

Article

# Time of Use and Patterns of Internet Consumption in University Students: A Comparative Study between Spanish-Speaking Countries

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**Abstract:** Today, the processes of virtualization in higher education are decisive. The digital paradigm has an enormous influence on the university world, and will have even more in the future. Knowing how students access the Internet, how they consume it and how long they use it would be of great value for university policy, to facilitate the proper integration of information and communication technologies (ICT). The main objective of this study is to determine the time of use of the Internet by university students in different Spanish-speaking countries in the last eight years (2012–2019). It also aims to determine whether belonging to a common cultural space has an influence on this fact. The broad sample was composed of 2463 subjects from Chile, Ecuador, Spain, Guatemala, Mexico, Peru, and Venezuela. The results show that there is no homogeneity in the time of use and consumption patterns among the countries analyzed. The particular elements and social habits of each specific country, and multiple variables within each of them, condition their use. In conclusion, it can be argued that the integration of ICTs in university contexts is a very complex phenomenon in which multiple factors are present. In this sense, the sustainable educational policies of each country—and even of each university—must focus on their characteristics and idiosyncrasies. Importing practices from other countries, or attempting to apply common patterns of integration, may not be effective because of differences in the very different variables present in each.

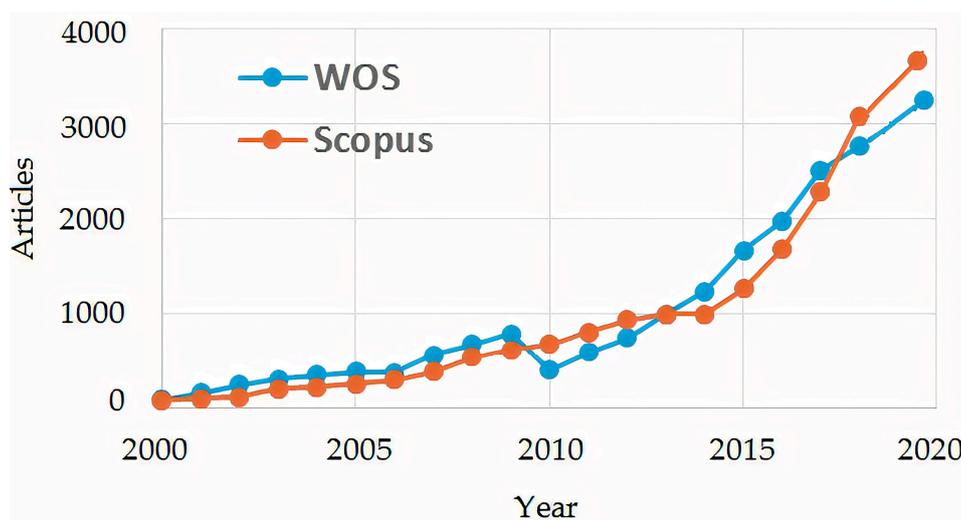
**Keywords:** higher education; icts; consumption; university students; education policy; teacher training; university

## 1. Introduction

The growth of Information and Communication Technologies (ICTs), the increase in communication transfers, and access to a myriad of information resources has led to the development of a modern society, known as the Knowledge Society [1]. With ICTs, a specific terminology has emerged to define the different generations of this society: Digital natives—for those who have used ICTs since childhood—and digital immigrants—for those who have used them later [2]. Similarly, a new concept also emerges digital ability or competence, which is an aspect that can be evaluated in the world of education. In fact, the acquisition of digital competence is key for university students, who must be

competent in mastering specific codes, symbolic systems and ways of interacting with information in digital format and through communication networks [3–5]. Taking into account this competence, a need arises to create educational spaces linked to educational technology [6], thus building an inexhaustible world of possibilities in the development of new formats in the teaching–learning processes [7].

The production of knowledge in all areas of learning is growing exponentially, and university students have to face this development, which is an endless source of resources that can facilitate and develop their academic training [8]. In this sense, Bauman [9] sees society as being in a liquid, changing state, with a certain uncertainty about the future in terms of the real and virtual worlds. Thus, the growing interest that Internet consumption has aroused in the scientific community, especially in the last five years—as can be seen in Figure 1—implies that it is growing and that, consequently, it has great potential for study. For this reason, it is necessary to broaden our knowledge of the factors that lead to Internet consumption (technological development of the country, economic and political aspects of the country, social class, age, gender, family influence, etc.) and the possible consequences that this can produce: Loss of social skills [10]; migraines [11]; suicide attempts [12]; lower emotional intelligence [13], etc. These and other negative consequences can arise when the distinction between use and abuse is not made [13] or when the end is not an educational objective. In this sense, Internet addiction is also a reality that arouses great interest in scientific studies, especially among adolescents [14–16] or university students [17,18].



**Figure 1.** Evolution of the number of published articles that include “Internet consumption” in the title, summary, or keywords, within the Web of Science (WOS) and Scopus scientific databases. Source: Own elaboration.

In the last decade, a large part of the research focused on Internet use [19] showed that 98% of Spanish university students have one or more devices with an Internet connection and 90% of them use it on a daily basis [20]. Some studies have not been limited to analyzing connection time but have also looked more deeply into the characteristics of consumption [21], since there is no difference between the different genders, but there is with respect to age (the older the person, the shorter the connection time). Studies by authors such as [16] state that 53.5% of those investigated claim that the main reason for use was recreational (online games, movies, and videos), a figure that is lower than 64.4% [17].

However, they are not very frequent in comparative studies between countries, which would undoubtedly allow us to obtain valuable information on trends and developments in similar regions, contexts, or cultural spaces [22,23]. Although there is specific research comparing countries (from 2 to 39) on Internet addiction [24], typology of users [25], adolescent use according to gender [26], impact and effects of the Internet [27], training of students in online learning [28], etc. On the other hand, the contributions of tangential research, which considers the problem within the context of

improving students' experiences [29], specifically focused on the university world and homogeneous cultural spaces are lacking.

That is precisely what we are trying to do with this research. To offer a comparative analysis of the use of ICTs by university students and in the specific context of Latin America (focused on Spain and several Central and South American countries). It should be borne in mind that many factors influence the integration of ICT in Higher Education, and this is one of the most prominent. Although there has been an evolution in the processes of adaptation and integration in this scenario since the beginning of the 21st century until today, the factors involved in it remain. Many specialists have been able to determine this, both in a stage prior to this study [30–34] and those we analyzed during the period of the fieldwork developed for this research, from 2012 to the present [35–39].

These factors of a different nature are still present today, as a recent study by Liu, Geertshuis, and Grainger shows [40]. In this article, the authors analyzed 131 articles that focused on factors involved in the integration and adoption of ICTs in Higher Education by academics. As a main result of this extensive systematic analysis of the scientific literature, they concluded that it is a highly complex process in which multiple factors related to different dimensions are present.

We have obtained this same result particularly in the areas of teachers, students, and the university itself [41,42]. It has been possible to systematize, from the dimensions identified by ourselves [43], different factors of relevance. Although, naturally, they are all interrelated, it should be noted that many researchers have made interesting contributions specifically to very specific factors. Thus, they offer valuable information in the search for solutions for the integration of ICTs in university contexts. Among other factors, we can identify those referring to the teaching staff, which may be related to attitude (use of ICTs, consumption time, characteristics of their use, motivation, influence of age, etc.) [44–47], or to aptitude (previous training, continuous training, adaptation to digital evolution, etc.) [48–50]; factors referring to the students, which are also related to their attitude (use of ICTs and characteristics, consumption time, expectations and interest, confidence, motivation, etc.) [51,52], or their aptitude (previous training, university training, knowledge as users, mastery of specific tools, academic, etc.) [53–56]; and factors of an institutional nature, related to economic investment (adequate financial resources, projects, agreements, etc.) [57–59], technical infrastructure (platforms, technological tools, virtual campuses, support structures, etc.) [30,36], organizational development and human resource management [30,39,60,61], or integration models (underlying educational model, partial b-learning, general b-learning, u-learning, e-learning, etc.) [62,63].

In our case, within these dimensions, we focus on the factors related to the students, and specifically on one of them: The time they spend on the Internet, which is connected to their knowledge as users and their interest in the new digital environments. It is certainly a factor of interest and one for which there is not much background.

On the other hand, an increasingly digitalized university can contribute decisively to sustainability, one of the main challenges of our time. Higher education plays a key role in supporting the implementation of sustainability initiatives. From within academia itself, as recent studies have shown, [64] educators perceive sustainability as a complex issue, posing a challenge to teaching in university systems whose normative curricula are based on the solution of instrumental problems. However, the idea of sustainability forces organizations and individuals to rethink worldviews and justify their actions, even if conceptualization of sustainability in higher education institutions is still limited. Fundamentally because it requires, among other factors and as advocated by Bien and Sassen [65], a redistribution of power, which increases its difficulty. Academic leaders often impose their own understanding of science, the university, and sustainability on others, while conceptualizing sustainability to maintain or increase that power. However, this is a necessary path.

Despite these organizational challenges, however, the integration of ICTs into higher education is a critical process for sustainability. It is true that for some time there was a wide debate about whether the environmental effects of ICTs were positive or negative. Their use and widespread use can naturally contribute to increasing levels of emissions due to the energy consumption of machinery

and technological devices, as well as the recycling of waste generated. However, on the other hand, ICTs lead to the development of smarter cities and organizations, more efficient transport systems, optimization of electricity grids and energy consumption by other industries, etc. Today we know that when a high level of ICT development is achieved the balance is tipped in favor of the benefits [66,67], which continue to improve as the use of digital increases. They play an integral role in improving environmental quality policy [68]. Therefore, the widespread integration of ICTs in an organization that has such an impact on our civilization as the university is a decisive factor in favor of sustainability, and all studies carried out with this objective would undoubtedly contribute to its effectiveness and generalization.

In our case, studying the time and characteristics of Internet consumption by Latin American university students, we also seek to obtain valuable information about a factor that, in addition to reflecting an informal training acquired by them, would tell us about the relevance that ICTs may have in their lives today. This is fundamental to help in the processes of integration of these technologies in higher education, in how to improve them and adapt them to each specific context.

## 2. Materials and Methods

### 2.1. Objectives

The main objective of this research is to carry out a comparative study between Spanish-speaking countries (Spain and other Latin American countries) of the time of use and the characteristics of Internet consumption by university students. The aim of this work is to determine whether there is homogeneity in terms of geographical and cultural situation.

### 2.2. Population and Sample

The sample of this investigation (N = 2463) was carried out by the non-probabilistic method of sampling for convenience. Since the survey was completed in different countries, only those with more than 30 respondents were selected as representative cases for this study: Chile (31), Ecuador (468), Spain (1457), Guatemala (88), Mexico (194), Peru (99), and Venezuela (126). The remaining countries, with less than 30 completed surveys, were discarded.

### 2.3. Instruments

The data were collected by means of the questionnaire called: “Digital Basic Competences 2.0 of University Students” COBADI® (Registered trademark: 2970648, access at <https://bit.ly/2p1aKVh>), which is a questionnaire about the training and experience regarding different digital competences. This questionnaire has 23 items distributed in three categories: (i) “Competences in the use of ICT for the search and treatment of information”, that is to say, it refers to the individual competence in the use of diverse technological tools; (ii) “Interpersonal competences in the use of ICT in university scenarios”, serves to evaluate how a student resolves his doubts and problems related to ICT; and (iii) “Virtual and social communication tools of the University”, includes questions about the use of the students of the electronic platforms of each University.

This article presents the analyzed data of the first of these categories. The questionnaire was distributed digitally in different Latin American countries and Spain during seven academic years, from 2012/2013 to 2018/2019, with the collaboration of university professors who offered their students the online link where the instrument was located (COBADI®). This questionnaire is made up of 11 items that are evaluated through a Likert scale from 1 to 4 points, where 1 refers to “I feel completely ineffective in carrying out what is presented” and 4, “I feel completely effective”. In addition, it presents the option NS/NC/NA (in case you do not know the answer to the question, or if it is not applicable to the question requested).

This questionnaire was chosen above all because it has been applied by different research groups with whom we collaborate and because it has been used in other field work by many universities and

authors with positive international results [69–71]. Of all the times this instrument has been applied, it is the one with the largest sample.

#### 2.4. Methods

The statistical analysis presented in this article has focused on items 5 and 8 of the first category of the COBADI<sup>®</sup> questionnaire Table 1: (i) item 5: How much time do you spend surfing the Internet? with answers on the Likert scale, (a) between 1 and 3 h per week; (b) between 4 and 9 h per week; or (c) more than 9 h per week; (ii) item 8: Can you tell me how much time you use the Internet for the following actions that I mention, with the option of answering (a) Nothing (you never use it); (b) Little (less than 5 h per week) and (c) A lot (5 or more h per week):

**Table 1.** Item 5 (navigation time) and item 8 (evaluated activities and time of use) of COBADI<sup>®</sup>.

Item	Question	Response	
5	How much time do you spend browsing the Internet?	Between 1 and 3 h a week	
		Between 4 and 9 h a week	
		More than 9 h a week	
		Other:	
		Watch TV programs	Nothing Little A lot
		Listen to music	Nothing Little A lot
		Inform myself about topics that interest me academically and professionally	Nothing Little A lot
		Play online	Nothing Little A lot
		Searching for information to perform university tasks	Nothing Little A lot
		Publish photos/video	Nothing Little A lot
8	Can you tell me, how long do you use the Internet for the following actions?	Download music, movies, games, etc.	Nothing Little A lot
		Talk to friends through social networks, chat, etc.	Nothing Little A lot
		Find new friends using social networks (Facebook, Twitter, MySpace, Tuenti, Orkut, Hi5, etc.)	Nothing Little A lot
		Working in groups with classmates to perform academic tasks	Nothing Little A lot

All analyses were carried out in R programming language. The outputs of the inferential analyses shown in the command console are provided with their respective interpretations in the context of each of the objectives. In the same way, the main representative graphics of each analysis are presented in the context of their respective objectives. In the analyses, the Likert scale responses were treated as an interval scale and distributed continuously [72].

The use of the R programming language for application in the social sciences is widely reported in the scientific literature on research methods [73–76] and has been validated and proven effective [77–79]. In our case, the process followed was:

(a) Database loading and filtering: The database corresponding to the complete sample with 2482 observations was selected. The database was formatted for each of the variables of interest in the questions offered with the execution of this script.

(b) For the variable “Weekly navigation time” it was necessary to make, in R programming language, a coercion of the representative factors of the variable to finally specify with only 3 factors that allows the time of use of Internet weekly. In this way, we obtained that the variable only has the levels: (N1) between 1 and 3 h per week; (N2) between 4 and 9 h per week; (N3) more than 9 h per week. In this way, it was more effective for comparative analyses.

(c) Having defined the three levels of the factor, all the responses were unified into three distinguishable factors.

(d) Factors were ordered from shortest to longest time of use and the variables to be used to answer the questions posed were selected. Likewise, the names of the countries—obtained in the different fieldwork carried out in each one of them—were modified so that they were all collected in a similar and homogeneous format.

(e) Data were filtered using only those countries with more than 30 respondents, answering the question: Which countries have more than 30 respondents? In this way, it was possible to obtain representative cases that could provide statistically significant and useful data for the study.

### 3. Results

#### 3.1. Weekly Browsing Time

As we have pointed out, the database corresponding to the complete sample (2463 observations) was formatted for each of the variables of interest in the questions offered with the execution of this script. Through the filtering carried out for the selection of representative cases from countries with more than 30 respondents (Figure 2), the exploratory analysis based on contingency tables can be carried out.



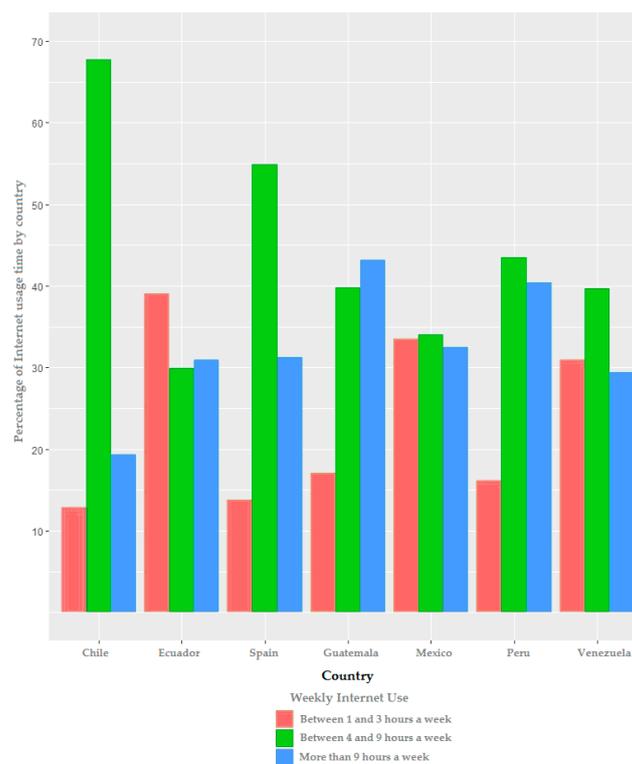
**Figure 2.** Number of respondents per country and weekly Internet usage time. (Note: Data transformations and graphs by percentages. Balloon Plot for x by y. Area is proportional to Freq.).

For the variable “Weekly browsing time”, the coercion of the representative factors was carried out, which allowed us to specify the three factors of weekly Internet use time in the levels (the resulting

table, Table 2, can be represented graphically in Figure 3): (1) Between 1 and 3 h a week, (2) between 1 and 3 h a week, and (3) more than 9 h a week.

**Table 2.** Data by percentage. Transformations of data for representation in a graph by percentages.

Country	Weekly Browsing Time	Percentage	N for Country	N for Use
Chile	Between 1 and 3 h a week	12.90323	31	4
Chile	Between 4 and 9 h a week	67.74194	31	21
Chile	More than 9 h a week	19.35484	31	6
Ecuador	Between 1 and 3 h a week	39.10256	468	183
Ecuador	Between 4 and 9 h a week	29.91453	468	140
Ecuador	More than 9 h a week	30.98291	468	145
Spain	Between 1 and 3 h a week	13.79547	1457	201
Spain	Between 4 and 9 h a week	54.90734	1457	800
Spain	More than 9 h a week	31.29719	1457	456
Guatemala	Between 1 and 3 h a week	17.04545	88	15
Guatemala	Between 4 and 9 h a week	39.77273	88	35
Guatemala	More than 9 h a week	43.18182	88	38
Mexico	Between 1 and 3 h a week	33.50515	194	65
Mexico	Between 4 and 9 h a week	34.02062	194	66
Mexico	More than 9 h a week	32.47423	194	63
Peru	Between 1 and 3 h a week	16.16162	99	16
Peru	Between 4 and 9 h a week	43.43434	99	43
Peru	More than 9 h a week	40.40404	99	40
Venezuela	Between 1 and 3 h a week	30.95238	126	39
Venezuela	Between 4 and 9 h a week	39.68254	126	50
Venezuela	More than 9 h a week	29.36508	126	37



**Figure 3.** Percentage of respondents, differentiated by country, of weekly Internet use time.

As main results, it has been possible to obtain that, among the people surveyed by country, university students in Guatemala declared in a greater percentage (43%) that they use the web for more than 9 h a week. The case of Ecuador is also noteworthy: The majority of its respondents (39%)

indicated that they use the Internet to surf between 1 and 3 h a week. Students in Chile, on the other hand, declare in their great majority (67%) that they use the Internet between 4 and 9 h a week. Mexico is represented by respondents who graphically appear to have a more homogeneous distribution (each third of the population declares itself to be a user of one of the categories of weekly Internet use).

However, based on these data, it is not possible to determine that there is general homogeneity among Latin American countries. Each one of them determines a different consumption of the Internet, depending on the circumstances and idiosyncrasies of each country. As a cultural region as such, in principle, there is no similarity in the use of the Internet by Spanish-speaking countries.

Nor could we relate consumption in each of these countries to economic level, at least directly. For example, Guatemala presents the highest percentage of students who make a more intensive use of the Internet (43% more than 9 h and 39% between 4 and 9 h, with only 17% who use it between 1 and 3 h a week), a country that economically has much less income per capita than Spain, which presents a lower use globally, in the time interval studied (31% more than 9 h, 55% between 4 and 9 h although only 13% between 1 and 3 h). It is not possible to make any interpretation of this fact; it may be because Guatemala is in Central America and has a great influence of the United States, where the use of Internet is intensive. Alternatively, perhaps the Guatemalan university students in the sample may belong, in a higher percentage than in Spain, to higher social classes, which means that in their homes they have easy access to the Internet and make a high degree of regular use. In any case, there would be multiple variables that condition the circumstances of the time of use, and characteristics of the same, in each of the Latin American countries studied.

It should not be forgotten either that the study has been carried out over a very long period, from 2012 to 2019, and that the evolution in each country may have been different. Although, obviously, this is not the objective of our study, which focuses on the comparison of countries looking for a common pattern of time of use in the Latin American region. In that sense, as can be shown, it is not possible to defend that homogeneity among Spanish-speaking countries.

### 3.2. Results of the Differential Analysis with the Application of the Chi-Square Test of Independence

A differential analysis with the application of the chi-square test of independence was used to deepen the study. A chi-square test 2 was carried out to evaluate more precisely the relationship between weekly Internet use time and the country of residence of the respondents (using the data from the contingency table for the number of respondents per country of weekly Internet use time, see Table 2).

## Pearson's Chi-squared test

## data: timenavcountry

## X-squared = 199.55, df = 12, p-value <  $2.2 \times 10^{-16}$

It is possible to interpret the result of the test carried out that the inferential analysis indicates that there is no independence between the variables "Country" and "Time of web use". This corroborates that the respondents have a different weekly web use behavior depending on the country where they reside, there being no similarity or homogeneity in the Latin American region.

### 3.3. Results of the Post-Hoc Analysis

A post-hoc analysis was also conducted to study the particular difference between country pairs (Table 3).

**Table 3.** Post-hoc analysis to study the particular difference between country pairs.

Comparison	p.Chisq	p.adj.Chisq
<b>Chile: Ecuador</b>	$5.78 \times 10^{-5}$	$2.99 \times 10^{-4}$
<b>Chile: Spain</b>	$3.14 \times 10^{-1}$	$3.66 \times 10^{-1}$
<b>Chile: Guatemala</b>	$2.26 \times 10^{-2}$	$3.95 \times 10^{-2}$
<b>Chile: Mexico</b>	$1.46 \times 10^{-3}$	$4.38 \times 10^{-3}$
<b>Chile: Peru</b>	$5.10 \times 10^{-2}$	$7.14 \times 10^{-2}$
<b>Chile: Venezuela</b>	$1.66 \times 10^{-2}$	$3.49 \times 10^{-2}$
<b>Ecuador: Spain</b>	$0.00 \times 10^0$	$0.00 \times 10^0$
<b>Ecuador: Guatemala</b>	$3.79 \times 10^{-4}$	$1.33 \times 10^{-3}$
<b>Ecuador: Mexico</b>	$3.70 \times 10^{-1}$	$4.09 \times 10^{-1}$
<b>Ecuador: Peru</b>	$7.11 \times 10^{-5}$	$2.99 \times 10^{-4}$
<b>Ecuador: Venezuela</b>	$9.02 \times 10^{-2}$	$1.11 \times 10^{-1}$
<b>Spain: Guatemala</b>	$2.01 \times 10^{-2}$	$3.84 \times 10^{-2}$
<b>Spain: Mexico</b>	$0.00 \times 10^0$	$0.00 \times 10^0$
<b>Spain: Peru</b>	$8.06 \times 10^{-2}$	$1.06 \times 10^{-1}$
<b>Spain: Venezuela</b>	$1.00 \times 10^{-6}$	$6.90 \times 10^{-6}$
<b>Guatemala: Mexico</b>	$1.59 \times 10^{-2}$	$3.49 \times 10^{-2}$
<b>Guatemala: Peru</b>	$8.79 \times 10^{-1}$	$8.79 \times 10^{-1}$
<b>Guatemala: Venezuela</b>	$3.35 \times 10^{-2}$	$5.03 \times 10^{-2}$
<b>Mexico: Peru</b>	$7.20 \times 10^{-3}$	$1.89 \times 10^{-2}$
<b>Mexico: Venezuela</b>	$5.87 \times 10^{-1}$	$6.16 \times 10^{-1}$
<b>Peru: Venezuela</b>	$2.84 \times 10^{-2}$	$4.59 \times 10^{-2}$

As can be seen from the test results, all country pairs showed differences in weekly web usage behavior. It was not possible to find even one similarity between pairs that could determine any pattern based on given parameters.

The interpretation we can make is that, in general, Latin American students make significant use of the Internet but there is no homogeneous distribution. In each country of those studied, there is a different time of use, most likely linked to both social customs and the possibilities of access to the network.

#### 3.4. Actions Carried Out during the Time of Use of the Internet

To continue with the comparative study of the time of use of Internet of the university students in different countries of Spanish speech, in the search of finding a possible homogeneity in this geographical and cultural space, we also carried out the analysis of the actions that they realize when they are using the net. This was done in accordance with the structure of the COBADI<sup>®</sup> instrument presented. For this purpose, and in order to make the work and the results operative, a selection of variables of interest was carried out from the filtered database.

The filter and transformations were as follows: (1) Grouping by country; (2) case counts for each time investment by country in each of the activities studied; (3) naming the variables for each of the data tables generated for the case counts; (4) merging all the tables created into one with the counts for each web use and country according to the activities studied; and (5) transforming the counts by condition (Country/Web Use) and in percentages for display by country.

We present the results obtained in Figure 4, collecting the percentage of time of use according to the main actions carried out on the Internet (assignments, find friends, social chat, downloads, videogames, music, publish content, group work), by intensity (nothing, a little, a lot), and country (Chile, Ecuador, Spain, Guatemala, Mexico, Peru and Venezuela). We show them below:

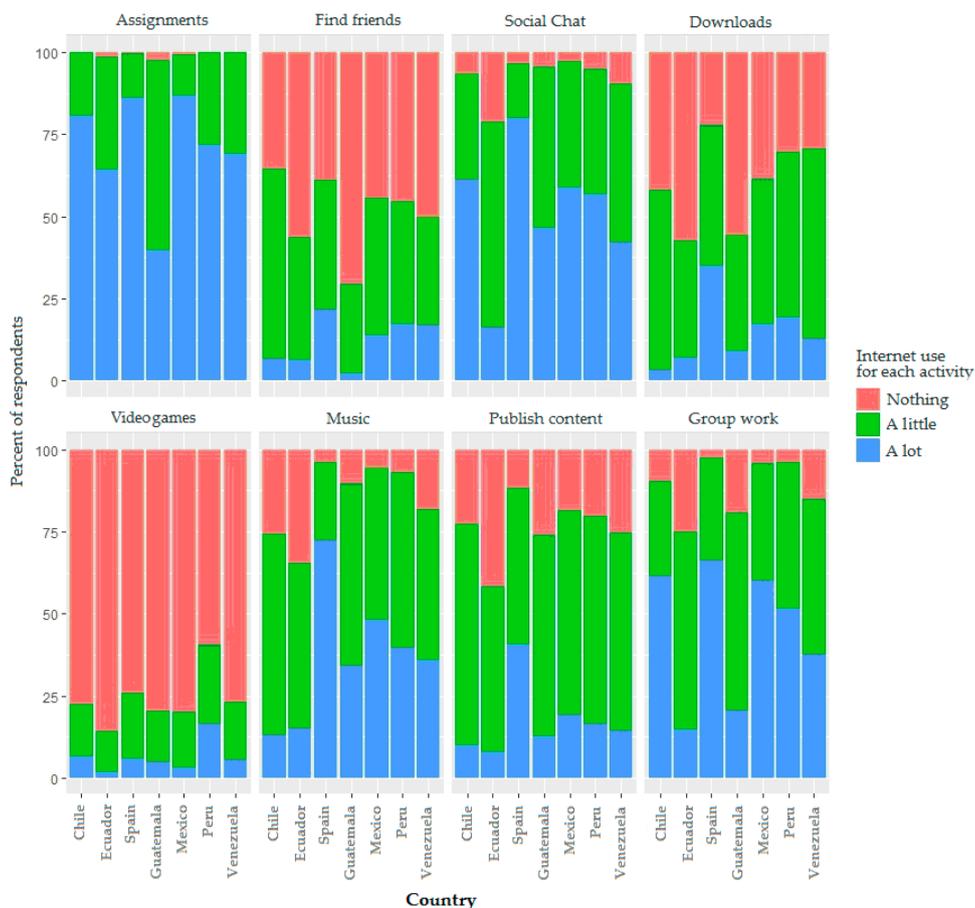


Figure 4. Percentage of respondents: Internet usage time according to activities.

In the interpretation of the results, we can highlight the behavior of two main activities in all the countries studied. In the case of web use for Assignments, in most countries, respondents (>50%) responded that they use “a lot” of the web for this activity. In the case of web use for video games, the opposite is true. In all countries, more than 60% of respondents say that they do not use (“nothing”) the web for this activity.

In most of the countries, it is verified that students, in more than 50% of those surveyed, use “a lot” the web for social chat; Ecuador is excluded from this context, which is consistent with what was observed in the previous analysis—as can also be seen graphically—in which it is shown that in the mentioned country there is less weekly use of the internet than in other Latin American countries. It is also noteworthy that the response “a lot” is consistently high in percentage terms for all activities studied by those surveyed in Spain, which is also easy to interpret since Internet use is higher in Europe than in Central and South America [69,71].

### 3.5. Results of the Inferential Analysis on Activities during the Time of Internet Use

As we did when establishing the time of use, to deepen the information on activities, we applied the chi-square test of independence for each of the studied activities. The characteristics of the chi-square analysis are similar to the one performed previously. In this case, the test was repeated for each of the activities studied. As they were categorized (\$Assignments, \$Findfriends, \$Socialchat, &\$Downloads, \$Videogames, \$Music, \$Publishcontent, \$Groupwork), and in order not to exceed unnecessarily the length of the article, we indicated as a sample the one referred to Videogames: \$Videogames

```
## Pearson’s Chi-squared test with simulated p-value
## data: table(actbycountry$Country, actbycountry$Videogames)
```

## X-squared = 61.661, df = NA, p-value = 0.0004998

In relation to our objective, in the analysis of the chi-square test for independence it was expected that there would be different behaviors in the time of Internet use for each activity according to each of the countries represented in the survey, and this is indeed the case. The result obtained shows that there is a relationship between Internet use time and the activities evaluated within each specific country, but the behaviors in each one of them are independent. The time spent by university students in each of the countries on the different actions analyzed is different.

Only a certain homogeneity was found in which doing assignments on the Internet is a very common activity in Latin America, which shows the relevance that the network has acquired in the last eight years for this purpose. On the other hand, there is also an activity that is little practiced, in general, by university students in Latin America, and that is to spend time using the Internet to play videogames. Precisely, their condition as students and the realization of multiple academic activities, for which they are very busy, would justify this fact. It would be very interesting, due to the social and recreational impact that this activity has today, to compare it with people from other different sectors. The other actions analyzed (find friends, social chat, downloads, music, publish content, group work) show a different behavior according to each country.

Again, it is determined that the Latin American environment is not homogeneous in terms of the use of the Internet by university students. It depends very much on the countries, in accordance with different conditions (own customs, possibilities of access to the network, economic level of the country, etc.). Even if the study had been by sample of Latin American universities, instead of focusing on countries, a similar result could be observed. No patterns of common use can be found despite being located in a geographical space with the same language and cultural scenario.

#### 4. Discussion

The main objective of this study was to determine whether the time of use of university students on the Internet is homogeneous in Spanish-speaking countries using a large sample (2482 subjects surveyed) and over a long period of time (from 2012 to 2019). The answer we have obtained is no, which corresponds to other studies carried out.

For example, also using the COBADI<sup>®</sup> instrument, and although they did not have the same goal and will present much lower samples, we can refer to the works of Vazquez-Cano et al. [8], Concepción et al. [80], or Olmedo et al. [81], with similar results to those obtained in terms of time of use by students in different countries in this geographical area. In addition, other research provides us with information on time of use. Thus, García [82] carried out a study of the digital competencies of engineering students at a Peruvian public university, with a sample of 140 subjects, in which 72.9% registered 5 h of Internet connection time per week, a figure in line with what we have maintained in the present study. The same happens with the time of use in Spain, as determined, within a comparative study between different European countries with a sample of 534 students, by Fernandez-Marquez et al. [83]. These data also coincide with the analysis carried out by López-Gil and Bernal [84], although in this case the sample is reduced to a single Spanish university.

It is also interesting to highlight the work of Conde, Trujillo, and Castaño [85] who used this instrument, COBADI<sup>®</sup>, for its application in Colombia, a Latin American country for which we had no sample. Applied to 89 students, it shows a time of use and consumption of the Internet that does not correspond to any of the countries that we have studied. Once again, this shows that there is no homogeneity among the countries of the region.

It is possible that homogeneity cannot be found even in each country independently, and may depend on the social and economic level of each student, where the university is located, whether it is public or private, etc. One case, for example, could be the gender variable, which we have not considered in our research (which looks for general social trends) and in which there are studies that even determine differences within the same country. For example, the contributions of Concepción et al. [80] or Ordoñez et al. [81], with large samples of more than 500 students and also carried out over an

extensive period of time, in this case centered on Spain, determined a weekly usage time similar to that of our study but offered the data whereby there were differences in the use that men and women make of the Internet (even in its characteristics, as men use it more, for example, for videogames than for academic tasks, which are more frequent among university women).

Outside of Latin America, most international comparative studies focus on university students' ICT skills or impact rather than on the time spent using the Internet [86–91]. On the other hand, they also focus on specific variables, such as differences between urban and rural use [92] or, as we saw in our selected area, gender [93].

Although with such large samples it is always a challenge to try to establish whether cultural and social characteristics can be a determining factor in the use of the Internet in a large common geographical space, the studies that have been carried out in this respect have not found any homogeneity produced by this fact either, for example in Africa or Asia [94,95]. It is not possible, therefore, to determine that in countries of the same geographical and cultural area there is homogeneity of use. On the contrary, the particular elements of each particular nation condition their use and, consequently, a different time of use.

Regardless of the above, we would like to point out some limitations in our study, which can be reduced in future work. One of them would focus on the proportionality of the sample in relation to the population of each country, which was not possible to maintain in our case as it depended on the surveys collected in multiple centers. In studies composed of larger teams of researchers, this could be a factor to consider. Although we obtained a larger sample in some countries than in others, we considered it relevant to use all the surveys obtained since the objective of the research was to identify general common patterns. Some comparative studies have done so with positive results [25,26]. This is also what has forced us to work with aggregated results. However, considering that there has been a continuous growth in ICT consumption worldwide [23], we were in the context of a controlled variable.

Another limitation has been the need to focus the study on a particular factor, in line with the initial objectives pursued, and not to cover others. As we explained, the integration of ICTs in university contexts is a very complex phenomenon in which multiple factors are present (skills in their knowledge of students and teachers, characteristics of use, application in social communication and collaborative learning frameworks, teacher training, information search and processing, use of digital platforms, investment in technology, etc.). One of these factors, within the characteristics of use of ICT, is the one we have focused on specifically for this work: The time of consumption of the Internet. It is common to find research that also addresses a single specific factor, as we listed in the introduction to this article. On many occasions, it is also appropriate for operational reasons [49,54,57]. In our case, the application of a dense questionnaire to a large sample has meant collecting a very high volume of information that has had to be systematized, which, although it has advantages—it allows a topic to be focused and located by other researchers—also represents a conditioning factor. This will lead us to make future contributions that will complete all the information that has been obtained from the sample, and that will allow us to broaden the interpretations. For example, with the instrument used and in the sample obtained, it will be valuable to explore the influence of the Internet on the quality of university education—from both perspectives, teaching and learning, for which correlations, regressions, etc., could be determined—in order to determine the evolution of the adaptation of Latin American universities to the new digital era.

## 5. Conclusions

The main objective of this study was to determine the time and the characteristics of Internet by university students in different Spanish-speaking countries in order to try to determine if this fact could have relevance in the search for common employment patterns. The results allow us to defend that there is no homogeneity among the countries analyzed. Moreover, in our case, it implies a common cultural space, which is not binding either in the use of the Internet by university students.

It is clear, therefore, as we have presented in other studies [96–98], that the integration of ICTs in university contexts is a very complex phenomenon in which multiple factors are present. In addition to the social habits of a given country or specific area, there are also those offered by the educational world itself. Training and practice with these tools and means are fundamental for the use of the network by students, which, as we have already argued, today occupies educational research so much [99–101].

Beyond the number of hours that students use the Internet in Latin America, which we have found in this study has been significantly high in the last decade, highlighting the medium and high ranges (between 4 and 9 h, and more than 9 h per week), the work allows us to demonstrate that the educational policies of each country should be focused on its own characteristics and idiosyncrasies. Importing practices from other countries that can be considered similar, or attempting to apply common patterns of ICT integration in common geographical spaces, may not be effective because of the differences that may exist in the variables present in each of them.

It is therefore very important that each university studies the characteristics and needs of its own students. At present, when the use of digital technologies is so decisive in the processes of virtualization of higher education to which we are heading, one of the vertexes of university education policies must be the appropriate integration of ICT; for which the knowledge of the use that students make of the Internet today is fundamental. It would allow to increase the quality of the processes of teaching learning and to motivate the students in the construction of knowledge in an individual way as well as in a collaborative way. Moreover, let us not forget, all this in a social scenario—in this case on a world and global scale—where the digital paradigm has an absolute leading role.

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## References

1. Leal, F.; García, M.; Estrada, P.C.; Cabero, J. Uso de las redes sociales virtuales por los estudiantes de la UAT. *Revista de Ciències de l'Educació* **2018**, *1*, 32–42.
2. Prensky, M. Digital natives, digital immigrants. *On the Horizon* **2001**, *9*, 1–6. [[CrossRef](#)]
3. Area, M. Alfabetización digital y competencias profesionales para la información y la comunicación. *Organización y gestión educativa: Revista del Fórum Europeo de Administradores de la Educación* **2014**, *22*, 9–13.
4. González, V.; Román, M.; Prendes, M. Digital competences training for university students based on DigComp model. *EduTec Rev. Electrónica Tecnol. Educ* **2018**, *65*, 1–15.
5. Vázquez-Cano, E.; Marín, V.; Maldonado, G.; García-Garzón, E. La competencia digital del alumnado universitario de Ciencias Sociales desde una perspectiva de género. *Prism. Soc.* **2017**, *19*, 347–367.
6. Jiménez Márquez, J.C.; Colunga Moreno, J.A. Comportamiento académico del uso de un Learning Management System (LMS) entre estudiantes universitarios mexicanos. In *Investigaciones Educativas Hispano-Mexicanas*; López-Meneses, E., Maldonado, G., Marín, V., Vázquez-Cano, E., Eds.; AFOE: Seville, Spain, 2018; pp. 8–23.
7. Gutiérrez, A.M.; Gómez, M.G. La educación virtual de posgrado: Estudio exploratorio sobre competencias digitales en estudiantes de especialización. *RIEEGE* **2017**, *15*, 51–57.
8. Vázquez-Cano, E.; Reyes, M.; Colmenares, L.; López-Meneses, E. Competencia digital del alumnado de la Universidad Católica de Santiago de Guayaquil. *Serbiluz* **2017**, *83*, 229–251.
9. Bauman, Z. *Múltiples Culturas, Una Sola Humanidad*; Katz Editores: Madrid, Spain, 2008.
10. Torrente, E.; Piqueras, J.; Orgilés, M.; Espada, J. Association of Internet addiction with social anxiety and lack of social skills in Spanish adolescents. *Terapia Psicológica* **2014**, *32*, 175–184. [[CrossRef](#)]

11. Tepecik, İ.B.; Kurt, A.N.Ç.; Hesapçioğlu, S.T.; Uğurlu, M. Relationship between headache and Internet addiction in children. *Turkish J. Med Sci.* **2019**, *49*, 1292–1297.
12. Sedwick, R.; Epstein, S.; Dutta, R.; Ougrin, D. Social media, internet use and suicide attempts in adolescents. *Curr. Opin. Psychiatr.* **2019**, *32*, 534. [[CrossRef](#)]
13. Váldez, V. Uso y Abuso de Internet en Adolescentes y su Relación con la Inteligencia Emocional. Ph.D. Thesis, Universitat d'Alacant-Universidad de Alicante, San Vicente del Raspeig, Spain, 2019.
14. Kuss, D.J.; Van Rooij, A.J.; Shorter, G.W.; Griffiths, M.D.; Van de Mheen, D. Internet addiction in adolescents: Prevalence and risk factors. *Comput. Hum. Behav.* **2013**, *29*, 1987–1996. [[CrossRef](#)]
15. Jorgenson, A.G.; Hsiao, R.C.J.; Yen, C.F. Internet addiction and other behavioral addictions. *Child Adolesc. Psychiatr. Clin.* **2016**, *25*, 509–520. [[CrossRef](#)]
16. Cortaza-Ramírez, L.; Blanco-Enríquez, F.; Hernández-Cortaza, B.A.; Lugo-Ramírez, L.A.; Beverido Sustaeta, P.; Salas, B.; De San Jorge-Cárdenas, X. Use of internet, alcohol consumption and family Functionality in mexicans adolescents. *Health Addict.* **2019**, *19*, 59–69.
17. Gabarda, S.; Orellana, N.; Pérez, A. La comunicación adolescente en el mundo virtual: Una experiencia de investigación educativa. *RIE* **2017**, *35*, 251–267. [[CrossRef](#)]
18. Jang, S.M.; Sohn, S.; Yu, M. Perceived stress, alcohol consumption, and Internet use among Korean college students: Does sensation-seeking matter? *Child. Youth Serv. Rev.* **2018**, *88*, 354–360. [[CrossRef](#)]
19. Del Barrio, A.; Ruíz, I. Hábitos de uso de Whatsapp por parte de los adolescentes. *IJODAEF* **2017**, *2*, 23–30. [[CrossRef](#)]
20. Pérez, T.; Godoy, C.; Piñeiro, E. Habits of consumption of the new technologies in teenagers. Use or abuse? *IJODAEF* **2019**, *7*, 47–57.
21. Delfino, G.; Sosa, F.; Zubieta, E. Internet usage in Argentina: Gender and age as variables associated to the digital divide. *Investigación Desarrollo* **2017**, *25*, 100–123. [[CrossRef](#)]
22. Rial, A.; Golpe, S.; Gómez, P.; Barreiro, C. Variables related with problematic internet use among adolescents. *Health Addict.* **2015**, *15*, 25–38.
23. Vázquez-Cano, E.; Gómez-Galán, J.; Infante-Moro, A.; López-Meneses, E. Incidence of a non-sustainability use of technology on students' reading performance in Pisa. *Sustainability* **2020**, *12*, 749. [[CrossRef](#)]
24. Zhang, L.; Amos, C.; McDowell, W.C. A comparative study of Internet addiction between the United States and China. *CyberPsychology Behav.* **2008**, *11*, 727–729. [[CrossRef](#)] [[PubMed](#)]
25. Christodoulides, G.; Michaelidou, N.; Siamagka, N.T. A typology of internet users based on comparative affective states: Evidence from eight countries. *Eur. J. Mark.* **2013**, *47*, 153–173. [[CrossRef](#)]
26. Drabowicz, T. Gender and digital usage inequality among adolescents: A comparative study of 39 countries. *Comput. Educ.* **2014**, *74*, 98–111. [[CrossRef](#)]
27. Stodt, B.; Brand, M.; Sindermann, C.; Wegmann, E.; Li, M.; Zhou, M.; Sha, P.; Montag, C. Investigating the effect of personality, internet literacy, and use expectancies in internet-use disorder: A comparative study between China and Germany. *Int. J. Environ. Res. Public Health* **2018**, *15*, 579. [[CrossRef](#)]
28. Usagawa, T. A Comparative study of students' readiness on e-learning education between Indonesia and Myanmar. *Am. Sci. Res. J. Eng. Technol. Sci.* **2018**, *40*, 113–124.
29. Ammigan, R.; Jones, E. Improving the student experience: Learning from a comparative study of international student satisfaction. *J. Stud. Int. Educ.* **2018**, *22*, 283–301. [[CrossRef](#)]
30. Stensaker, B.; Maassen, P.; Borgan, M.; Oftebro, M.; Karseth, B. Use, updating and integration of ICT in higher education: Linking purpose, people and pedagogy. *Higher Educ.* **2007**, *54*, 417–433. [[CrossRef](#)]
31. Schneckenberg, D. Understanding the real barriers to technology-enhanced innovation in higher education. *Educ. Res.* **2009**, *51*, 411–424. [[CrossRef](#)]
32. Bustos Andreu, H.; Nussbaum, M. An experimental study of the inclusion of technology in higher education. *Comput. Appl. Eng. Educ.* **2009**, *17*, 100–107. [[CrossRef](#)]
33. Shaikh, Z.A. Usage, acceptance, adoption, and diffusion of information & communication technologies in higher education: A measurement of critical factors. *J. Inf. Technol. Impact* **2009**, *9*, 63–80.
34. Nawaz, A.; Awan, Z.; Ahmad, B. Integrating educational technologies in higher education of the developing countries. *J. Educ. Pract.* **2011**, *2*, 1–13.
35. Sarkar, S. The role of information and communication technology (ICT) in higher education for the 21st century. *Science* **2012**, *1*, 30–41.

36. King, E.; Boyatt, R. Exploring factors that influence adoption of e-learning within higher education. *Br. J. Educ. Technol.* **2015**, *46*, 1272–1280. [[CrossRef](#)]
37. Venkatesh, V.; Rabah, J.; Fusaro, M.; Couture, A.; Varela, W.; Alexander, K. Factors impacting university instructors' and students' perceptions of course effectiveness and technology integration in the age of web 2.0. *McGill J. Educ.* **2016**, *51*, 533–561. [[CrossRef](#)]
38. Khalid, M.S.; Pedersen, M.J. Digital exclusion in higher education contexts: A systematic literature review. *Procedia-Soc. Behav. Sci.* **2016**, *228*, 614–621. [[CrossRef](#)]
39. Tømte, C.E.; Fosslund, T.; Aamodt, P.O.; Degn, L. Digitalisation in higher education: Mapping institutional approaches for teaching and learning. *Qual. Higher Educ.* **2019**, *25*, 98–114. [[CrossRef](#)]
40. Liu, Q.; Geertshuis, S.; Grainger, R. Understanding academics' adoption of learning technologies: A systematic review. *Comput. Educ.* **2020**, *151*, 103857. [[CrossRef](#)]
41. Gómez Galán, J. Educational research and teaching strategies in the digital society: A critical view. In *European Innovations in Education: Research Models and Teaching Applications*; López Meneses, E., Sirignano, F., Reyes, M., Cunzio, M., Gómez Galán, J., Eds.; AFOE: Seville, Spain, 2017; pp. 105–119.
42. Gómez Galán, J. Educational research in the ICT era: Towards new theoretical frameworks. In *Philosophy of Educational Research in a Global Era: Challenges and Opportunities for Scientific Effectiveness*; Ponce, O., Pagán, N., Gómez Galán, J., Eds.; Publicaciones Puertorriqueñas: San Juan, Puerto Rico, 2018; pp. 137–154.
43. Gómez Galán, J. *Innovation and ICTs in Education: The Diversity of the 21st-Century Classroom*; River Publishers: Aalborg, Denmark, 2020.
44. Player-Koro, C. Factors influencing teachers' use of ICT in education. *Educ. Inq.* **2012**, *3*, 93–108. [[CrossRef](#)]
45. John, S.P. The integration of information technology in higher education: A study of faculty's attitude towards IT adoption in the teaching process. *Contaduría y Administración* **2015**, *60*, 230–252. [[CrossRef](#)]
46. Huang, F.; Teo, T. Influence of teacher-perceived organisational culture and school policy on Chinese teachers' intention to use technology: An extension of technology acceptance model. *Educ. Technol. Res. Dev.* **2019**, *68*, 1547–1567. [[CrossRef](#)]
47. Lemoine, P.A.; Seneca, S.; Richardson, M.D. Resilience for faculty development in global higher education. In *Handbook of Research on Faculty Development for Digital Teaching and Learning*; Elçi, A., Beith, L.L., Eds.; IGI Global: New York, NY, USA, 2019; pp. 481–504.
48. Afshari, M.; Bakar, K.A.; Luan, W.S.; Samah, B.A.; Fooi, F.S. Factors affecting teachers' use of information and communication technology. *Int. J. Instr.* **2009**, *2*, 77–104.
49. Tezci, E. Factors that influence pre-service teachers' ICT usage in education. *Eur. J. Teach. Educ.* **2011**, *34*, 483–499. [[CrossRef](#)]
50. Goh, E.; Sigala, M. Integrating Information & Communication Technologies (ICT) into classroom instruction: Teaching tips for hospitality educators from a diffusion of innovation approach. *J. Teach. Travel Tour.* **2020**, *20*, 156–165.
51. Martins, J.; Branco, F.; Gonçalves, R.; Au-Yong-Oliveira, M.; Oliveira, T.; Naranjo-Zolotov, M.; Cruz-Jesus, F. Assessing the success behind the use of education management information systems in higher education. *Telemat. Inform.* **2019**, *38*, 182–193. [[CrossRef](#)]
52. Salam, M.; Farooq, M.S. Does sociability quality of web-based collaborative learning information system influence students' satisfaction and system usage? *Int. J. Educ. Technol. Higher Educ.* **2020**, *17*, 1–39. [[CrossRef](#)]
53. Sadeghi, H. *Pathology of Learning in Cyber Space: Concepts, Structures and Processes*; Springer: Cham, Switzerland, 2019.
54. Van Dinther, M.; Dochy, F.; Segers, M. Factors affecting students' self-efficacy in higher education. *Educ. Res. Rev.* **2011**, *6*, 95–108. [[CrossRef](#)]
55. Virtanen, A.; Tynjälä, P. Factors explaining the learning of generic skills: A study of university students' experiences. *Teach. Higher Educ.* **2019**, *24*, 880–894. [[CrossRef](#)]
56. Wood, R.; Shirazi, S. A systematic review of audience response systems for teaching and learning in higher education: The student experience. *Comput. Educ.* **2020**, *153*, 103896. [[CrossRef](#)]
57. López-Meneses, E.; Vega, Z.; Bernal, C.; Gómez-Galán, J. *Educational Studies and Innovative Practices in Higher Education: An International Perspective*; UAGM/Eurytion Press: Badajoz, Spain, 2018.
58. Krishnaveni, R.; Meenakumari, J. Usage of ICT for Information Administration in Higher education Institutions—A study. *Int. J. Environ. Sci. Dev.* **2010**, *1*, 282–286. [[CrossRef](#)]

59. Altbach, P.G.; Reisberg, L.; Rumbley, L.E. *Trends in Global Higher Education: Tracking an Academic Revolution*; Brill: Leiden, The Netherlands, 2019.
60. Wang, X.; Jacob, W.J.; Blakesley, C.C.; Xiong, W.; Ye, H.; Xu, S.; Lu, F. Optimal professional development ICT training initiatives at flagship universities. *Educ. Inf. Technol.* **2020**, *14*, 1–20.
61. Zhu, C. Organisational culture and technology-enhanced innovation in higher education. *Technol. Pedagog. Educ.* **2015**, *24*, 65–79. [[CrossRef](#)]
62. Ramírez, G.M.; Collazos, C.A.; Moreira, F.A. Systematic mapping review of all-learning model of integration of educational methodologies in the ICT. In *Recent Advances in Information Systems and Technologies*; Rocha, A., Ed.; Springer: Cham, Switzerland, 2017; pp. 897–907.
63. Mozelius, P.; Hettiarachchi, E. Critical factors for implementing blended learning in higher education. *Int. J. Inf. Commun. Technol. Educ.* **2017**, *6*, 37–51. [[CrossRef](#)]
64. Anastasiadis, S.; Perkiss, S.; Dean, B.A.; Bayerlein, L.; Gonzalez-Perez, M.A.; Wersun, A.; Acosta, P.; Jun, H.; Gibbons, B. Teaching sustainability: Complexity and compromises. *J. Appl. Res. High. Educ.* **2020**. preprint. [[CrossRef](#)]
65. Bien, C.; Sassen, R. Sensemaking of a sustainability transition by higher education institution leaders. *J. Clean. Prod.* **2020**, *256*, 120299. [[CrossRef](#)]
66. Higón, D.A.; Gholami, R.; Shirazi, F. ICT and environmental sustainability: A global perspective. *Telemat. Inform.* **2017**, *34*, 85–95. [[CrossRef](#)]
67. Chen, X.; Gong, X.; Li, D.; Zhang, J. Can information and communication technology reduce CO<sub>2</sub> emission? A quantile regression analysis. *Environ. Sci. Pollut. Res.* **2019**, *26*, 32977–32992. [[CrossRef](#)] [[PubMed](#)]
68. Haseeb, A.; Xia, E.; Saud, S.; Ahmad, A.; Khurshid, H. Does information and communication technologies improve environmental quality in the era of globalization? An empirical analysis. *Environ. Sci. Pollut. Res.* **2019**, *26*, 8594–8608. [[CrossRef](#)]
69. López-Meneses, E.; Sirignano, F.M.; Vázquez-Cano, E.; Ramírez-Hurtado, J.M. University students' digital competence in three areas of the DigCom 2.1 model: A comparative study at three European universities. *Australas. J. Educ. Technol.* **2020**, *36*, 69–88. [[CrossRef](#)]
70. Agudo, A.A.; Garcia, E.G.; Martinez-Heredia, N. Challenges for inclusive citizenship: Digital literacy between elderly and young. *Midia E Consumo* **2020**, *17*, 11–34.
71. Vázquez-Cano, E.; León Urrutia, M.; Parra-González, M.E.; López Meneses, E. Analysis of interpersonal competences in the use of ICT in the spanish university context. *Sustainability* **2020**, *12*, 476. [[CrossRef](#)]
72. Richards, G.; Magee, C.; Artino, A.R. You can't fix by analysis what you've spoiled by design: Developing survey instruments and collecting validity evidence. *J. Grad. Med. Educ.* **2012**, *4*, 407–410. [[CrossRef](#)]
73. Klokke, J.; McKean, J.W. *Nonparametric Statistical Methods Using R*; CRC Press: Boca Raton, FL, USA, 2014.
74. Ignatow, G.; Mihalcea, R. *Text Mining: A Guidebook for the Social Sciences*; Sage Publications: Thousand Oaks, CA, USA, 2016.
75. Li, Q. *Using R for Data Analysis in Social Sciences: A Research Project-Oriented Approach*; Oxford University Press: Oxford, UK, 2018.
76. Aizaki, H.; Nakatani, T.; Sato, K. *Stated Preference Methods Using R*; CRC Press: Boca Raton, FL, USA, 2014.
77. Cremers, J.; Klugkist, I. One direction? A tutorial for circular data analysis using R with examples in cognitive psychology. *Front. Psychol.* **2018**, *9*, 2040. [[CrossRef](#)]
78. MacInnes, J.; Breeze, M.; de Haro, M.; Kandlik, M.; Karels, M. *Measuring up: International Case Studies on the Teaching of Quantitative Methods in the Social Sciences*; The British Academy: London, UK, 2016.
79. Khanna, P.; Kumar, S.; Mishra, S.; Sinha, A. Sentiment analysis: An approach to opinion mining from twitter data using R. *Int. J. Adv. Res. Comput. Sci.* **2017**, *8*, 1–5. [[CrossRef](#)]
80. Concepción, J.D.; Veytia, M.G.; Gómez Galán, J.; López Meneses, E. Integrating the digital paradigm in Higher Education: ICT training and skills of university students in a European context. *Int. J. Educ. Excell.* **2019**, *5*, 47–64. [[CrossRef](#)]
81. Olmedo, E.; Vázquez-Cano, E.; Arias-Sánchez, S.; López-Meneses, E. Las competencias en el uso de las Tecnologías de la Información y la Comunicación en el alumnado universitario. *Pixel-BIT, Medios y Educación* **2020**, *59*. [[CrossRef](#)]
82. Garcís, S.A. Análisis de las competencias digitales de estudiantes de ingeniería de una Universidad pública peruana. *Hamut'ay* **2019**, *6*, 114–125.

83. Fernández-Márquez, E.; Vázquez-Cano, E.; López-Meneses, E.; Sirigiano, F. La competencia digital del alumnado universitario de diferentes universidades europeas. *Espacios* **2020**, *41*, 1–15.
84. López-Gil, M.; Bernal, C. El perfil del profesorado en la sociedad en red: Reflexiones sobre las competencias digitales de los y las estudiantes en Educación de la Universidad de Cádiz. *Revista Internacional de Investigación e Innovación Educativa* **2018**, *11*, 83–100.
85. Conde, E.; Trujillo, J.J.; Castaño, H. Descifrando el curriculum a través de las TIC: Una vision interactiva sobre las competencias digitales de los estudiantes de Ciencias del Deporte y de la Actividad Física. *Revista de Humanidades* **2017**, *31*, 195–214. [[CrossRef](#)]
86. Kim, Y.; Sohn, D.; Choi, S.M. Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Comput. Hum. Behav.* **2011**, *27*, 365–372. [[CrossRef](#)]
87. Kesici, Ş.; Şahin, İ. A comparative study of uses of the internet among college students with and without internet addiction. *Psychol. Rep.* **2009**, *105* (Suppl. 3), 1103–1112. [[CrossRef](#)] [[PubMed](#)]
88. Papadopoulou, Y.; Aristodemou, E.; Laouris, Y. The use of e-learning in adult learning: A comparative study between six European countries. In Proceedings of the 7th European Conference on E-Learning, Ayia Napa, Cyprus, 6–7 Nnovermber 2008.
89. Latif, A.A.; Md Din, M.; Ismail, R.; Othman, M.; Suliman, A. Understanding Malaysian Internet addiction: A comparative study on Malaysia and selected countries. *Int. J. Interdiscip. Soc. Sci.* **2010**, *5*, 391.
90. Holm, T.; Sammalisto, K.; Vuorisalo, T. Education for sustainable development and quality assurance in universities in China and the Nordic countries: A comparative study. *J. Clean. Prod.* **2015**, *107*, 529–537. [[CrossRef](#)]
91. Shin, L. A comparative study of mobile internet usage between the US and Korea. *J. Eur. Psychol. Stud.* **2014**, *5*, 46–56. [[CrossRef](#)]
92. Loan, F.A. Internet use by rural and urban college students: A comparative study. *DESIDOC J. Libr. Inf. Technol.* **2011**, *31*, 431–436. [[CrossRef](#)]
93. Li, N.; Kirkup, G. Gender and cultural differences in Internet use: A study of China and the UK. *Comput. Educ.* **2007**, *48*, 301–317. [[CrossRef](#)]
94. Idowu, A.P.; Idowu, A.O.; Adagunodo, E. A comparative study of information and communication technologies at higher educational institutions in Africa: Case studies from Nigeria and Mozambique. *J. Inf. Technol. Impact* **2004**, *4*, 67–74.
95. Chai, C.S.; Hong, H.Y.; Teo, T.K. Singaporean and Taiwanese pre-service teachers' beliefs and their attitude towards ICT use: A comparative study. *Asia-Pac. Educ. Res.* **2009**, *18*, 117–128.
96. Gómez Galán, J. Transformación de la educación y la universidad en el postmodernismo digital: Nuevos conceptos formativos y científicos. In *La Era de las TIC en la Nueva Docencia*; Durán, F., Ed.; McGraw-Hill: Madrid, Spain, 2014; pp. 171–182.
97. López Meneses, E.; Gómez Galán, J. Prácticas universitarias constructivistas e investigadoras con software social. *Praxis* **2010**, *6*, 15–31.
98. López Meneses, E.L.; Vázquez-Cano, E.; Gómez Galán, J.G.; Fernández Márquez, E. Pedagogía de la innovación con tecnologías. *Guiniguada* **2019**, *28*, 76–92.
99. Ponce, O.A.; Gómez Galán, J.; Pagán, N. Current scientific research in the humanities and social sciences: Central issues in educational research. *Eur. J. Sci. Theol.* **2019**, *15*, 81–95.
100. Ponce, O.A.; Pagan, N. Educational research in the 21st century: Challenges and opportunities for scientific effectiveness. *Int. J. Educ. Res. Innov.* **2017**, *8*, 24–37.
101. Gómez-Galán, J. Media education in the ICT Era: Theoretical structure for innovative teaching styles. *Information* **2020**, *11*, 276. [[CrossRef](#)]

