-Peñalvo, & Conde-González, 2015; Verhoeven, Heerwegh, & Wit, 2014). However, some studies have confirmed that the incorporation of social media as an educational tool tends to be much more effective than these platforms (Manca & Ranierit, 2016). Thus, for example, one study found that personal learning environments based on Google, wikis, and social media have greater capacity to promote participation and social capital among students than virtual environments based solely on Moodle, although no differences can be observed in the academic performance of the students (Casquero, Ovelar, Romo, Benito, & Alberdi, 2016). In this regard, Zheng, Niiya, and Warschauer (2015), found that the use of wikis does not produce an impact on student learning if not accompanied by an appropriate pedagogical design.

With regard to the use of social media, So (2016) found that students who use instant messages to consult about subjects or solve exercises obtain better results on examinations and have a positive perception regarding the knowledge they can acquire using this technology. Other studies (Hamid, Waycott, Kurnia, & Chang, 2015; Thai, Sheeran, & Cummings, 2019; Whittaker, Howarth, & Lymn, 2014) have shown that Facebook groups generate motivation among students, increasing their participation and producing greater closeness with their teachers. However, in a recent study it was concluded that frequent use of this application simultaneously causes distraction from academic activities, regardless of whether the social media is used for entertainment or study (Feng et al., 2019).

Finally, one group of studies has observed a negative impact of internet use on the academic performance of university students (Feng et al., 2019; Karamti, 2016; Lau, 2017).

Digital divides

Although some studies reveal that access to digital technologies has ceased to be a problem among the youngest students (Abu-Shanab & Al-Jamal, 2015; Sahin, 2017; Tondeur, Sinnaeve, VanHoutte, & VanBraak, 2010), significant gaps still persist in digital skills, in the way they use ICT, and in the ability to obtain benefits from these uses. In this regard, authors such as Helsper (2012), Van Deursen and Helsper (2015), and Van Deursen, Van Dijk, and Helsper (2014), have begun to warn how low levels of digital appropriation could negatively affect the development of new capitals (in Bourdian terms), replicating and eventually exacerbating social inequalities in non-digital areas (Toyama, 2011).

In this context, the studies have shown that age, sex, ethnicity, and geographical origin are factors that determine differences in ability to use ICT (Fraillon et al., 2014; Hale, Cotten, Drentea, & Goldner, 2010; Van Deursen & Van Dijk, 2015). Similarly, income or socioeconomic status (Hargittai, 2010; Van Deursen & Helsper, 2015, 2017) and cultural capital (Hatlevik & Christophersen, 2013; Villanueva-Mansilla, Nakano, & Evaristo, 2015) are variables that operate as catalysts of digital divides.

In spite of this, few studies have been aimed at studying these divisions between higher education students and, of those that have, the majority have focused on establishing gender gaps, obtaining contradictory results. Thus, Moussa and Seraphim (2017), for example, in a study with university students in Dubai, concluded that more than 50% of the women surveyed used the internet for four or more hours per day, a percentage that decreased to 35% among the men considered in the study. On the other hand, in a study carried out in Jordan, it was found that only 29% of women used the internet for four or more hours a day, a figure that rose to 38% in the case of male university students (Abu-Shanab & Al-Jamal, 2015).

In the same vein, there are studies that have found that women use technology more than men for academic activities and perceive greater utility in use of the internet (Abu-Shanab & Al-Jamal, 2015; Doiron, 2012; Moussa & Seraphim, 2017). Nevertheless, use of the internet is limited in areas such as commerce and electronic government, where men have a predominant role (Moussa & Seraphim, 2017). By contrast, other research has not identified statistically significant differences in the use of the internet between female or male university students (Akçayir, Dündar, & Akçayir, 2016).

With regard to socioeconomic level, Hargittai (2010) states that students from households of a low socioeconomic level have less knowledge of internet tools and visit a smaller variety of websites.

Moreover, the relationship between the use of ICT and cultural capital has also been studied (Paino & Renzulli, 2012; Tondeur et al, 2010), the latter being understood as people's cultural dispositions and knowledge. According to Bourdieu (2000), this capital can occur in three forms: incorporated, in the form of durable dispositions; objectified, in the form of cultural assets; and institutionalized, in the form of titles. Hargittai (2010), considering institutionalized cultural capital, found that those who come from homes where at least one of the parents has a postgraduate degree have greater knowledge of internet use than the other students. In the same vein, but considering objectified cultural capital, Hatlevik and Christophersen (2013) found moderate correlations between this variable and digital skills. By contrast, in a study conducted with university students in Peru (Villanueva-Mansilla et al., 2015), where the three forms of cultural capital were considered, no correlation was found between the cultural assets of young people and their digital skills, but there was correlation between cultural capital and the use of technological devices.

From another perspective, the gap according to residence has been rarely studied (Van Deursen & Van Dijk, 2015). Studies that have considered this variable have worked with populations over 18 years of age, concluding that there are differences in the use of ICT depending on whether they are from urban or rural areas. However, it is less relevant than other variables such as age and educational level (Hale et al., 2010; Van Deursen & Van Dijk, 2015). As regards ethnicity, Hale et al. (2010) found that it was not a predictor of ICT use among the general population. Hargittai (2010), meanwhile, concluded that although the number of websites visited on the internet varies according to the origin of young people (Asian, Hispanic, white, or African), ethnicity is no longer an explanatory factor when controlling for access and years using ICT, except in the case of Asians, who carry out a larger amount of activities on the internet, regardless of these variables.

Finally, as regards academic factors, some studies have identified that the educational level of young people over 18 represents an explanatory factor for differences in ICT use and skills (Akçayir et al., 2016; Chiu, Liang, & Tsai, 2016; Varela-Candamio et al., 2014), with a relationship existing between educational level and information search and evaluation skills, and strategic or internet planning skills (Chiu et al., 2016). On the other hand, there is no clarity regarding the influence of the subject or area of knowledge: while some researchers (Margaryan et al., 2011; Selwyn, 2008; Vega-Hernández, Patino-Alonso, & Galindo-Villardón, 2018; Villanueva-Mansilla et al., 2015) argue that this variable influences the frequency of university students' ICT use and the type of content they consume on the internet, other specialists have not found statistically significant differences between the digital behavior of students from different areas of knowledge (Akçayir et al., 2016).

Method

Data collection techniques

We used a survey for the data collection process, with the intention of learning about the academic activities carried out by higher education students using the internet and establishing the factors that would explain the gaps in the realization of these activities. In this context, the survey included questions associated with: sociodemographic characteristics, academic data, cultural activities and practices, and generic and academic use of the internet.

Once the survey was designed, it was subjected to six cognitive interviews with the objective of establishing the relevance of the questions and the clarity and completeness of the response categories. From these interviews, a new version of the survey was created, which was applied to a sample of 435 higher education students. The survey was made available online and the link was sent by mail to 54% of the sample of the students and on paper to the remaining percentage (46%).

Population and sample

The study population was comprised of higher education students in the municipality of Temuco, La Araucanía Region, Chile, which reached a total of 54,162 people (Servicio de Información de Educación Superior, SIES, 2018). With the objective of controlling variables, we selected students who were studying the second year of their course. In particular, we worked with a sample of 435 students, which represent the population with a 5% error and 95% confidence. The sample was of a proportional stratified type, where 68% were university students (public and private), 17% were students at professional institutes (PI), and 14% were students at technical training centers (TTC).

Data analysis

Once the metric characteristics were verified for the items on which the students were consulted regarding academic activities conducted using the internet ($kmo = 0.81$; $Bartlett = 0.00$), we applied an exploratory factorial analysis, using principal axis factoring and varimax rotation. Three factors emerged from this analysis, which together explain 57% of the variance. Table 1 shows the factors obtained together with their respective items. It should be noted that two items were eliminated, as they presented a factorial load of less than 0.50.

Table 1. Factorial solution of the scale of academic activities carried out with the internet

Factor	Item	Always or almost always	Factorial load	Alpha
Searching for information to study	Searching for tutorials or extra information on the internet, to understand content explained in classes.	38%	0.80	0.83
	Searching for extra information or materials on the internet, to study for a test	34%	0.69	
	Searching for extra information and material, to complement the content seen in classes	46%	0.63	
	Searching for information to solve some activity or exercise that was given in classes.	50%	0.55	

Collaborative academic activities	Preparing group reports with my classmates.	59%	0.67	0.77
	Making corrections and changes to the work I am doing with my other classmates.	48%	0.63	
	Obtaining educational material to study with my classmates.	46%	0.61	
	Asking my classmates to explain to me how to do a task or solve an exercise.	33%	0.51	
Creating and sharing academic products	Preparing academic documents or tasks with web tools.	33%	0.86	0.78
	Sharing academic documents or tasks using online folders.	24%	0.71	

Source: Prepared by the authors.

Population and sample

Once the factors were identified, we performed mean difference analysis to establish discrepancies in frequency according to a set of demographic variables (sex, area of residence, and ethnicity), socio-structural variables (socioeconomic level and cultural capital), and academic variables (knowledge area of the course, semester grades, and type of institution at which they study). For the demographic variables Student *t* was used, while ANOVA was used for the remaining variables.

It should be noted that the socioeconomic level and cultural capital variables are indicators that were constructed from directly measurable variables. Thus, in order to calculate the socioeconomic level, we considered the household income, occupation, and educational level of the parents, while to calculate the cultural capital, we considered the number of languages spoken by the students, the frequency with which they carried out cultural activities (for example, watching movies or documentaries, doing manual activities, playing musical instruments, practicing some sport or artistic activity, etc.) and the number of cultural objects they possessed (for example, books, musical instruments, materials for visual arts or crafts, etc.).

Finally, we performed a logistic regression analysis to establish which variables would best explain the gaps in academic use of the internet. As predictor variables we used the variables that produced statistically significant differences in academic activities done with the internet. Internet access was also included in the models. For each set of variables it was found that there was no collinearity, with correlations below 0.3 identified between the variables, except between cultural capital and socioeconomic level, where the correlation was 0.41, indicating moderate correlation, which does not constitute a collinearity problem (Catena, Ramos, & Trujillo, 2003).

Considering that these are variables that do not necessarily have linear correlation, we categorized them into dummy variables to perform their analysis. Meanwhile, we decided to use the introduction method, since the objective of the analysis was to prioritize the importance of the factors that were selected previously.

Results

Of the students who answered the survey, 40% were male and 60% were female. Some 28% of the population surveyed was of Mapuche origin and 15% from rural areas. The average age was 21, all were in the second year of a higher education course, and 21% had previously studied a higher education course, but only 3% of them had managed to complete those studies. The highest number of respondents were students in the area of Health (34%), followed those in the areas of Engineering (33%), and Education and Social Sciences (32%). Students in the Agronomy area only accounted for 10% of the respondents. A little over half studied at a public university (54%), 15% at a private university, 17% at a PI, and 14% at a TTC.

As regards access to technological equipment, 96% of the participants had a computer, 98% had a cell phone, and 98% had access to the internet (84% had Wi-Fi at home, 79% had internet on their telephone, and 65% had both).

Uses of the internet

According to those responding to the survey, the main use they make of the internet is for cultural activities (4.83 on a scale of 1 to 5, where 1 is *never or almost never* and 5 is *always or almost always*), such as talking with friends about a topic of interest, looking for news, current affairs, information on matters of self interest, and watching movies or documentaries. After these, the standouts are academic activities (4.10 on a scale of 1 to 5) and activities related to the economic sphere, (2.8 on a scale of 1 to 5), such as buying or selling products and carrying out bureaucratic procedures, among others.

As regards use of the internet for academic purposes, the factorial solution identified three sets of activities conducted via the internet: collaborative academic tasks (4.20 on a scale of 1 to 5), searching for information to study (4.12 on a scale of 1 to 5), and creating and sharing academic products (3.45 on a scale of 1 to 5).

Collaborative academic activities include the preparation of reports with classmates (59% do this always or almost always), making corrections to collaboratively prepared work (48% do this always or almost always), obtaining educational material with classmates (46% do this always or almost always), and asking for help from classmates to explain how to carry out a task or solve an exercise (33% do this always or almost always).

Meanwhile, searching for information to study considers searching for information or tutorials to understand content seen in classes (38% do this always or almost always), searching for information to study for a test (34% do this always or almost always), to complement the content seen in classes (46% do this always or almost always), or to solve some activity or exercise they have seen in classes (50% do this always or almost always).

Finally, creating and sharing academic products refers to the preparation of academic documents or products using web tools (33% do this always or almost always) and sharing those products with teachers or classmates through shared folders (24% do this always or almost always).

Factors related to the digital divides

When analyzing the divides according to demographic variables, in Table 2 we can see that there are no statistically significant differences in the frequency with which male and female students carry out the various academic activities. As for those of Mapuche origin, those students who declare that they belong to that ethnic group conduct collaborative academic activities at a significantly lower frequency ($t = -1.98$; p

= 0.048) than those who do not (4.09 and 4.24, respectively), which could be explained by the availability of internet access, since although 95% of those who declare themselves to be Mapuche have internet access, only 67% have a Wi-Fi connection at home.

Meanwhile, the geographical area of origin produces statistically significant differences in the frequency with which students search for information to study ($t = 2.88$; $p = 0.005$), carry out collaborative academic activities ($t = 3.318$; $p = 0.001$), and create and share academic products ($t = 2,900$; $p = 0.005$), with students of urban areas carrying out these activities more frequently. It should be noted that the correlation between geographic area and internet access is significant, but low ($r = 0.18$; $p = 0.000$).

Table 2. Average frequency with which students carry out activities via the internet, according to demographic variables

		Searching for information to study		Collaborative academic activities		Creating and sharing academic products	
		Average	Sig.	Average	Sig.	Average	Sig.
Gender	Male	4.18	0.13	4.15	0.22	3.47	0.74
	Female	4.07		4.23		3.43	
Area	Urban	4.16	0.00	4.25	0.00	3.5	0.00
	Rural	3.86		3.93		3.08	
Ethnicity	Mapuche	4.05	0.27	4.09	0.04	3.3	0.14
	Not Mapuche	4.14		4.24		3.5	

Source: Prepared by the authors.

As regards the socio-structural variables, in Table 3 we can see that the socioeconomic level does not produce statistically significant differences in activities related to searching for information to study and for collaborative academic activities, despite the fact that students of low socioeconomic level conduct these activities less frequently. On the other hand, statistically significant differences are observed between students of low and high socioeconomic status in activities related to creating and sharing academic products ($p = 0.006$), with those of high socioeconomic status being the ones who carry out these activities most frequently. The correlation between socioeconomic status and internet access is not significant ($r = 0.08$; $p = 0.232$).

The cultural capital of the students, meanwhile, produces differences in the frequency with which they carry out activities associated with searching for information to study, collaborative academic activities, and creating and sharing academic products, since students with less cultural capital carry out these activities less frequently. However, the differences are only statistically significant among students with low and high cultural capital. It should be noted that the correlation between cultural capital and internet access is not significant ($r = 0.09$; $p = 0.148$).

Table 3. Average frequency with which students carry out academic activities with the internet, according to socio-structural variables

		Searching for information to study		Collaborative academic activities		Creating and sharing academic products	
		Average	Sig.	Average	Sig.	Average	Sig.
SEL	Low	4.00		4.06		3.09	
	Medium	4.16	0.17	4.23	0.09	3.48	0.00
	High	4.15		4.23		3.63	
Cultural capital	Low	3.99		4.08		3.12	
	Medium	4.14	0.00	4.22	0.01	3.53	0.00
	High	4.25		4.31		3.83	

Source: Prepared by the authors.

Regarding the academic variables, in Table 4 we can see that neither the area of knowledge of the course being studied nor the average semester grades produce statistically significant differences in the frequency with which students carry out activities associated with searching for information to study and collaborative academic activities. However, in activities related to creating and sharing academic products, statistically significant differences can be observed between students of Education and Social Sciences and Agronomy ($p = 0.00$), between students of Health and Agronomy ($p = 0.00$), and between students of Engineering and Agronomy ($p = 0.00$), the latter being those who perform these activities least (2.81), while students of Education and Social Sciences conduct them most frequently (3.59).

As regards the type of educational institution, there are statistically significant differences between TTC and PI students in terms of the frequency with which they carry out activities associated with searching for information to study ($p = 0.002$) and collaborative academic activities ($p = 0.010$), with TTC students being those who perform these activities most frequently (4.28 and 4.32, respectively). Statistically significant differences are also observed between students at public universities and those at private universities ($p = 0.000$), PI students ($p = 0.027$) and TTC students ($p = 0.00$), considering the frequency with which they create and share academic products, since public university students are those who conduct these activities most frequently.

Table 4. Average frequency with which students carry out academic activities with the internet, according to academic variables

		Searching for information to study		Collaborative academic activities		Creating and sharing academic products	
		Average	Sig.	Average	Sig.	Average	Sig.
Area of knowledge	Engineering	4.14	0.86	4.12	0.18	3.47	0.00
	Education and Social Sciences	4.06		4.21		3.59	
	Health	4.14		4.28		3.51	
	Agronomy	4.10		4.13		2.81	
Average semester grade	Below 5.0	4.12	0.62	4.18	0.89	3.62	0.19
	Between 5.0 and 5.8	4.15		4.21		3.44	
	Above 5.8	4.06		4.20		3.45	
Type of institution	Public university	4.13	0.00	4.26	0.00	3.82	0.00
	Private university	4.10		4.02		2.64	
	PI	3.86		3.96		3.32	
	TTC	4.28		4.32		3.02	

Note: Grades in Chile range from 0 to 7 and are equivalent to US grades as follows: 6.50-7.00 = A, 6.00-6.49 = A-, 5.50-5.99 = B+, 5.00-5.49 = B, 4.50-4.99 = B-, 4.00-4.49 = C, 0.00-3.99 = F.

Source: Prepared by the authors.

In order to establish which variables explain the differences in use of the internet for academic purposes, we carried out a regression analysis, the results of which are shown in Table 5. As regards searching for information on the internet to study, the geographical area of residence, cultural capital, and the type of educational institution operate as predictors. However, the type of institution is the variable that has the greatest explanatory capacity. Thus, if all the variables are kept constant, residing in an urban area will increase the frequency at which internet searches are conducted to study by 0.2 points (on a scale of 1 to 5). The same is true if the student has high cultural capital. By contrast, studying at a public university or a PI reduces the frequency of searching for information on the internet to study by 0.2 and 0.5 points, respectively (on a scale of 1 to 5). The latter implies that these students are those who conduct this activity to a lesser extent, despite the fact that the demographic and structural variables have been controlled for.

The same variables are those that affect the frequency with which students conduct out collaborative activities with the internet. Thus, if the other factors remain constant, residing in an urban area will increase the frequency with which students carry out these activities with the support of the internet by 0.2 points (on a scale of 1 to 5) and by 0.1 points if they have high cultural capital. By contrast, the frequency will decrease

by 0.3 points (on a scale of 1 to 5) if the students study at a private university or a PI. It should be noted that although ethnicity produces statistically significant differences, it is no longer an explanatory variable when the rest of the variables are controlled for.

With regard to creating and sharing academic products, we can state that having a medium or high level of cultural capital and studying at a public university increases the frequency with which these activities are carried out. In this context, if all other variables remain constant, having medium cultural capital will increase the frequency of using the internet to create and share academic products by 0.3 points (on a scale of 1 to 5), while having high cultural capital will do this by 0.4 points. Meanwhile, studying at a public university increases the frequency of using the internet to create and share academic products by 0.7 points. In fact, it is this latter variable that has the highest relative weight (0.291) among all of the predictors. On the other hand, the socioeconomic level and the area of knowledge of the course studied cease to be significant when the rest of the variables are controlled for.

Table 5. Results of multiple regression for the frequency with which students carry out academic activities with the internet

	Searching for information to study		Collaborative academic activities		Creating and sharing academic products	
	Coeff.	Est. Coeff.	Coeff.	Est. Coeff.	Coeff.	Est. Coeff.
Area (Rural)						
Urban	0.238* (0.102)	0.117	0.224* (0.096)	0.121	0.23 (0.161)	0.07
Cultural capital (Low)						
Medium	0.112 (0.090)	0.067	0.119 (0.03)	0.078	0.364** (0.141)	0.134
High	0.228** (0.088)	0.143	0.166* (0.081)	0.114	0.482** (0.147)	0.187
Institution (TTC)						
Public university	-0.235* (0.098)	-0.158	-0.138 (0.092)	-0.102	0.704*** (0.162)	0.291
Private university	-0.214 (0.127)	-0.101	-0.329** (0.119)	-0.171	-0.509* (0.259)	-0.149
Professional Institute	-0.493** (0.136)	-0.213	-0.334** (0.125)	-0.159	0.130* (0.256)	0.035
Internet in the home (No)						
Yes	0.474 (0.281)	0.084	0.506 (0.257)	0.099	0.851 (0.430)	0.093
Ethnicity (not Mapuche)						
Mapuche			-0.77 (0.080)	-0.051		
SEL (Low)						
Medium					-0.047 (0.140)	-0.019
High					-0.025 (0.177)	-0.009
Area of knowledge (Agronomy)						
Engineering					-0.172 (0.246)	-0.067
Education and Social sciences					-0.040 (0.235)	-0.014
Health					-0.026 (0.257)	-0.01
Constant	3.983*** (0.282)		3.620*** (0.269)		1.946*** (0.471)	
R	0.08		0.08		0.20	
R adjusted	0.06		0.06		0.17	
N	396		396		396	

Source: Prepared by the authors.

Discussion and Conclusions

According to the results obtained, we can establish that higher education students frequently use the internet for their academic activities, as previous research has already shown (Margaryan et al., 2011; Thang et al., 2014; Thang et al., 2016), with the standouts being collaborative academic activities and searching for information to study. In fact, academic activities are second in frequency, surpassed only by cultural activities. It should be noted that the survey was applied during October, which may explain the students' greater level of dedication to their academic work, this month being in the middle of the semester.

As regards collaborative academic activities, the results confirm the usefulness of communication tools to obtain educational material or for asking questions to classmates (So, 2016), this being one of the activities most frequently carried out, as found in previous research (Hrastinski & Aghaee, 2012; Waycott et al., 2010).

Meanwhile, activities related to creating and sharing academic products using web tools are conducted less frequently, which corroborates the idea that young people use a small variety of technological tools (Corrin et al., 2010; Jones et al., 2010; Thang et al., 2016; Thompson, 2013) and that they do not often create digital products (Kennedy et al., 2010).

On the other hand, the results show a set of gaps in the frequency with which students use the internet for their academic activities. In particular, those in urban areas, with high cultural capital, and/or studying at a TTC, more frequently conduct activities related to searching for information to study. Likewise, non-Mapuche students, from urban areas, with high cultural capital, and/or studying at a TTC, conduct collaborative academic activities more frequently than the rest of their classmates. Finally, students from urban areas, of high socioeconomic status, who have medium-high cultural capital, and/or who attend a public university, more frequently carry out activities related to the creation of academic products.

Furthermore, the results of this research did not reveal statistically significant differences in the frequency with which men and women use the internet for academic activities, which was consistent with the findings of Akçayir et al. (2016).

As regards the area of residence—and as has been shown in previous studies (Hale et al., 2010; Van Deursen & Van Dijk, 2015)—students in rural areas use the internet for academic work less frequently than their peers in urban areas. However, it is important to specify that this gap is not determined by access, since 83% of students from rural areas have some form of internet access. This finding indicates the need to design and implement policies that are aimed at reducing the gap between students residing in urban and rural areas. In order to do this, it is essential to go more deeply into the factors that could explain this difference in the use of such tools.

With respect to ethnicity and Mapuche background, the results indicate that this does not represent a determining factor in the digital divide, because although statistically significant differences were found in the frequency with which these students conduct collaborative activities, when access to the internet, cultural capital, the area of origin, and the type of education institution are controlled for, these are no longer significant. Although the low relevance of this variable in explaining differences in internet use has been noted previously (Hale et al., 2010; Hargittai, 2010), we should underline that we did not have access to research that studied the effect of Mapuche ancestry in populations of higher education students.

Meanwhile, the socioeconomic level only produces statistically significant differences in the frequency with which students use web tools to create products. However, it is no longer an explanatory factor when internet access and the rest of the demographic and academic variables are controlled for. This result contradicts the conclusions of previous studies (Hargittai, 2010; Van Deursen & Helsper, 2015), which considered this variable as one of the main generators of gaps, but it is consistent with the conclusions of Van Deursen and Van Dijk (2015), who found that economic income has a moderate relationship with access to technology and low correlation with

the use of digital tools. This may indicate that the predictive capacity of the socioeconomic level, measured in the way it was in this study, has diminished for those activities that are carried out most frequently or daily by young people, but continues to produce differences in activities that are more precise, that require greater digital skills, or which need constant internet access. From another perspective, the results could indicate a change in the socioeconomic conditions of the students that enter university.

By contrast, cultural capital is one of the variables that systematically operates as a predictor of gaps in internet use, which has been put forward in previous studies with similar populations (Hargittai, 2010; Hatlevik & Christophersen, 2013; Villanueva-Mansilla et al., 2015). However, it should be noted that while Hargittai (2010) only uses the level of education of the parents as a variable and Hatlevik and Christophersen (2013) use access to books as cultural capital, Villanueva-Mansilla et al. (2015)—as in this study—measure cultural capital considering access to cultural assets (objectified cultural capital) and the frequency with which the subjects carry out cultural activities (incorporated cultural capital), which increases the consistency of the results. In any case, the fact that the cultural capital and not the socioeconomic level is one of the main explanatory factors raises questions about the relationship between these two variables and their impact on the digital practices of higher education students.

In terms of areas of knowledge, differences were only found in the use of the internet for creative activities and this ceased being relevant when the rest of the variables were controlled for. However, we expected to find greater differences due to the nature and characteristics of the different areas of study, as various studies have concluded (Margaryan et al., 2011; Selwyn, 2008; Vega-Hernández et al., 2018; Villanueva-Mansilla et al., 2015).

Meanwhile, the average grade did not produce any discrepancies, which is consistent with the low relationship identified between the use of digital technologies and academic performance, both in school contexts (Genlott & Grönlund, 2016; Organisation of Economic Co-operation and Development, OECD, 2015) and higher education contexts (Cerda, Huete-Nahuel, Molina-Sandoval, Ruminot-Martel, & Saiz, 2017).

On the other hand, the type of educational institution is one of the variables that does produce differences in all the activities and which has a greater relative weight as an explanatory factor of the frequency with which the students use the internet for all academic activities. This result could reveal different teaching styles or cultures among higher education institutions. In the same vein, it was found that public university students are those who most frequently use the internet to create and share academic products, which could possibly be explained by a greater tendency of these institutions to use virtual platforms (virtual campus, for example) to communicate with classmates and teachers; however, the specific use of this tool was not sufficiently explored in the survey, this being a constraint to go more deeply into the conclusions in this area.

Meanwhile, the results overwhelmingly demonstrate that there has been a reduction in the access gap, as previous research has indicated (Abu-Shanab & Al-Jamal, 2015; Sahin, 2017; Tondeur et al., 2010), since 84% of the students surveyed have internet access at home and 79% on their cell phone, which means that 98% of the students have some form of internet access. In addition, this variable does not constitute a predictor in the frequency of internet use for academic activities.

As a consequence, it can be concluded that the explanatory capacity of the socioeconomic level has diminished in determining gaps in the use of the internet, being relevant only in activities that are more specific or carried out to a lesser extent by students. By contrast, cultural capital constitutes one of the variables with the greatest capacity to predict differences in the frequency with which students use the internet for all academic activities. This implies that, although these students have managed to overcome the economic barriers to enter the higher education system, there are still gaps in cultural capital that reproduce digital inequalities, affecting the way in which they use the internet for their academic activities, which would be consistent with the approaches of critical theories of education (Bourdieu & Passeron, 2003).

As regards future research, and considering that internet access is not a determining factor in the digital divides seen among higher education students, it is essential to continue examining aspects that can explain the reasons for inequalities between students in urban and rural areas, particularly because these divides may extend to academic performance.

In the same vein, it is important to look more deeply into the various teaching practices of the different higher education institutions and how they encourage or mediate use of the internet, in order to understand the variations identified in this study.

In this regard, and considering the results obtained, it would be recommendable for public universities and professional institutes to develop strategies to encourage use of the internet, in order to search for information to study and to carry out collaborative activities, particularly focused on students with lower cultural capital.

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