European Journal of Open Education and E-learning Studies
ISSN: 2501-9120
ISSN-L: 2501-9120
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.2613531 Volume 4 | Issue 1 | 2019

UNIVERSITY STUDENTS' SKILLS IN USING THE INTERNET FOR EDUCATIONAL PURPOSES AND THE DIGITAL DIVIDE

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Abstract:
This article focuses on digital skills competence of students in higher education. It is considered to be one of the most prominent scientific research topics in recent decades since it leads to the digital divide. Based on the theory of Bourdieu, this research describes quantitative data with the aim to investigate the presence of the digital divide in higher education through the relationship between the use of Internet digital tools and the socioeconomic status (SES). The results suggest that the majority of students consider they have acquired good knowledge of effective Internet and computer use opposed to the way they use Internet tools for teaching and learning justifying though the existence of the digital divide. The relationship between SES and students' skills shows the presence of the digital divide in higher education that increases learning inequalities. It concludes that the bridging of the digital divide has to be a priority for policies in order to implement new digital teaching and learning processes at all levels of education. New practices also have to be applied in higher education institutions and support students digitally promoting them to acquire sufficient skills and to make more effective use of the Internet.

Keywords: higher education, Internet use, digital skills, digital divide, socioeconomic status (SES)

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1. Introduction

The development of digital skills for the use of the Internet in higher education is an issue of prominent debate among the scientific community. Previous research shows that it has an impact on student performance. It increases the digital divide and educational inequalities, a severe social problem that mostly affects students of low economic and social background (Buzzetto-Hollywood et al., 2018). This argument is part of the broader awareness of many researchers from various disciplines that examine the reasons and consequences of using the Internet for individuals and society (Wellman 2004).

Recent statistics provide the data that more than four billion people worldwide use the Internet and more than half of the world's population are connected to it (Brand, Todhunter & Jervis, 2017). Under those circumstances, several studies examine various issues trying to answer questions such as, what has the Internet become following its tremendous worldwide expansion? Is it a way to create a free and open-minded society or a factor, which dreads social inequalities? Even more remarkable questions have to be asked like, what about those who are not connected, or if Internet users have the accurate and sufficient skills to use digital tools for educational purposes, access to knowledge and use for learning.

Since 2000, Internet expansion, accessibility and use of mass social network communication have been considered as a powerful force for strengthening educational and social change. The low cost of computers and Internet access were likely to ensure equality in education allowing everyone to have access.

Increasingly, this view has been questioned after the expansion of new research data showing, from the one hand, the importance of the Internet use but, from the other hand, the presence of the digital divide in access to and the use of the Internet. In fact, the use of the Internet is massive, but not in a consistent way increasing the digital divide, with consequences for education, economic and social life, especially for young people.

Especially in higher education, disparity in students' digital skills for the use of the Internet has been observed. Social factors are responsible for their unequal distribution. Although more and more students are using the Internet, this fact does not mean that they make eloquent and beneficial use of their studies and professional future (Santos et al., 2013). Students are not likely to be, to the same extent, digitally literate. The term "digital literacy" refers to the ability to use digital technology, communication tools, and/or networks to access, manage, integrate, evaluate, create, and communicate information ethically and legally "*in a nonlinear fashion while often integrating visual media to synthesize that information*" (Osterman, 2012, p. 135). The term refers to an important life skill for people in information societies and refers to the "*ability to understand and to use information from a variety of digital sources… the ability to read, write and otherwise deal with information using the technologies and formats of the time" (Bawden, 2008, p. 18). This means that at the core of the term lies not the issue of technical*

skills, but "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers" (Gilster, 1997, p. 1-2).

The emergence of the issue of digital literacy in the modern knowledge and information society has highlighted the fact that not all people have acquired an advanced level of digital literacy. Different levels of digital literacy often lead to differences in use among people from different socioeconomic backgrounds. Inequalities in ICT and internet use, the so-called "digital divide" or "digital gap", constitute an important issue, since they are essential in education and the labor market (van Dijk, 2005). The term "digital divide" has been used since the 1990s, after the wide spread of the Internet, when early research on access to ICT skills was conducted (Livingstone & Helsper, 2007). Is a common topic for political and economic debate particularly in promoting its widespread use in education (Robinson, 2009). It is also linked with social and cultural inequalities. According to the OECD, the term refers to "*the gap between people, families, businesses and geographical areas at different socioeconomic levels in terms of opportunities for access to ICT and the use of the Internet for a wide range of activities*" (OECD, 2001). It is a descriptive definition referring to differences in the use of the Internet associated with new forms of inequality. More generally, the digital divide refers to the difference between having and not having access to the Internet resulting in an unequal distribution of information and useful knowledge (Van Dijk, 2005).

In this context, research shows that the digital divide has multifaceted technical and social aspects. The idea of the digital divide in higher education is multi-dimensional, divided into two distinct dimensions. The first dimension is related to the issue of inequalities on the basis of students' access and opportunities to use the Internet. The second dimension is related to inequalities that arise as a result of the inappropriate use or disuse of the Internet for educational purposes. These two dimensions validate the impact of the digital divide in higher education. New forms of social inequalities are likely to be shaped since Internet use provides knowledge and strength to those who have the ability and the skills to use it for gaining knowledge and developing learning strategies. It is beneficial for students who have the skills to take advantage of the Internet and they have the possibility to increase the opportunities for achieving their educational goals. The factors that cause and intensify existing inequalities are linked to the digital divide. Van Dijk argues that there are six stages of digital divide on the basis of the required time for doing various activities, the accessible resources, the income as well as other psychological, social and cultural factors (Van Dijk, 2005 & 2008).

In modern society, Internet skills are considered a vital resource given the fact that the necessity for individuals to take advantage of the large amount of information is constantly increasing. The initial form of the digital divide was strongly related to Internet access but has evolved into a gap that includes disparities in Internet use skills (Van Deursen & Van Dijk, 2011).

For this reason, the term 'digital divide' should be redefined. A more holistic approach is suitable in order to shed light on the effective use of the internet by university students (Peña-López, 2010).

Generally, the fact that students from a lower socioeconomic background students make limited use of the Internet, means that is less possible for the education to be turned into a transformative power of teaching, to reduce inequalities and to improve learning. Advanced access and use of the Internet may increase learning opportunities and facilitates academic achievements. Digital inequalities in education have; in any case, enormous consequences not only on internet access but also on the ways students use it to acquire knowledge (Van Dijk, 2005, Van Deursen, Van Dijk & Peters A., (2011).

On this context, a growing body of research seeks to explore the reasons that cause the increasing presence of digital divide in education. They conclude that one of the most important factors is the necessary development of individual skills in order to take advantage of the new technology (Castells 2001). Factors related to social and cultural differences play an important role on the level of skills development. Attempts to be examined the digital skills unawareness may lead to an effective comprehension of one of the most serious problems of modern educational reality (Van Deursen & van Dijk, 2011 & 2016). The debate on this issue was the basis for the research presented below.

Bourdieu's theory has the potential to offer a better understanding of the digital divide (Tondeur et al., 2010). According to this theory, the digital divide in terms of access and Internet use is related to the different levels of skills development as a result of social diversity. Thus, new forms of social inequalities are triggered by the diverse individual educational and professional paths. It is related to unequal access to a form of resources, in other words, to a form of cultural capital linked to social inequalities (Bourdieu, 1986). Today, the conventional content of Bourdieu's term cultural capital seems to be replaced by new forms of cultural capital related to new technologies (Emmision Frow, 1998).

2. Material and Methods

Given the fact that a large body of international literature for digital divide have been developed worlwide, it has not been researched in Greek higher education. The aim of this research is to investigate whether there is a digital divide in the Internet use for educational purposes in Greek higher education. More specifically, data collection is based on a part of a wider research aimed to investigate the relationship between the use of Internet digital tools and the socioeconomic status (SES). Using the quantitative method, the research was conducted in 2016 in various departments of the University of Ioannina, a peripheral University on Northwestern Greece, to 406 undergraduate students who were about to complete their studies (Kyriazis, 1999: 122). The University of Ioannina was established in 1964. It is one of the largest peripheral universities of

Greece including 22 academic departments covering a large part of the scientific disciplines, an interconnected campus community and an upcoming technology infrastructure.

The social characteristics of students are listed below: According to the gender, women are represented by a higher percentage than men, 67.5%, compared to 32.5%, respectively.

The variables are used to measure socioeconomic status (SES) of students are (a) parents profession, (b) parents educational level and (c) place of residence. Parents profession was measured according to the following categories: I=Professional occupations, II=Managerial and technical occupations, IIIa=Skilled non-manual occupations, IIIb=Skilled manual occupations, IV=Partly-skilled occupations, V= unskilled workers (CASMIN Educational classification). Parents' educational level was measured according to National Statistics Socio-economic Classification (NS-SEC) in the three following educational categories: (1) parents have attained primary level education, (2) parents have attained secondary and vocational high school and (3) parents have attained a higher education degree and a master or PhD degree.

Table 1: Parents educational level

		Mother	**Father**
	Primary school	6.4%	8.6%
	Secondary school	32.7%	37.2%
	Vocational high school	12.8%	17.7%
	Technological Universities degree	14.8%	9.4 %
	University degree	29.1%	20.0%
	Master or PhD degree	4.3%	3.7%
	Total	100%	96.6%
			3.4%
Total			100.0%

According to parents' profession, the majority of students are middle class students. This means that the distribution of professions is highly represented in the third category, though skilled manual occupations, 46.1% (n=187). In other words, the majority of the students has father with a manual occupation. On the other hand, the percentage of students with father that has professional occupation (I) is 25.1% (n=102) and managerial and technical occupation (II) is 17.2% (n=70). Lastly, 10.3% (n=42) of them have partly-skilled occupations (V) and only 1% (n=4) has father with unskilled occupation.

The distribution of mother profession is not similar to men. Mother has advanced profession level in comparison with men. Particularly, the majority of them have a managerial and technical occupation (II), 32.2% (n=131). A high percentage of them, 29.6% (n=120), have skilled non-manual occupations (IIIa). Generally, they are less likely to have manual occupations. Only 15.3% (n=62) have skilled manual occupations or unskilled occupations 2% (n=8). Unlikely men, women are more likely to be unemployed. It was common in the past, that women stayed at home and took care

of family members. The research data show that 20.7% (n=84) of mothers are unemployed.

With this in mind, this paper addresses the following research questions:

1) Is there a relationship between students' socioeconomic status (SES) and the developed digital skills for getting educational benefits?
2) Is there a relationship between students' socioeconomic status (SES) and the reasons for using the Internet?

3. Results and Discussion

We first present the collected data concerning the acquisition of Internet skills. When students were asked if they have attended seminars in order to improve their Internet skills, a high percentage, 44.8%, answered that the acquired knowledge and skills have been improved by daily access to technologies and the individual use of the Internet during their studies. Some students attribute their Internet skills improvement to the previous school years. Particularly, 20.5% of students answered that they had already improved their Internet skills attending computer courses during the secondary school. 33% of students said that they had attended these courses, for a short or a longer period, in order to obtain a formal certification that constitutes a basic job qualification.

Table 2: Sample distribution according to the Internet

	N	Percentage %	Mean (SD)
No knowledge/ skills	10	2.5%	
Little knowledge/ skills	7	1.7%	
Basic knowledge/ skills	18	4.4%	
Adequate knowledge/ skills	145	83.4%	4.35
Total	374	92.1%	(0.87)
Missing data	32	7.9%	
General total	406	100%	

More specifically, as can be seen in Table 2, the majority of students, 83.4%, state that they have sufficient knowledge and skills to use effectively the Internet. Gender and parental education differentiate the extent that students believe that they have developed skills (Chi-Square = 29.78, df = 10, p = .001), as can be shown in the table below. As for skills required for the use of the Internet, although there are no widely accepted criteria for measuring Internet skills, research data show that most students believe that they have the required skills acquired through their daily activities and individual experiences (Deursen & Van Dijk, 2010). They consider that they have developed a sufficient level of skills for effective use, as shown in Table 2.

The majority of students believe that the required Internet skills for their studies have been developed in a large extent. In order to gain much more ground on the development of Internet skill during studies, the students were asked about the computer use. The research data showed that a high percentage of students gave a positive answer on the question related to the level of knowledge on computer use.

77.1% of students believe that they acquire good knowledge of effective computer use considering it as a prerequisite for the Internet use. On the contrary, only 5.9% of students have little or no knowledge and 11.1% of students believe that they have a basic computer competency.

Table 3: Sample Distribution according to use of computer

	Mean	St. Deviation
I use computer very often in the class	2.73	1.28
I use computer very often in the lab/in the library	3.71	1.21
I use computer very often to write essay in Word	4.15	2.34
I use computer very often to attend online courses	3.93	1.99
Use Excel ή Microsoft Access	3.60	1.25
Use of PowerPoint (presentations)	3.85	1.17
Use of multimedia CD-ROM ή DVD, etc	3.55	1.32

According to the data, few students, 10.6%, use computer in the classroom. 31% of them use the computer at the library or at a university laboratory and 39.6% of them use computer for having access to online courses. 49.7% of them use the computer for writing a text in Word or for preparing presentations, such as PowerPoint, 36% for preparing excel files and 30.8% for using Access database (Microsoft office).

Not all students improve the computer skills in the same extent. That means that lower-class students are more likely to take less advantage of its use. For example, mother's level of education differentiates computer knowledge level (Chi-Square = 22.70, df = 8, p = .004). More specifically, 66.7% of students that have a mother with primary level education answered that they have not developed computer skills, compared to other educational levels (Figure 1). Gender can also be a differentiating factor (Chi-Square = 14.52, df = 4, p = .006). From the majority of students, 44.8%, who stated that they have good knowledge on how to use Internet sufficiently 72.5% of them are women. 50.9% of students stated that they are familiar with computer use but only 7.5% of them stated that they need help on a regular basis. Parents' education and particularly mother education differentiates the use of computer to a statistically significant extent (Chi-Square= 24.58, df=8, p=.002). According to father's educational level, the findings are similar (Chi-Square = 29.78, df = 10, p = .001).

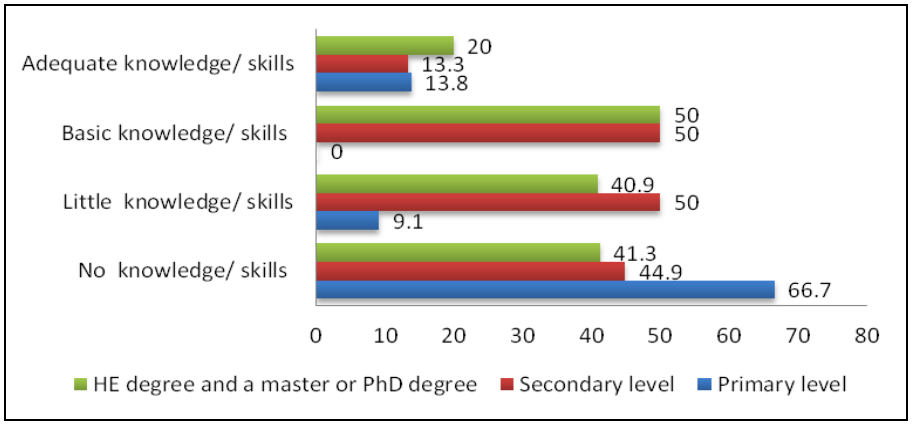

Figure 1: Mother's level of education and computer skills

` Additional data on digital skills have been collected by a number of questions regarding the Internet tools that students use during their studies. The questions are included well-known and widely distributed tools useful for their studies and their every day lives.

Table 4: Sample distribution for the use of Internet tools

	Percentage %	**Mean (SD)**
E-mail (e.g: Gmail, Yahoo, Hotmail)	97.3%	1.04(0.34)
Blogging (e.g: Blogger, WordPress)	26.5%	1.73(0.44)
Microblogging (e.g: Twitter)	29.4%	1.64(0.48)
Podcasting (e.g: iTunes, Miro, Audacity)	87.2%	1. 12(0.33)
Collaborative and contributional tools (e.g Wikipedia)	92.7%	1.07 (0.25)
Social media (e.g Facebook)	97.2%	1.02 (0.16)
Multimedia files (e.g: YouTube, SlideShare)	83.1%	1.17 (0.37)
Web conferencing (e.g: Skype)	36.1%	1.63 (0.48)
On line games(e.g: Second Life)	82.2%	1.17 (0.38)
Word processing and document creation (e.g: Word ή το WordPerfect)	96.3%	1.03 (0.19)

The most widely recognised Internet tool being used by a high percentage of students, namely 97.3%, is e-mail. It is considered to be one of the basic Internet tools, since it is obvious that offer fast and free communication with professors, fellow students, friends and family. Social media tools are also widespread to a similar high percentage, 97.2%. It is a well-known notion that they have a huge impact on the new generation, as many studies documented. High is, also, the percentage of students who use the Word processing and document creation, 96.3% as well as collaborative and contributional tools such as Wikipedia, 92.7%, the use of podcasting (e.g.: iTunes, Miro, Audacity), 87,2%, multimedia files, 83,1% on line games 82,2%.

The most prominent tools of the research enable them to communicate, to exchange messages, to take part in social media, to search for information and gain knowledge, to enjoy and to attend online courses. Similarly, the findings of a study conducted in 332 students in 2012 showed that 79.9% of students use the Internet on a daily basis for communication and social networking, while 72.4% use the Internet on a daily basis for entertainment purposes, such as listening music and watching movies. On the other hand, students use the Internet for educational purposes at a lesser extent. Differences, related to the demographic and social characteristics of the students have also been observed. Gender is a factor that differentiates the use of Internet tools. Women use communication tools for social networking more often than men, as well as the Word processing and document creation. On the other hand, men more often use podcasting blogging, e-mail, games and multimedia files. For example, more men use microblogging such as, for example, Twitter, than women, 44.9% vs. 31.4%. (Chi-Square = 6.74, df = 1, p = .009). Gender also significantly differentiates the use of podcasting blogging (Chi-Square = 8.83, df = 1, p = .003), as well as the use of collaborative learning

tools (Chi-Square = 5.21, df = = .022). Women make wider use of these tools compared to men, 94.7% vs. 88.5%.

Moreover, parental education has to be taken into account in any attempt to interpret the digital divide. Students with fathers who have attended primary education are more likely to use media files, collaborative and contributional or communication tools. On the other hand, students with fathers who have attended higher education are more likely to use information tools like as blogging (eg: Blogger, WordPress) or Web conferencing (eg Skype). Moreover, mother profession differentiates the use of Web conferencing, such as Skype (Chi-Square = 7.28, df = 1, p = .007). Students with a mother whose profession is not included in skilled manual occupations (IIIb) or partly-skilled occupations (IV) use Skype to a higher extent, 70.7% than students with a mother whose profession is included in one of these categories, 29.3%

According to the data, mother profession differentiates the use of microblogging (Chi-Square = 6.55, df = 1, p> .005). Students whose mother does not have a manual occupation use this micro blogging to a higher percentage, 70.5% vs. 29.5%.

As for the third parameter, the place of residence, the research reveals that students who live in an urban area do not show similarities in the use of Internet tools to those who live in a bigger city center. For example, even if the e-mail is considered to be one of the most useful Internet tools, the research reveals that students from different socioeconomic backgrounds use it differently. Students who live in an urban area use mostly microblogging tools such as Twitter but students who live in a city centre use mostly email and pod casting, such as iTunes or Miro.

5. Recommendations

Measures need to be implemented to facilitate the bridging of the digital divide. According to several studies, the bridging of the digital divide is not likely to be tackled only by the upgrading Internet infrastructures but also by the improvement of students' digital culture (Howard et al., 2010). This research should be expanded to all levels of education as well as at the university. Academic staff often wrongly think that all students have access to the Internet and express little or no interest to students with inadequate skills in using it for learning. Supporting students to use the Internet for educational purposes is a way to increase their knowledge and their academic success (Tondeur et al., 2010: 155). Higher education institutions need to provide students with adequate skills in order to promote equal learning, educational and professional paths.

6. Conclusion

The first aim of the study was to shed light on the relationship between the socioeconomic status (SES) of students and the extent to which they develop the digital skills for getting educational benefits. According to this research question, the results suggest that the majority of students believe that they have acquired good knowledge

of effective Internet use and this type of knowledge acquisition has been improved by daily access to technologies and their individual use of the Internet during their studies. The majority of students have stated that they have sufficient knowledge and skills to use effectively the Internet. Gender and parental education influence the extent that students believe that they have developed skills.

They also believe that they have acquired good knowledge of effective computer use considering it as a prerequisite for the Internet use. They use computer in the classroom, at the library, at a university laboratory and some of them use computer for having access to online courses. The majority of them use the computer for writing a text in Word or for preparing presentations. Women and students with a mother in a high educational level have stated that they have improved the computer skills and are more likely to take less advantage of its use. Totally, the research came to the conclusion that socioeconomic status (SES) influences the use of the Internet and of the computer.

Secondly, the research data highlight that the most widely recognised Internet tool being used by a high percentage of students is e-mail. Social media tools are also widespread to a high percentage. Women and men do not make use of Internet tools in the same way. Women use communication tools for social networking and men more often use podcasting blogging, e-mail, games and multimedia files. Moreover, students with fathers who have attended primary education are more likely to use media files, collaborative or communication tools but students with fathers who have attended higher education are more likely to use information tools like as blogging (eg: Blogger, WordPress) or Web conferencing (eg Skype). Moreover, students with a mother whose profession is not included in skilled manual occupations use Skype to a higher extent. As for the second research question, the researches highlight the reasons that students use the Internet, since they use Internet tools inversely on the basis of their socioeconomic background. They mostly use it for communication.

It has already been explored the range of skills and tools that are distinguished across the students influencing their use of web activities, their knowledge improvement and the information management useful for education (Gouga and Kamarianos, 2007). These differences justify the existence of the digital divide in the use of Internet tools for teaching and learning. The digital divide is focused on gaps in computer and Internet access related to economic and cultural capital, social and economic background and place of residence, strengthening social inequalities. Socioeconomic background is a determined factor in predicting the digital advantages and disadvantages that students can gain from using the internet during their studies.

From this perspective, Bourdieu's theory refers to the digital divide in terms of unequal access to a form of resources, in other words, to a form of cultural capital (Bourdieu, 1986, Tondeur et al., 2010). Even though Internet use is linked to innovation, promoting equal opportunities in teaching and learning, recent research shows that it reproduces social inequalities among students. It creates new forms of social inequalities on the basis of the educational and professional trajectories of individuals. Bourdieu's cultural capital theory is a valuable tool in order to understand

the digital divide in higher education and find out the deeper reasons that cause it as well as to come up with affective solutions. Coming up with digital divide is cosidered, nowadays, to be a necessity, as far as internet use is becoming more and more useful for educational, social and professional reasons. What is presupposed, systematic researches have to be done and explore the dimensions of digital divide shedding light into new policies and practices. Under those circumstances, institutions and educational policy factors face with a double challenge. On the one hand, they try to minorise digital divide in higher education as well as reduce inequalities in internet use among students with diverse social backgrounds. On the other hand, they have to implement policies and find solutions to the problems that have been caused by.

Generally, the findings of the research highlight a problem that needs to be addressed by institutions of higher education. In other words, the skills that have students of low economic and social backgrounds for internet use, need to be placed at the center of educational research. Further research has to be conducted and examine the technology uses, backgrounds, needs, interests, career goals, and professional expectations with respect to a range of currently relevant technologies.

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