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Digital competence among young people in Spain: A gender divide analysis

Competencias digitales de la juventud en España: Un análisis de la brecha de género

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ABSTRACT

Datafication in today's communicative ecosystem poses a challenge to media and digital literacy, especially with regard to young people's participation and civic and democratic engagement. We address this issue using the notion of digital citizenship, in order to study the gender digital divide as it relates to competence (i.e., skills and knowledge) and the possibility of leveraging said competence to promote civic education grounded in gender equality in the digital environment. For this study, we surveyed a representative sample of 600 young people between the ages of 16 and 18 in Spain to gauge their digital competence through three variables: technical skills, informational skills and critical knowledge. We then performed a descriptive analysis resulting in percentages, means and standard deviations and a bivariate analysis using significance testing (T-tests) between the above variables and the gender variable. Results show a relative balance between men and women in technical and informational digital skills, albeit tipped slightly in favour of women. By contrast, men claim to have more critical knowledge. Based on these results, we discuss the need to consider the contributions of feminist theories in the field of technology to develop proposals for teaching digital competence that encourage active digital citizenship based on gender equality.

RESUMEN

El escenario de datificación del ecosistema comunicativo actual plantea un desafío a la alfabetización mediática y digital, especialmente en lo que respecta a la participación y el compromiso cívico y democrático de la población joven. En este artículo abordamos esta cuestión a partir de la noción de ciudadanía digital con el objetivo de estudiar la brecha digital de género en términos de capacidades —competencias y conocimientos— y la posibilidad de aprovecharlas para promover una educación cívica fundamentada en la igualdad de género en el entorno digital. Para ello, mediante una encuesta con una muestra representativa de 600 personas jóvenes —entre 16 y 18 años— en España, observamos su nivel de competencias digitales a través de tres variables: competencias técnicas, competencias informacionales y conocimientos críticos. Los resultados del análisis descriptivo, mediante porcentajes, medias y desviaciones típicas; y bivariado entre dichas variables y la variable de género mediante pruebas T-test de significatividad, muestran que, si bien hay relativa igualdad de condiciones entre hombres y mujeres en cuanto a competencias digitales técnicas e informacionales con un ligero dominio de las mujeres, los hombres afirman tener más conocimientos críticos. Desde ahí, discutimos la necesidad de considerar los aportes de las teorías feministas en el ámbito tecnológico para elaborar propuestas educativas en competencias digitales que fomenten desde la igualdad de género la promoción de una ciudadanía digital activa.

KEYWORDS | PALABRAS CLAVE

Digital citizenship, citizenship education, media literacy, critical thinking, gender equality, young people.
Ciudadanía digital, educación ciudadana, competencia mediática, pensamiento crítico, igualdad de género, jóvenes.

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1. Introduction and state of the art

Digital platforms are taking over as the predominant venues for shaping public opinion, effectively transforming the media ecosystem and posing significant challenges for media literacy (Valtonen et al., 2019). These corporate platforms employ a business model based on personal data collection and traffic, leaning into the paradigm of datafication, i.e., the transformation of social actions into quantifiable online data, using methods that implement "dataveillance", which involves surveilling people through the use of their online data (Van-Dijck, 2014). When the Cambridge Analytica case came to light in 2018, it became known that the company had used personal data to build psychometric profiles to influence electoral processes such as Brexit and the 2016 United States presidential election. This scandal came as a wake-up call about the impact of big data and digital-platform-managing algorithms on democratic societies. Within the discourse on the true effect of algorithm-driven "echo chambers" (Dubois & Blank, 2018), we subscribe to the idea that these shape "immersive media environments" that affect people's values and actions (Cohen, 2018).

Debates on what is meant by digital citizenship and how it can be promoted through education date back to the beginning of the 21st century (Richardson et al., 2021), but they are now more relevant than ever given the current state of affairs. This article is a response to the need to digitally empower people to face the media challenges that question democracy as a system of social organisation. Our research focuses on young people aged 16 to 18 in their position as citizens close to acquiring full participation rights. We also specifically hone in on the gender factor, in order to explore whether digital technologies contribute evenly to young people's civic engagement.

The research questions guiding our study are as follows: [RQ1] How digitally competent do young Spaniards claim to be? [RQ2] Are there gender differences in young people's self-perceived digital competence? Our hypotheses are: [H1] Young Spaniards will report having better technical and informational digital skills than critical digital knowledge. [H2] There will be differences between young men and women regarding their self-perceived digital competence, especially with respect to critical knowledge.

1.1. Digital citizenship and youth

Digital citizenship can be understood as a multidimensional concept encompassing literacy, competencies, participation, and digital access and divides. However, it is still being defined and addressed in various fields, including education, communication and political science (Gleason & Von-Gillern, 2018; Panke & Stephens, 2018). From this discourse, we agree with Richardson et al.'s (2021) systematic review of digital citizenship, which found the most comprehensive paper to be by Choi (2016). This author defines digital citizenship as "abilities, thinking and action regarding internet use" and says that it "allows people to understand, navigate, engage in, and transform self, community, society, and the world" (Choi, 2016: 20).

Relevant here is the proposal by Yue et al. (2019), which identifies two predominant approaches to digital citizenship in relation to youth. First is the "control approach", which conceives young people as passive subjects and "not-yet-citizens", with digital citizenship adopting a normative perspective. This approach excludes young people from participation mechanisms and subordinates them to adult-centric criteria. Second is the "freedom approach", which views young people as active agents, emphasising participation and inclusion through digital media. However, this perspective assumes that young people are digital natives and autonomous users in open and horizontal participatory processes, which implies understanding digital participation as inherently positive and taking an uncritical view of the datafication scenario presented above. Again, drawing on Yue et al. (2019), we embrace a third approach that emphasises the civic aspect of digital participation and the importance of media literacy. This perspective requires a critical understanding of young people, not as passive subjects or active agents per se, but as users embedded in a complex, technical, commercial, cultural, social, and political assemblage in two interrelated environments (offline and online). In practical terms, this approach calls for us to examine the youth population's digital practices and, most crucially, any differences within this demographic (Darvin, 2018; Porat et al., 2018).

1.2. The digital divide and digital competence from a gender perspective

Taking this approach, we draw on Choi's (2016) conceptual analysis of digital citizenship, which identifies four major categories: "ethics", "media and information literacy", "participation/engagement" and "critical resistance". This article expands on the "media and information literacy" category by exploring the three identified sub-themes: the digital divide, technical skills and psychological capabilities.

The digital divide concept emerged when digital technologies became available and widespread. Their social impact soon became apparent, namely through an uneven distribution among the population, whether by gender, class, ethnicity, location, level of education, or other socio-economic and socio-cultural factors. This phenomenon is also more explicitly referred to under the term "digital inequalities", which highlights the link between digital and social exclusion (Helsper, 2021). Nomenclature aside, research in this area has evolved from technical enquiries about who has access to digital devices and who does not, to multidimensional studies considering differences in digital uses and skills as a "second-level digital divide" (Hargittai, 2002). Recently, research on socio-digital inequalities has explored how "digital capital" (Ragnedda, 2016), digital resources, (internet connection, devices, etc.) and digital capabilities (skills, competencies and knowledge) can lead to "tangible" benefits outside the digital environment, be they personal, political, cultural, financial, or social, in what amounts to a "third-level digital divide" (Van-Deursen & Helsper, 2015; Ragnedda, 2016). On the gender factor in the digital divide, it needs to be said that technology has historically been a predominantly male domain (Cockburn, 1983; Wajcman, 2004; Loh, 2019). Research on the digital gender divide is therefore a continuation of these studies (Gurung, 2018).

Thanks to this multi-level, digital competence-embracing perspective, we are able to link the digital divide to the other two media and information literacy sub-themes outlined by Choi (2016). First, technical skills, which in this article we refer to as "technical digital skills". According to Choi (2016), these "represent an instrumental perspective on literacies and competencies, such as how to use new digital technologies, computers, smartphones and/or tablet PCs" and "serve as prerequisites for advanced internet activities" (14). Second, psychological capabilities, referred to in this article as "informational digital skills". These encompass "cognitive-intellectual abilities to select, classify, analyse, interpret, and understand data critically [...]; socio-communicative abilities to communicate/network with others, share photos/videos, or exchange ideas through blogs, podcasts, and/or online discussion forums [...]; and emotional abilities to learn how to control negative feelings or sympathize with others' emotions" (Choi, 2016: 14-15). Both types of skills can be interpreted at the second level of the digital divide.

While Choi's (2016) proposal does state that digital competencies cannot be reduced to their instrumental aspect, a consideration shared by Gutiérrez-Martín and Tyner (2012), we also agree with the latter authors in that media education cannot be reduced to digital competencies either (ibid). We therefore extend our analysis to include a third component relating to "critical digital knowledge". This is based on the premise that, although media literacy and digital literacy belong to the same field, their key difference lies on the particular focus that the digital aspect places on the structural transformations imposed on society by the digital environment (Bali, 2019). For this purpose, we follow Mihailidis et al.'s (2021) proposal to take "critical consciousness" as the central value of a transformative media pedagogy (here in its digital form), adopting the Freirean approach of "conscientisation" (Freire, 1970), understood as the "liberating education process through which people [...] acquire a critical awareness of themselves and reality, which they turn into action, thus affirming themselves as conscious subjects and co-creators of their historical future" (Díez-Gutiérrez, 2022: 51). Based on this perspective, we add a scale of digital environment-related knowledge that is considered critical, insofar as it allows users to distance themselves enough to structurally understand how digital media work.

By further developing this pedagogical approach reinterpreted by Hooks (1994) from an intersectional feminist perspective, we are able to lay the foundations for a transgressive educational proposal. We discuss the need and possible features of a type of literacy that draws from the media tradition and focuses on embracing a critical (Pangrazio, 2016) and feminist perspective (Bali, 2019) when engaging with the digital environment. A type of literacy that is not only geared towards employment in the labour market, but also the formation of digital citizenship (Pötzsch, 2019).

2. Material and methods

2.1. Design

Research design is quantitative and cross-sectional, involving an online survey intended to measure the self-perceived digital competence of young people aged 16 to 18 living in Spain. This age group was chosen because they are close to acquiring full citizen participation rights, such as the right to vote in Spain. The survey was self-administered, i.e., it was completed by the respondents themselves without the presence of an interviewer, between 23 September and 5 October 2021, with prior informed consent. Data and participant security and confidentiality were respected following the UNE EN ISO/IEC 27001 standards and the favourable report issued by the Universitat Oberta de Catalunya (UOC) Ethics Committee under file CE22-PR05.

2.2. Survey

The survey is based on Van-Deursen et al.'s (2016) and Aranda et al.'s (2020) extension of the Oxford Internet Institute's (OxIS) WIP Britain 2013, combined with a systematic review of the notion of "digital youth work" (Fernández-de-Castro et al., 2021). It includes a section of socio-demographic questions (gender, age, place of residence, etc.) and three further sections comprising 24 questions about the respondents' self-perceived digital competence. Because the survey asked young people about how they perceive their own digital skills and knowledge, their answers may not necessarily match their actual competence level.

The first and second sections on digital competence asked about technical skills (nine items) and informational skills (ten items), respectively. Answers were given on a 5-point Likert scale: 1: I don't know what this is or what it means; 2: I know what this is but I don't know how to do it; 3: I would know how to do this with help; 4: I know how to do this by myself; and 5: I know how to do this and could teach others. The third section dealt with critical knowledge of the digital environment and included five items, also measured on a 5-point Likert scale: 1: Nothing at all; 2: A little bit; 3: An average amount; 4: A fair amount; and 5: A lot.

A principal component analysis was carried out on the proposed scales to check their validity and Cronbach's alpha was used to measure their reliability. Regarding the section on technical digital skills, the analysis showed an acceptable structure for all nine items (KMO=0.910; Bartlett's test significant with $p<0.001$). The structure comprised two components explaining 64.8% of the total variance (40.1% for the first component and 24.7% for the second); the Cronbach's alpha coefficient was 0.903 for the first component and 0.773 for the second. For the section on informational digital skills, the analysis showed an acceptable structure for all ten items (KMO=0.955; Bartlett's test significant with $p<0.001$). A single component explained 59.9% of the total variance and Cronbach's alpha was 0.925. For the section on critical digital knowledge, the analysis showed an acceptable structure for all five items (KMO=0.843; Bartlett's test significant with $p<0.001$). A single component explained 58% of the total variance and Cronbach's alpha was 0.819.

2.3. Sample

Data collection was carried out by ODEC, which sent a link to the participants, fulfilling representative criteria in terms of age, gender, education, and place of residence in Spain. By means of a simple random sampling strategy, 600 young people completed the survey, taking an average of 13 minutes per person. The sampling response rate was 62.11%, with a margin of error of 4% for the sample as a whole, a confidence level of 95% (1.96 standard deviation) and maximum indeterminacy (P=Q=50%). Subsequently, the stratification was weighted to refine the respondent weights based on the population data of the final study universe. The reference data for the weighting coefficient were calculated using the variables "Nielsen area", "municipality size", "gender", and "age" from the latest wave of the Spanish General Media Study (EGM).

3. Analysis and results

The results were processed using IBM SPSS Statistics 24®. We first performed a descriptive statistical analysis of the survey's Likert scale variables, including calculating means and standard deviations. We also carried out a bivariate analysis to check the digital competence variables against the gender variable. For inference, we performed an independent samples T-test to determine whether there was any significant difference between two groups, with the significance level set at 5%. In what follows, we highlight key data relating to the respondents' autonomously self-reported skills. We also cover the knowledge items, focusing on the figures for knowing a lot or a fair amount. The remaining data are presented in the tables below.[1]

With regard to technical skills (Table 1), the results show that 73.4% of young people claim to know how to install/uninstall basic programs and applications without help. There is hardly any difference by gender in this regard (73.3% of women; 73.5% of men). Most young people report knowing how to browse the internet and use related services for everyday purposes, with 80.7% saying they can do this without help. Again, there is no significant difference by gender (80.7% of women; 80.9% of men).

Fewer young people appear to use content management platforms to produce multimedia publications, with only 26.6% claiming to know how to do this without help. We do not observe a relevant difference by gender in this respect. Meanwhile, 58.4% of the respondents say they know how to record, edit and upload video content to the internet without help. In terms of difference by gender, young women claim to be more competent in this regard than young men (60.6% vs 56.2%). As for sharing and distributing digital multimedia content, 69.7% of the young people surveyed say they can do this without help, with no relevant difference by gender (69.5% of women; 69.9% of men). A total of 66.6% of young people say they know how to work with others using digital collaboration tools without help; by gender, this breaks down to 65% of young women and 68.2% of young men. Only 27.8% of young people say they know how to set up digital services and use tools to increase online privacy and anonymity without needing help; by gender, this is 29.3% of young men compared to 26.3% of young women. In terms of knowing how to read and/or write computer code, only 19.2% say they can do this without help, with no relevant gender difference (19% of women; 19.4% of men). Similarly, few young people claim to know how to repair and/or service devices without help (25.5%). There is a gender difference here, with the scales tipped in favour of young men (32.6%) compared to young women (18.3%).

Table 1. Young people's technical skills by gender (%)

Technical skills / gender	Women			Men			Total		
	I know how to do this	I would know how to do this with help	I don't know how to do this	I know how to do this	I would know how to do this with help	I don't know how to do this	I know how to do this	I would know how to do this with help	I don't know how to do this
Install/Uninstall basic programs and applications for my needs	73.3	12.1	6.9	73.5	10.2	9.9	73.4	11.1	8.5
Browse the internet and use related services for everyday purposes	80.7	8.5	7	80.9	6.7	7	80.7	7.6	6.9
Use content management platforms to produce multimedia publications	26.9	16.8	31.5	26.4	25.7	31.4	26.6	21.3	31.5
Record, edit and upload video content to digital platforms	60.6	17.8	12.2	56.2	24.6	12	58.4	21.3	12.1
Share and distribute multimedia content across social media, platforms and mailing lists	69.5	12.8	8.4	69.9	9.3	13.8	69.7	11	11.2
Work with others using digital collaboration tools	65.0	14.7	11	68.2	14.4	11.9	66.6	14.5	11.4
Set up digital services and use tools to increase online privacy and anonymity	26.3	24.8	31.8	29.3	24.8	30.2	27.8	24.8	31
Read and/or write computer code	19	19.6	37.4	19.4	27.8	32.9	19.2	23.8	35.1
Repair and/or service devices	18.3	21.7	30.1	32.6	32	16.9	25.5	26.8	23.4

In terms of informational skills (Table 2), 49.4% of young people say they know how to check the reliability and truthfulness of information without help. Broken down by gender, 48.9% of young women

claim to have this skill, one percentage point lower than young men. Among young people, 54% say they know how to classify and filter information to suit their interests without help. By gender, more women report having this skill than men (55.1% vs 53%). A total of 69.9% of young people say they are able to find and save information for use when they need it. A considerable difference appears when this figure is broken down by gender: 73.3% of young women claim to have this skill compared to 66.7% of young men. With respect to social informational skills, 64.4% of the respondents say they know how to display self-control when interacting with others on social media and digital forums so as not to react impulsively. Regarding spotting so-called "trolls" in online discussions, 58.5% of the young people surveyed claim to have this skill (54.9% of women; 61.9% of men), while 47.3% report knowing how to tell when they are interacting with a bot (41.9% of women; 52.5% of men).

Table 2. Young people's informational skills by gender (%)

Informational skills / gender	Women			Men			Total		
	I know how to do this	I would know how to do this with help	I don't know how to do this	I know how to do this	I would know how to do this with help	I don't know how to do this	I know how to do this	I would know how to do this with help	I don't know how to do this
Check the reliability and truthfulness of information	48.9	21.6	16.3	49.9	23.5	18.8	49.4	22.6	17.5
Classify and filter information	55.1	19.7	15.5	53.0	17.6	21.3	54	18.6	18.4
Find and save information	73.3	9.6	8.5	66.7	14.6	14.4	69.9	12.2	11.5
Display self-control when interacting with others on social media and digital forums	64.4	9.8	14.7	64.3	13.9	15.4	64.4	11.9	15.1
Identify users who act in a provocative manner ("trolls")	54.9	12.7	17.3	61.9	15.2	16	58.5	14	16.7
Know when I am interacting with a bot	41.9	15.8	25.7	52.5	16.9	19.4	47.3	16.3	22.5
Manage the various profiles that make up my digital identity	71.2	8.7	11	66.4	17.3	11.8	68.8	13	11.5
Adapt my behaviour to the standards of each platform	67.7	9.3	12	68.7	11.1	12.1	68.2	10.2	12.1
Identify my needs and find tools and platforms to fulfil them	59.1	12.5	16.1	54.5	19.4	16.4	56.8	16	16.2
Participate in online deliberation and decision-making processes	49.0	17.8	17.7	42.1	25.7	19.5	45.5	21.8	18.7

According to this sample, 68.8% of young people (71.2% of women; 66.4% of men) are able to manage the various profiles that make up their digital identity. Meanwhile, 68.2% say they know how to adapt their behaviour according to the standards of each platform. By gender, men come in one point above women in this respect. Among the young people surveyed, 56.8% report being able to identify their needs and find tools and platforms to fulfil them without help; women claim to be more competent in this skill than men (59.1% vs 54.5%). Less than half of the young people in our sample (45.5%) say they are able to take part in online deliberation and decision-making processes; 17.6% say they know how to do this and could teach others, while 27.9% say they simply know how to do this alone. By gender, women again come out ahead (49.0% vs 42.1%).

In terms of critical knowledge (Table 3), 22.9% of the respondents say they know a lot or a fair amount about the basic features of digital services; men stand out considerably when this figure is broken down by gender (27.1% vs 18.5%). Of the young people surveyed, 33.6% say they know a lot or a fair amount about how technology companies use personal data, with men claiming to know more than women (38.4% vs 28.6%). Meanwhile, 18.7% of young people say they know a lot or a fair amount about laws dealing with issues related to digital technologies.

By gender, the percentage of men is higher in this respect, at 24.6% compared to 18.8% for women. Only 22.4% say they know a lot or a fair amount about the influence of technology companies on public policy, a figure that breaks down to 18.7% of women and 25.9% of men. Finally, 31.9% of young people say they know how the technological devices they use are manufactured; by gender, more men self-reported such knowledge than women (36.9% vs 26.8%).

Table 3. Young people's digital knowledge by gender (%)

Digital knowledge / gender	Women			Men			Total		
	A lot or a fair amount	An average amount	A little or nothing	A lot or a fair amount	An average amount	A little or nothing	A lot or a fair amount	An average amount	A little or nothing
The basic features of digital services	18.5	23.6	46	27.1	29.4	36.8	22.9	26.6	41.4
The use of personal data by technology companies	28.6	30.3	33.3	38.4	28.4	28.1	33.6	29.3	30.7
Laws dealing with internet-related topics and digital technologies	18.8	27.4	42.1	24.6	29.4	41	21.7	28.4	41.5
The influence of technology companies on policy	18.7	27.2	41.7	25.9	26.1	38.9	22.4	26.7	40.2
How technological devices are manufactured	26.8	29.8	30.4	36.9	31.2	27.1	31.9	30.5	28.6

3.1. Bivariate analysis

The results of the bivariate analysis[2] (Table 4) reveal trends indicating competence differences between men and women in two of the three dimensions. The technical skills dimension shows similar results by gender; men are self-reportedly more competent in five of the items while women, in the remaining four. However, the difference is more pronounced in the items favouring men, ranging from 11 to 44 percentage points. The largest gap is in the item on repairing and/or servicing devices. Meanwhile, the four items leaning in women's favour show a slighter difference of between 2 and 13 percentage points.

In terms of informational skills, women self-reported higher competence in almost all the items, with differences of between 7 and 26 percentage points in the mean scores. In addition, the results of the statistical T-test show significant differences by gender in two items in this dimension, namely in the ability to "find and save information for use when needed" (P=0.026, N=600) and to "display self-control when interacting with others on social media and digital forums so as not to react impulsively" (P=0.009, N=600).

In contrast, the results of the critical knowledge dimension show a tendency for men to be more knowledgeable. Indeed, they self-reported greater knowledge (from 11 to 33 percentage points) in all the survey items in this section, with the greatest gap existing in how much the respondents claim to know about the basic features of the digital services they use.

4. Discussion and conclusions

The 16-to-18-year-olds in our sample belong to Generation Z, a population group that frequently uses a variety of technological devices every day, which may lead to the assumption that they possess digital skills. However, as Darvin (2018) points out, such skills cannot be preconceived in terms of age alone; and as Porat et al. (2018) note, previous studies have shown that time spent online is only relevant when it comes to technical skills.

According to our findings, although young people's self-perceived competence in many of the technical skills is high (above 70%), there are still certain actions they report finding difficult to carry out, which gives us an answer to [RQ1]. This is a key point considering Van-Deursen et al.'s (2021) observation that technical skills are essential, for it is impossible to browse the internet or use mobile devices without them. Regarding the young respondents' self-perceived lack of knowledge on how to bolster their privacy (only 27.8% know how to use tools to increase privacy and anonymity online), Van-Deursen et al. (2021) note that this is a widespread feeling amongst users in the Internet of Things era, as "the collection, analysis and use of collected data is often not transparent to users, making it more difficult to make decisions about whether or not to use a smart device" (5).

Overall, in terms of technical skills, there are no significant differences between young women and men, except for the greater competence self-reported by young men in repairing devices. However, as Weston et al. (2019) argue, the need to improve the technical digital skills of girls and young women should not be dismissed, as this increases the likelihood that they will go on to pursue higher education in the traditionally male-dominated fields of science, technology, engineering, and mathematics (STEM).

Differences in informational skills may be linked to the ways in which people perceive and learn to use the internet, which can differ between age groups and work environments. Previous studies have suggested that this link is stronger in older age groups than in younger groups (Van-Deursen et al., 2014). According to previous research, cultural background and level of education have a significant effect, which

is stronger in technical skills, while gender shows a more defined impact on theoretical knowledge (Gui & Argentin, 2011; Vod et al., 2022). When broken down by gender, our results show that informational skills seem to be fairly balanced overall, although some differences are observed as we go further into detail. In all, young Spaniards believe they have higher technical and informational digital skills than critical digital knowledge, which validates [H1].

Low proficiency in certain skills is consistent with De-Vicente-Domínguez et al. (2022), who found that being a digital native does not necessarily mean possessing digital skills, as many young people display a number of deficiencies, such as a lack of knowledge of Boolean expressions and search commands and operators, and unfamiliarity with meta-search engines and specific directories. The authors recommend that teachers "provide students with useful digital resources to access reliable content of the subject taught, thus expanding their skills to access digital culture" (De-Vicente-Domínguez et al., 2022: 152).

In terms of critical knowledge by gender, men are self-reportedly much more knowledgeable than women in all the survey items in this section, which validates [H2]. These results do not bear out an actual knowledge gap between young men and women in Spain, as the data are based on the respondents' self-perceptions. However, given the contrast between male "superiority" in these sections and the relative predominance of young women in the digital skills analysed, these findings can be interpreted from the perspective that technology, as a social construct, is historically and culturally associated with the male gender and plays a key role in power relations between genders, reproducing patriarchal logic (Wajcman, 2010). In this regard, our results highlight the need and relevance of developing digital literacy education programmes that integrate, at their core, the approaches of feminist theories that address the issue of technology, in order to close the gender digital divide (Gurung, 2018).

Although previous literature frames our analysis within the second level of the digital divide, this paper offers a first glimpse into the digital skills and knowledge of Spain's younger population (16-18 years), as well as a stepping stone towards the third level of the digital divide, which involves harnessing the potential of digital capital to provide resources and training. By breaking this third level down by gender, we raise the possibility of linking digital capital and political capital (Ragnedda, 2016) through a critical digital pedagogy that combines digital skills and knowledge aligned with techno-feminism (Wajcman, 2004) or cyber-feminism, especially applied to educational settings (Mérida, 2019), both for the use of digital media as an extension of feminist activism (Sánchez-Duarte & Fernández-Romero, 2017) and for politicising digital technologies from a feminist perspective (Binder & García-Gago, 2020).

"Feminist internet research" (Perera, 2022), when approached from an intersectional perspective, provides tools to tackle the previously mentioned problems facing the public sphere. With respect to dataveillance, it proposes a structural approach that goes beyond personal privacy, shedding light on how surveillance intensifies among oppressed groups (Kovacs, 2017). Meanwhile, it questions the knowledge produced by datafication, studies the effects of its unequal distribution of power, and advocates the creation of pluralist epistemologies and policies (D'Ignazio & Klein, 2020). Regarding artificial intelligence, big data and the algorithms that govern the current media ecosystem, this approach calls out their biases and consequent reinforcement of inequalities, while proposing AI governance models that correct these biases and promote algorithmic justice (Peña & Varon, 2019).

The results of this research have implications in the design of future educational programmes for young people at the intersection of digital technologies and gender equality, viewing the binary gender approach used here as a limitation to be overcome by addressing the issues raised by queer theory in the field of media literacy in the digital environment (Van-Leent & Mills, 2017). While gender equality has been addressed in the context of formal education (Prendes-Espinosa et al., 2020), as a future line of research we suggest exploring the enormous potential of non-formal education and social education to apply this perspective, given the dynamic and fluid nature of young people's digital practices. Here the focus should not be so much on technical skills, but on the need to develop informational skills and critical knowledge, in line with the findings of studies such as Porat et al. (2018), Martinovic et al. (2019) and Jackman et al. (2021). Education in this respect must be continuous and cross-cutting so that it can adapt to the constant changes in the digital environment and make the public more competent for future working environments, as well as more socially, culturally, and politically egalitarian and participatory.

Notes

[1]In our presentation of the survey results, we have reduced the Likert scale from five to three variables, merging the options "I know how to do this and could teach others" and "I know how to do this by myself" as "I know how to do this" on one side and the options "I know what this is but I don't know how to do it" and "I don't know what this is or what it means" as "I don't know how to do this" on the other. Figures under the "Total" heading do not add up to 100% because the tables do not include instances where the respondent said that they did not know how to answer or did not answer at all.

[2]Table 4 is attached as supplementary material.

Authors' Contribution

Idea, E.E., M.M., D.A.; Literature review (state of the art), P.F.; Methodology, E.E., M.M., L.M.; Data analysis, L.M.; Results, E.E., M.M., L.M.; Discussion and conclusions, E.E., M.M., P.F.; Writing (original draft), E.E., M.M., P.F.; Final revisions, E.E., M.M., P.F., D.A.; Project design and sponsorship, D.A.

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