JOURNAL OF E-LEARNING AND KNOWLEDGE SOCIETY
Vol. 18, No. 3 (2022), pp. 74-82

Social exclusion and the digital divide

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(submitted: 29/3/2022; accepted: 14/11/2022; published: 13/12/2022)

Abstract

The recent advances in information and communication technology have given rise to radical changes in how we interact and communicate in our social, educational, and working environments. However, the potential and opportunities offered by these technologies are not fully available across society due to huge differences in their use and uptake, that is, what has traditionally been called the digital divide. Current research indicates that this divide is intimately connected to economic inequalities and social exclusion. The digital divide manifests primarily for those groups where economic resources are scarcest, and among such groups we find the lowest rates of device ownership and personal internet connection. Secondary to this, and the focus of the majority of literature on the subject, the digital divide further aggravates existing socioeconomic differences and even generates new forms of social exclusion. Taking a positive point of view, this situation does also imply that eliminating the digital divide could help alleviate social exclusion. Nevertheless, for social and educational intervention programmes to have any real effect on social exclusion, we need to have a more in-depth understanding of processes and variables that cause it at an individual level. In this way we could design interventions tailored to the personal interests, needs, limitations, and potential of every individual and that would prioritise particularly disadvantaged groups, which, according to this study include older people, the less well educated, those with health problems, and the unemployed.

KEYWORDS: Digital Divide, Social Exclusion, Digital Citizenship, Intervention, Social Justice.

DOI
https://doi.org/10.20368/1971-8829/1135660

CITE AS
López-Aguado, M., Gutiérrez-Provecho, L., Quintanal Díaz, J., & García Llamas, J.L. (2022). Social exclusion and the digital divide. *Journal of e-Learning and Knowledge Society*, 18(3), 74-82. https://doi.org/10.20368/1971-8829/1135660

1. Introduction

Information and communication technologies (ICTs) permeate all aspects of modern life (in education, work, leisure, and social interactions), such that they have become an indispensable resource to function effectively in our society. ICT enables all manner of social, cultural, and economic activities; it is intrinsic to exercising certain rights (Martin, 2020) and even in enabling social and political participation (Delfino et al., 2019).

Or, to put it another way, the appropriation of technology has become the tool to achieve what has been defined as *digital citizenship*, in the sense expressed by Emejulu and McGregor "as a process by which individuals and groups committed to social justice deliberate and take action to build alternative and emancipatory technologies and technological practices" (2019, p. 140).

However, not all citizens have the same capacity to achieve this technological appropriation that allows them to enjoy full citizenship (which includes digital citizenship), the varying rates at which these technologies have penetrated the lives of people in different continents, countries, and social groups have given rise to a new form of inequality: the digital divide. The term was coined during the 1990's, and, initially, it referred to an absence of technology access due to economic deprivation. Latterly, it has become increasingly apparent that the problem involves numerous structural, contextual, and personal factors

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(Colom, 2020). Furthermore, these factors go far beyond mere issues of access depending significantly on an individual's technological skills and the uses they make of technology (Toudert, 2019), since the opportunities offered by new technologies depend in great measure on the uses to which they are put (Castaño, 2009).

In this way, Martin (2020) observes that the multiple ways in which technology is used nowadays mean that the digital divide makes itself apparent in many different aspects of life, for instance, in access to the digital society, electronic commerce, training (e-learning), and the numerous digital government services that are often essential to citizens' ability to exercise of certain rights or undertake particular administrative tasks.

The digital divide is even present in the most technology saturated societies because the digital revolution is not reaching poorer urban and rural communities (Carrascosa et al., 2021). Access to ICT is not in itself a panacea for low income, however, lack of knowledge in how to use these tools can exacerbate existing inequalities in education and opportunities and increases rates of poverty and isolation (Servon & Nelson, 2001). Such effects were seen recently as a result of the COVID lockdowns (López-Aguado, 2020).

The relationship between digital inequalities and social inequalities is a two-way street. As multiple studies and reports have pointed out (Hernández-Gracia et al., 2019; ONTSI, 2020; Torres-Diaz & Duart, 2015), digital exclusion is, on one hand, an effect of social inequality, thus, to a large extent it reflects previously existing social ills.

However, even more importantly, the digital divide is becoming a cause of social exclusion since on one hand it affects those groups already facing disadvantage by aggravating and perpetuating existing inequalities and on the other, it places at a disadvantage a whole new set of groups and individuals cutting them off from avenues of personal, social, and economic development (Carrascosa et al., 2021). A lack of access to ICT means individuals are barred from sources of information and have fewer personal opportunities which in turn leaves them unable to respond to social demands thus destroying their links with society (Olarte, 2017). In this way, technological discrimination becomes a route to poverty and social exclusion (Arias et al., 2018).

Those who are unable to navigate the digital environment are at greatest risk of social and cultural marginalisation due to various factors, among which one of the most important is the increasing role of ICT in the work environment (Peña-Lapeira, 2015), both in terms of access to the labour market and also due to its use in professional development (Acosta-Velázquez & Pedraza-Amador, 2020). This is borne out by a report from the European Centre for the Development of Vocational Training (Cedefop, 2020) indicating that before 2025 between 85% and 90% of employment posts will require ICT skills. Increasingly, knowledge of ICT will be necessary not only for highly skilled jobs but also manual posts such as cleaners, auxiliary staff, security guards, waiters, domestic staff, warehouse workers, and shelf-stackers.

In 2015, alongside 193 other countries, Spain signed a United Nations General Assembly Resolution in which promises were made to put an end to poverty, channelling citizens' prosperity and opportunities into creating a healthier, peaceful planet. This was the 2030 Agenda for Sustainable Development and, it contains 17 Sustainable Development Goals (SDGs) that ultimately aim to guarantee the human rights of all citizens through the transformation of our financial, economic, and political systems. These goals are associated with 169 integrated and indivisible targets which will be achieved through the mobilisation of administrations at the national, devolved, and local government level.

Taking its cue from Agenda 2030, the Spanish government has initiated administrative activity at all levels of government: national, devolved, and local; it has also invited the contributions of various social actors, businesses, research centres, and universities in a person-centred enterprise with the shared vision of seeking to achieve the UN's SDGs. Besides publishing Action Plans and Implementation Guides, it has laid out 232 statistical indicators which are assessed yearly and reported in order to monitor progress with regards to the Agenda 2030 goals and targets.

Wide access to and use of ICT by citizens are among the conditions key to achieving several of the Agenda 2030 SDGs, for example, eradicating extreme poverty (1.1); reducing relative poverty in all its forms (1.2); ensuring good quality education (4.0); enhancing the use of enabling technologies including ICT (5.b), increasing productivity through diversification, technological upgrading and innovation (8.2); significantly increasing access to ICTs and the internet (9.c); and of course, fundamental to all the proposed targets: reducing all inequalities (10).

Overcoming the digital divide – achieving digital inclusion – is thus a tool in the promotion of social inclusion (Reyes & Prado, 2020); it is something that goes digital literacy (which itself is not simply the acquisition of digital skills) and would have a real social impact by immeasurably improving living standards (Olarte, 2017). The rapid digital revolution occurring in society represents a huge challenge as we strive for a more fully integrated society because it is precisely the cause of inequality, highlighting existing gaps in accessibility and ICT skills and leading to further, deeper social inequality. In this way, it is essential to look closely at infrastructure needs, and at the same time, develop people's skills so that they can make use of available ICTs thereby promoting self-teaching to gain relevant knowledge (Peña-Lapeira, 2015), and the use technology for personal, social, and economic development. As well as training initiatives, there is a need to increase the level of coordination between different administrative levels and among various organisations; to promote interventions that directly involve the citizenry in participatory processes and in

the adoption of technology; or simplifying administration processes (Carrascosa et al., 2020).

Thus, the challenge facing society is to strengthen integration strategies and so share the power of technology as a tool for inclusion, placing access to technological devices and an adequate internet within the reach of all citizens. But specially, what is required are public policies founded on evidence and based on a clear understanding of the issues involved (Olarte, 2017) which address ways to diminish the digital divide, particularly among groups at high risk of social exclusion (Carrascosa et al., 2021).

High-risk groups that for various reasons are especially vulnerable to the digital divide must be a priority for policy makers and social programmes. Furthermore, it is necessary to address other inequalities alongside the digital divide, for instance the urban-rural divide, the gender gap, and the generational gap, as well as considering the needs of other marginalised groups such as immigrants, those in poverty, the long-term unemployed, and ethnic minorities among others (Olarte, 2017).

However, in order to reinforce digital skills, we must identify first not only those segments of society that should be prioritised but also individuals' particular wants and needs such that personalised training programmes can be designed to fit their specific objectives and interests. It is increasingly clear that traditional one size fits all approaches are ineffective, personalised strategies on the other hand would ensure that ICT becomes a useful tool in combatting social exclusion.

Thus, the object of this work is precisely to focus on vulnerable sectors of the population (i.e., those who are marginalised or at risk of social exclusion) and identify those factors that have an effect, or are associated with, the manifestation of a digital divide in various spheres: personal, home, and family; health; training; and employment. Our purpose is then to make some proposals regarding training and skills development that are adapted to these citizens' needs and so design strategies that might result in better e-inclusion.

2. Materials and Methods

2.1 Instruments

Data was collected using the "Valora1001", a verbally administered questionnaire specifically designed for this study (Gutiérrez-Provecho et al., 2021). This instrument was used to explore the profiles of persons currently marginalised or at risk of social exclusion in the city of León (Spain); it investigates the following dimensions: socioeconomic circumstances, access to technology, health and disability, education, employment, and collects other data such as nationality, legal status, experience of gender-based violence, and previous criminal convictions. The validity of this instrument is described in other work (Gutiérrez-Provecho et al., 2021) and assessments by multiple judges show a high level of agreement as to the validity of its component items.

2.2 Participants and access procedure

Our target population was persons aged between 18 and 64 years at the time of data collection in receipt of the social guaranteed income, *Renta Garantizada de Ciudadanía* (RGC). This group represents a section of the population who are marginalised or at significant risk of social exclusion and need financial assistance in order to subsist. This population (approximately 1,600 people) were invited to take part in the study and given the difficulty of access to this population, our contact procedures needed to be particularly well-managed. Contact was initiated by letter. Where there was no response or in the case of a letter being returned, individuals were contacted by telephone. Lastly, where telephone contact failed, we attempted to locate these individuals through social services. Our final sample comprised 1125 people with a median age of 41.44 years, of which 56.5% were women and 46.5% were men. In order to complete the interviews for our study, the corpus was segmented according to proximity to the city's social services hubs, CEAS (Social Action Centres). In this way we hoped to maximize accessibility and so encourage a greater level of participation.

2.3 Variables analysed

Personal, home and family: variables of interest were gender, age, number of persons in the home, number of minors in the home, the quality of living conditions.

Health: variables of interest were the presence of health problems, disability status, whether or not participants' perceptions concerning health problems stopped them from working, whether or not participants' perceptions concerning health problems stopped them from accessing education.

Education: variables of interest were the level of education, additional training undertaken, and where participants had not completed any additional training, their level of enthusiasm towards gaining additional training.

Employment: variables of interest were whether they had worked in employment with social security benefits (i.e., legally recognised, and protected work), whether they made weekly visits to jobseekers' centres, whether they believed they had a chance of finding employment, whether they felt they knew how to seek employment, and what importance did they give to technology.

Digital divide markers: variables of interest will be analysed with respect to several markers including 1) *devices*, the number of devices available in their home (smartphone, computer, tablet, smart TV, etc.); 2) *access points*, the number of points available to access the internet (connection via smartphone, fixed connection in the home, etc.); 3) *technology use*, the number of

different procedures an individual has completed over the internet (with public administrations, in search of work etc.).

2.3 Data analysis

In order to achieve the objectives of our study we used descriptive statistics derived from the variables outlined above. These variables were analysed with respect to our markers, devices, access points, and technology use. To establish the statistical significance of differences between groups we used simple variance analysis (ANOVA) and used the F-value to contrast hypotheses.

3. Results

Information concerning the access to, and use of, technology can be summarised in the three variables, number of devices, number of access points, and technology use. The first of these, calculated as the sum of all the various devices in a given participant's home had a median value of 1.27; the second, calculated as the sum of all the various access points available to participants had a median value of 1.16; and the third, calculated as the sum of all online procedures participants undertook had a median value of 0.87 (Table 1).

n	Devices	Access points	Technology use
0	16.8%	18%	43.9%
1	45.9%	47.7%	25.6%
2	30.5%	34.1%	30.1%
3	6.8%	0.10%	0.40%
$\bar{x}$	1.27	1.16	0.87

Table 1 - Summary of digital divide markers.

3.1 Personal, home, and family related variables

Gender does not appear to effect participant's risk of e-exclusion; however, age does emerge as a significant factor (Table 2). As can be seen, increasing age corresponds to progressive and significant decreases in the number of devices, the number of access points, and the technology use recorded by participants.

The number of people living in the home appears to bear no relationship to either access or technology use, however, in the case where co-habitants were minors, the situation was somewhat different. Where there are minors in the home, the number of devices in the home increased, as did points of access, however technology use did not increase.

As might be expected, the quality of living conditions was related to our digital divide markers. Where participants reported having good quality living conditions, a significantly higher number of devices was recorded and, although this relationship was less pronounced, participants also recorded more technology use.

		Devices	Access points	Technology use
Gender	*Male*	1.22	1.15	0.84
	Female	1.31	1.17	0.86
Age	*25-34*	1.44	1.38	1.07
	35-44	1.28	1.18	0.92
	45-54	1.25	1.06	0.72
	>54	0.97	0.87	0.64
		$F(3,1121)=13.61$, $p<.001$	$F(3,1121)=25.11$, $p<.001$	$F(3,1121)=13.82$, $p<.001$
Number of persons in the home	*1*	1.19	1.06	0.91
	2	1.32	1.18	0.91
	3	1.36	1.23	0.83
	4	1.32	1.17	0.86
	5	1.20	1.23	0.85
	>5	1.33	1.27	0.86
Minors in the home	*No*	1.17	1.07	0.85
	Yes	1.36	1.24	0.86
		$F(1,1123)=15.70$, $p<.001$	$F(1,1123)=16.16$, $p<.001$	
Quality of living conditions	*Poor*	1.04	.098	0.76
	Good	1.32	1.20	0.90
		$F(1,1106)=19.30$, $p<.001$	$F(1,1106)=15.40$, $p<.001$	$F(1,1106)=4.21$, $p=.04$

Table 2 - Differences in markers of the digital divide as a function of personal, home and family variables.

3.2 Health related variables

The results of our analysis (Table 3) allow us to establish a significant relationship between health problems and a greater digital divide. Participants with health problems reported lower numbers of devices, fewer points of access and lower technology use. This trend was exacerbated when participants also reported having a registered disability.

Other variables in the area of health are also related to the digital divide: participants who perceived their problems as a barrier to finding work or to pursuing education reported lower values in all digital divide markers than those who believed that they did have opportunities to seek employment or further their education. In all cases these relationships were statistically significant.

These result show that health problems constitute a risk factor in the processes that lead to e-exclusion.

3.3 Education related variables

Results show (Table 4) the number of devices, points of access, and technology use all show a clear tendency to increase with the level of academic study achieved, and also with the completion of additional training. Furthermore, the same tendency was seen where participants expressed more desire to complete additional training. In all cases the relationships observed were statistically significant.

In this way, lower levels of education, both official and additional, seem to be important risk factors for e-exclusion.

		Devices	Access points	Technology use
Presence of health problems	*No*	1.32	1.23	0.92
	Yes	1.20	1.07	0.80
		$F(1,1121)=5.75$, $p=.017$	$F(1,1121)=7.31$, $p<.001$	$F(1,1121)=5.58$, $p=.018$
Disability status	*No*	1.30	1.19	0.90
	Yes	1.04	0.96	0.57
		$F(1,1117)=10.18$, $p<.001$	$F(1,1117)=11.08$, $p<.001$	$F(1,1117)=15.45$, $p<.001$
Participants' perceptions concerning health problems stopped them from working	*No*	1.38	1.20	1.07
	Yes	1.10	1.00	0.64
		$F(1,361)=7.79$, $p=.006$	$F(1,361)=4.95$, $p=.027$	$F(1,361)=18.01$, $p<.001$
Participants' perceptions concerning health problems stopped them from accessing education	*No*	1.42	1..22	1.01
	Yes	1.02	0.94	0.61
		$F(1,368)=20.86$, $p<.001$	$F(1,368)=14.54$, $p<.001$	$F(1,368)=20.66$, $p<.001$

Table 3 - Differences in markers of the digital divide as a function of health variables.

		Devices	Access points	Technology use
Level of education	*1**	0.77	0.53	0.10
	2	1.07	1.00	0.46
	3	1.15	1.08	0.74
	4	1.26	1.24	0.94
	5	1.56	1.34	0.77
	6	1.60	1.37	1.19
	7	1.63	1.37	1.39
	8	1.68	1.43	1.59
		$F(8,1116)=11.28$, $p<.001$	$F(8,1116)=9.42$, $p<.001$	$F(8,1116)=25.75$, $p<.001$
Additional training undertaken	*No*	1.00	0.96	0.58
	Yes	1.38	1.24	0.98
		$F(1,1116)=50.66$, $p<.001$	$F(1,1116)=35.12$, $p<.001$	$F(1,1116)=51.71$, $p<.001$
Attitude towards gaining additional training	*No*	0.89	0.81	0.43
	Yes	1.15	1.10	0.68
		$F(1,368)=20.86$, $p<.001$	$F(1,368)=14.54$, $p<.001$	$F(1,368)=20.66$, $p<.001$

** 1. Illiterate; 2. Without qualifications; 3. Primary education (no graduation certificate); 4. School Certificate; 5. Professional Training; 6. Completion of Compulsory Education (ESO); 7. Baccalaureate; 8. University Level*

Table 4 - Differences in markers of the digital divide as a function of employment variables.

3.3 Employment related variables

Whether or not participants had worked in employment with social security benefits had a statistically significant relationship to both the number of devices and technology use. However, no relationship was seen between this variable and the number of access points reported.

Further, participants' weekly attendance at jobseekers' centres, their perception of their chances of finding employment, their perceived knowledge of how to use technology to seek employment all showed a relationship to the number of devices, points of access, and technology use. Results demonstrate that not having had legal work in the past, as well as having a passive or negative attitude to searching for work are risk factors for e-exclusion (Table 5).

4. Discussion and conclusions

According to the latest report from Spain's Social Observatory, the country has experienced a digital revolution over the last 5 years with 85% of the population now using the internet (Carrascosa et al., 2021), however, at the same time, differences between socioeconomic groups have become accentuated (Sevilla & Márquez, 2021). Differences in access, use, and technology adoption tend to be associated with other socioeconomic inequalities and people belonging to vulnerable or marginalised groups also have high markers of e-exclusion. The Fostering Social Studies and Applied Sociology foundation estimates that 35.2% of homes are disadvantaged by the digital divide, and this percentage rises to 45.8% among groups experiencing social exclusion and further, to 51.2%, in instances of severe exclusion (FOESSA, 2021).

Our previous work (AI) has demonstrated the existence of a significant digital divide between our sample population (of those currently marginalised or at risk of social exclusion) and the general population. This divide is of such magnitude that it constitutes the most pronounced difference, i.e., Type IV or very significant (difference>16%) and suggests the presence of a social fracture between the two populations (Mendoza-Ruano & Caldera-Serrano, 2014) dividing them by a chasm of technological knowledge and capability.

However, technological deprivation is not homogeneous across all vulnerable groups, indeed, the character and depth of deprivation varies substantially between individuals. Hence there is a need for greater understanding of this variation, and this is the motivation behind this work.

In general terms, the results of this study confirm those of other researchers and the risk factors detected for the vulnerable population considered here are the same as those identified by Varela (2015) and Colom (2020) for the general population—with the exception of gender. In the following, we will discuss our results for each of the dimensions analysed.

Personal, home, and family

It seems that, in Spain, in the population at large, e-inclusion is becoming equalised with respect to gender (INE, 2020). Our results confirm this, and indeed may be swinging towards a situation where the most excluded population is increasingly male.

Our results also demonstrate the continued existence of an age gap in the sense that among those over the age of 55 years, deprivation manifests more deeply and creates a greater degree of vulnerability. This is in line with the findings of other work in this area (Carrascosa et al., 2021; Martín, 2020; ONTSI, 2020; Papi et al., 2020; Repetto, & Trentin, 2008).

With respect to the composition of the family, our results show this exerting some degree of influence on e-exclusion. Although the number of people in the

		Devices	Access points	Technology use
Had worked in employment with social security benefits	*No*	1.14	1.12	0.70
	Yes	1.33	1.18	0.94
		$F(1,1118)=13.06$, $p<.001$		$F(1,1118)=17.84$, $p<.001$
Make weekly visits to jobseekers' centres	*No*	1.24	1.10	0.80
	Yes	1.48	1.39	1.18
		$F(1,706)=11.26$, $p<.001$	$F(1,706)=24.21$, $p<.001$	$F(1,706)=28.35$, $p<.001$
Belief in having a chance of finding employment	*No*	1.14	1.06	0.72
	Yes	1.43	1.27	0.84
		$F(1,1034)=31.18$, $p<.001$	$F(1,1034)=22.89$, $p=.027$	$F(1,1034)=35.64$, $p<.001$
Knowing how to seek employment	*No*	0.93	0.83	0.17
	Yes	1.56	1.43	1.45
		$F(1,1114)=186.18$, $p<.001$	$F(1,1114)=242.98$, $p<.001$	$F(1,1114)=1320.16$, $p<.001$

Table 5 - Differences in markers of the digital divide as a function of employment variables.

household appears not to be a factor, the presence of minors among that number is significant in that it influences both the number of devices and the access points available in the home. The National Observatory of Technology and Society (ONTSI) has also found that the presence of children in a household has a positive impact on internet usage. In households comprising a couple with children, on average, 97.7% are occasional internet users while 96.2% report using the internet on a weekly basis. In contrast, in households composed of childless couples these figures are 87.3% and 82.8% respectively (ONTSI, 2020). These findings may be due to the fact that younger people need to use technology for educational purposes and, particularly, as a primary tool for socialising.

Health

Our findings demonstrate that having health problems is a risk factor for e-exclusion but also that such problems feedback to worsen social exclusion. Participants with health problems had fewer devices, fewer access points and their technology use was low, and these effects were more pronounced for participants who also reported having a disability.

This pattern is reproduced in the population at large where significant differences are found between those reporting having some form of disability and those who do not in terms of the number of devices, number of access points, and technology use (Peña-Lapeira, 2015; Torán & Sendra, 2021). These facts clearly show how the disadvantage of having a disability amplifies the risk of cultural and social marginalisation (Ferreira & Velázquez, 2009).

The participants in our sample population already belong either to marginalised groups or groups at risk of social exclusion and, as our results show, this feeds back into their digital disadvantage. People in these vulnerable groups tend to believe themselves unable to find employment or continue their studies. This is perhaps because literacy programmes are often targeted at the general population without taking account of the needs of persons with disabilities (Torán & Sendra, 2021), or it may be due to persisting problems of content accessibility (Peña-Lapeira, 2015).

As a result, from our participants' point of view, their health problems negatively affect their chances of accessing education which in turn has repercussions on their subjective perceptions concerning their employment opportunities. Undoubtedly, these individuals' extremely negative beliefs about their opportunities are likely to lead to these people feeling less able to undergo personal development causing a progression towards ever greater exclusion, further demotivation, and a lack of proactivity. This process could perpetuate and deepen the divide experienced by those who perceive their lack of resources to be too great to overcome. In order to change this, it is essential to depart from the "one size fits all" model of social intervention and instead design personalised programmes of action aimed at strengthening social participation, targeted to take specific account of individual limitations (Peña-Lapeira, 2015).

Education

Our results show that the digital divide is exacerbated by lower levels of academic attainment, lower rates of additional training, and even by the lack of motivation to consider additional training. These results reproduce patterns seen in the general population where educational level has also been related to e-exclusion (Papi-Galvez et. al., 2020). Studies show that, among people with primary level education, 70% connect to the internet on a weekly basis and this percentage rises to almost 100% among those with university level qualifications (ONTSI, 2020). Work by Carrascosa et al. (2021) showed practically identical findings with 100% of those holding a university degree using the internet on a regular basis, while only 27.4% of those who had only finished primary education reporting the same.

In very general terms then, our study demonstrates that a high digital divide index is associated with a lack of proactivity and a low level of motivation. This reinforces the idea of feedback described in the literature in the sense that lower educational attainment results in a wider digital divide. Educational e-exclusion generates fewer opportunities, more inequalities, and ultimately a greater degree of social exclusion such that the resulting inequality of opportunity with regards to information access, knowledge, and ITC enabled education severely limits possibilities of personal development (Vivancos, 2013).

Employment

Our study shows that not having been employed in the past, as well as having a passive, negative attitude towards seeking a job appear to be risk factors for e-exclusion. These findings partially coincide with those of the ONTSI (2020) report indicating that the employed, the jobless, and students had the highest percentages of internet access, while pensioners, and those who worked in the home had the lowest rates of connectivity.

Nevertheless, this relationship is bi-directional in the sense that differences in access to technology understood as training in its use, establishes an employment divide (access to employment, choice of better/worse employment, and job stability) that causes new forms of poverty and exclusion (Olarte, 2017).

The labour market is undergoing profound restructuring due to technological innovation, not only because this process generates new jobs demanding new technological qualifications (Olarte, 2017), but also because of the way in which traditional jobs are becoming increasingly digitised. According to the COTEC foundation (2021), this growing digitisation involves the automation of many activities and also changes in roles, services, and tasks requiring a new

level of technological competence such that it is estimated that by the end of the period 2017-2025 between 85% and 90% of jobs will require technological skills (Cedefop, 2020).

The digital divide represents a barrier to employment (Morales & Macias, 2020), and means that the e-excluded (at a disadvantage in the labour market) are exposed to poverty and marginalisation as a result (Olarte, 2017), or as is the case with our corpus, experience greater levels of social exclusion.

In this way, it is evident that in order to lessen the digital divide we much enhance connectivity and access to technology particularly among vulnerable groups. This, of course implies the need to increase economic growth and development and investment in technology should be seen as a tool to reduce inequality bringing access to education and better employment opportunities. However, as has been indicated in other studies, an abundance of technology in itself does not reduce the digital divide, instead, the essential ingredient is enhanced technological skills during the process of adoption (López-Aguado, 2020; Gómez et al., 2018) with educational institutions - schools and universities - taking a leading role (Cabero & Ruiz-Palmero, 2018; Gallo, 2008).

Understanding the digital divide as a factor that causes or deepens social exclusion leads to an understanding of how its reduction could at the very least act as a tool to facilitate social inclusion. However, to achieve this requires focussed attention on particular priority groups identified in this study as especially vulnerable, that is, those groups for which several risk factors coincide. According to our findings, these priority groups include older people, especially those who do not live with children or youngsters of school age; people with lower levels of academic achievement; people with health problems (those with a greater degree of disability being in most urgent need of help); and people who have not been able to find work.

As a result, it is essential to design educational interventions that reach all segments of the population (Carrascosa et al., 2021) and for these to have the objective not only of developing digital skills but also, perhaps especially, of fostering social participation taking account of individual starting points, as well as the different needs, skills, limitations, and potential of every individual. In this way, it might be possible to mitigate the effects of the digital divide on the social exclusion experienced by the most vulnerable groups in society and so move towards the goal of a fully digitally empowered citizenry, so that people in vulnerable situations are able to use technologies as a way to achieve greater inclusion, but also to appropriate them as an emancipatory and empowering tool that drives social change.

Acknowledgements

Research carried out within the framework of the Observatory for Social Inclusion in the city of León, which has been set up with the financial contribution of León City Council from the funding line of the Sustainable and Integrated Urban Development Strategy (EDUSI) of the ERDF Funds.

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