MOVING TOWARDS BETTER DIGITAL ACCESSIBILITY – CURRENT STATUS AND CHALLENGES

Marzena WÓJCIK-AUGUSTYNIAK[1*], Marek SZAJCZYK[2], Mariusz CIELEMĘCKI[3], Stanisław SZAREK[4]

[1] University of Siedlce, Faculty of Social Sciences; marzena.wojcik-augustyniak@uws.edu.pl,
ORCID: 0000-0001-5096-2863
[2] University of Siedlce, Faculty of Social Sciences; marek.szajczyk@uws.edu.pl,
ORCID: 0000-0002-0591-8174
[3] University of Siedlce, Faculty of Social Sciences; mariusz.cielemecki@uws.edu.pl,
ORCID: 0000-0002-3593-3455
[4] University of Siedlce, Faculty of Social Sciences; Stanislaw.szarek@uws.edu.pl,
ORCID: 0000-0003-1623-6379
* Correspondence author

Purpose: This article aims to identify the current challenges faced by various stakeholder groups in increasing digital accessibility in EU countries.

Design/methodology/approach: The main assumption of this article is that in order to enhance the level of digital accessibility, it is necessary to take not only legal actions but also engage in social and training initiatives. The basic research problem is: What challenges related to acquiring new competencies are currently being faced by stakeholders involved in ensuring website accessibility. The research was based on quantitative data collection methods.

Findings: The results of quantitative research based on 432 surveys collected among project stakeholders in four countries: Slovenia (N = 173), Poland (N = 135) Greece (N = 89) and Spain (N = 35) shows that IT/Web development professionals, young adults, and those with higher education are more knowledgeable about accessibility standards and regulations. Preferences for additional training on web accessibility varied, with uniform importance placed on international certification. Training plans were positively correlated with occupation, particularly among IT professionals, but showed no correlation with age, country, education level, or employment status.

Research limitations/implications: Implications resulting from the conducted research include both social and practical aspects. Socially, the findings highlight the need to engage non-IT professionals and older individuals in digital accessibility training to ensure broader inclusion. Practically, the research points to the necessity of developing comprehensive training programs and certification standards, as well as streamlining recognition systems for digital accessibility qualifications, to enhance overall digital competency and inclusion.

Originality/value: The value and originality of this article lie in its dual focus on the legal and social dimensions of digital accessibility, particularly within the European Union. It provides a comprehensive analysis of the current challenges faced by stakeholders in ensuring website

accessibility, emphasizing the necessity of both regulatory measures and practical training initiatives.

Keywords: digital accessibility, digital inclusion, digital accessibility skills, digital accessibility professions.

Category of the paper: scientific research.

1. Introduction

In the digital era, where technology permeates every aspect of our lives, ensuring equal access to digital content and services for all people is of paramount importance. This is where the concept of digital accessibility comes into play. Digital accessibility refers to the design and development of digital information that can be accessed and used by people with disabilities, providing them with equal opportunities to use online content and services. The current status of digital accessibility reveals both progress and challenges. On the other hand, there is also growing awareness and recognition of the importance of accessibility in the digital space.

Some laws and regulations, such as the Web Accessibility Directive – WAD (European Union, 2016) in the European Union, Americans with Disabilities Act – ADA (1990) in the United States and the Web Content Accessibility Guidelines – WCAG (W3C, 2004) internationally, have been established to enforce accessibility standards and promote inclusive design practices. As a result, many organizations are beginning to prioritize accessibility, understanding that it not only fulfils legal obligations but also opens up new markets and improves user experiences for a broader group of recipients. However, despite the progress made, there are still significant challenges for new IT professionals entering the field of digital accessibility. One key challenge is the need for specialized knowledge and skills and one of the answers to such a challenge was the Certified Digital Accessibility Training (DigitalAccessibility) project implemented under the Erasmus+ Program: KA2 - Cooperation for innovation and the exchange of good practices, type of action: KA202 - Strategic partnerships for vocational education and training. As part of the project, extensive quantitative research was carried out in four countries of the European Union: Slovenia, Poland, Greece and Spain.

This article aims to identify the current challenges faced by various stakeholder groups in increasing digital accessibility in EU countries.

The article attempts to illustrate the importance of not only targeted digital accessibility training, but also the establishment of robust recognition systems and social initiatives to address the shortage of skilled experts and improve overall digital competence in society. This study is particularly relevant for policy makers, educators, IT professionals and organisations concerned with increasing digital inclusion.

2. Digital inclusion and digital accessibility

### 2.1. Legal basis of Digital Inclusion

Living in an era of ubiquitous access to goods and services, both physical and digital, benefits individuals and organizations alike. However, while the digital world offers convenience to many, it poses significant barriers for some, hindering their social participation and inclusion. International organizations have developed directives and standards to address this issue, rooted in principles of equality and human rights. The Universal Declaration of Human Rights asserts the right to freedom of expression and access to information (United Nations, 1948). The 2030 Agenda for Sustainable Development emphasizes the commitment to leaving no one behind (United Nations, 2015). The Convention on the Rights of Persons with Disabilities highlights accessibility in the digital realm (United Nations, 2007). The Web Accessibility Directive aims to make public sector websites and mobile apps more accessible (European Union, 2016). Despite efforts, a 2023 review showed minimal impact, necessitating stronger enforcement (European Union, 2023). Lack of supervision and sanctions for non-compliance lead to low motivation for implementation, making digital accessibility training essential. Such initiatives align with Europe's growth and sustainability strategies (European Commission, 2020), including the EU Green Deal (European Union, 2019). Improving digital accessibility fosters social inclusion, aligning with the Green Deal's vision of a sustainable society.

2.2. Digital inclusion as a part of social inclusion of people with disabilities

As per the European Parliament (Media Access Australia, 2014), only one-third of EU public sector websites complied with basic accessibility standards, leaving over 167 million citizens struggling to access online services. The 2022 evaluation may indicate improved compliance with the 2016 Directive, yet challenges persist for people with disabilities, leading to social exclusion (European Union, 2022). Social inclusion for disabled and elderly individuals encompasses access to employment, leisure, and social life (Rankin, 2005; Spandler, 2007). While physical access has improved, a 2018 audit in Poland revealed shortcomings in government efforts (NIK, 2018).

In today's digitized society, access extends to the digital realm, where "digital inclusion" means unrestricted access for all (NIK, 2018). Essential ICT infrastructure, including broadband, facilitates this access. Figure 1 illustrates the rate of change in access to broadband connections per 100 people in selected European Union countries from in 2010 to 2021. Considering the upward trend in this pace over the analysed years, it can be concluded that more and more people will be able to use the Internet in the future. Consequently, the creation of accessible websites will play an increasingly vital role in the digital inclusion of individuals who rely on it.
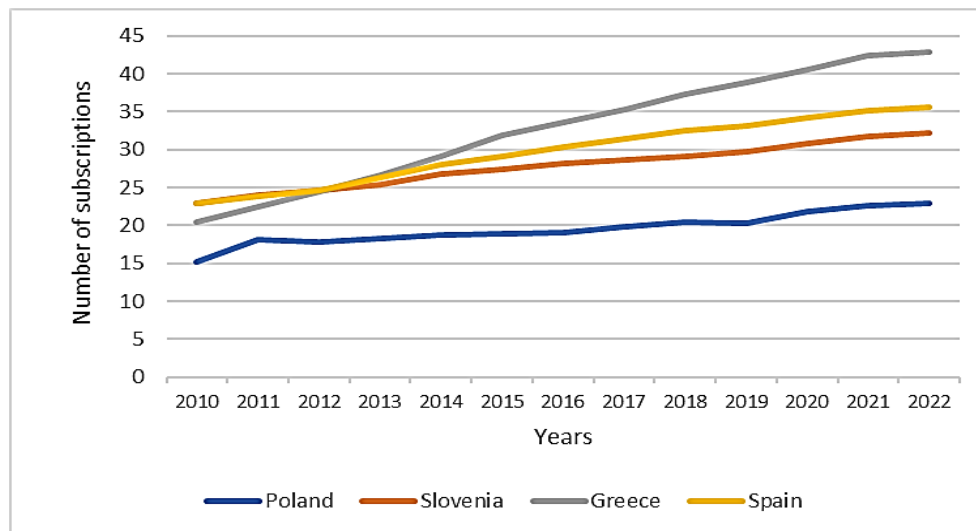
Figure 1. Fixed broadband subscriptions (per 100 people) - Poland, Spain, Slovenia, Greece in 2000 – 2021.

Source: own study based on data from World Bank (World Bank, 2023).

Figure 2 depicts the upward trend in the number of individuals using the internet to interact with public authorities in the analysed countries. Consequently, it can be inferred that in the future, the percentage of people using the Internet to communicate with public entities will continue to rise. This underscores the growing importance of creating their websites in an accessible manner.
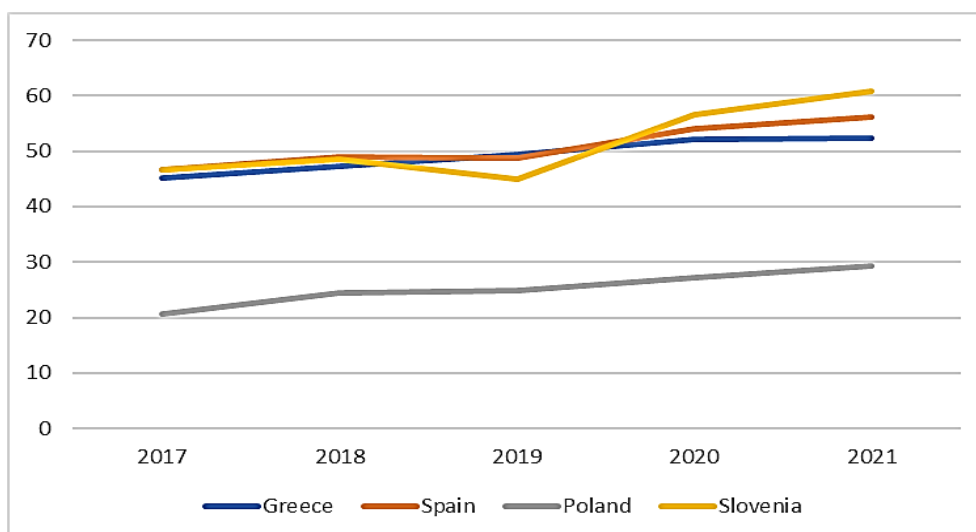
Figure 2. Individuals using the internet for interacting with public authorities in 2017-2021.

Source: own study based on (European Commission, 2023).

However, it's crucial to emphasize that digital inclusion is not solely a matter of the availability of tools (hardware, software, and Internet) (OECD, 2022; Fung et al., 2023). It also depends on users' proficiency in using these tools. Proficiency in navigating digital technologies, comprehending online content, and effectively utilizing digital tools are essential for individuals to fully participate in the digital world. Therefore, digital skills play a pivotal role in digital inclusion. Regrettably, significant disparities in these skills exist among different

populations, particularly among older adults (Kärnä et al., 2022), people with disabilities, and those with limited educational opportunities (Beaunoyer et al., 2020; Nguyen,et al., 2021). Moreover, differences in digital skills based on one's place of residence, whether in urban or rural areas, (OECD, 2021), and disparities between low- and high-income households across countries (Notley & Aziz, 2024) should also be taken into consideration.

Given that contemporary life unfolds in both the physical and digital realms concurrently, the subject of digital inclusion holds immense importance. Navigating this digital reality has become a matter of "to be or not to be included" in normal social and professional life. Hence, many authors address the issue of digital inclusion and exclusion concerning disabled and elderly individuals in their research and publications (Verdegem, 2011; Hill et al., 2015; Costi Santarosa, Conforto, 2016; Tsatsou, 2020; Lin et al., 2018; Martínez-Alcalá et al., 2018).

2.3. Digital Accessibility

To reduce digital exclusion and social exclusion among vulnerable populations, it's crucial to implement measures for digital space access. Approximately 87 million EU citizens have some form of disability, a number expected to rise due to population aging (European Commission, 2023). Accessibility is thus vital for ensuring their equal participation and contributing to smart, sustainable, and inclusive growth (European Commission, 2015). But what does digital accessibility entail? In general, it means being "easy to understand, assimilate; comprehensible, accessible" (Polish Language Dictionary, 2021). For websites, it's about creating sites accessible to a wide audience, particularly those prone to exclusion, like those with disabilities or lower education levels (Wikipedia, 2023). Accessibility ensures equal opportunities, just as it's unjust to hinder building access due to mobility issues; it's wrong to exclude due to hearing, vision, or cognitive impairments (mozilla, 2023). Accessibility refers to how easily persons with disabilities or special needs can access products, services, or environments. Digital accessibility focuses on technology, including hardware and software (Kulkarni, 2019). The European Accessibility Act mandates accessibility for various products and services, including computers, e-books, e-commerce platforms, and mobile apps (European Union, 2019). Achieving this requires adherence to specific guidelines detailed in Annex WCAG 2.1.

Web accessibility standards first emerged in 1999 with the release of WCAG 1.0. Since then, they undergone two updates: in 2016 (WCAG 2.0) and 2018 (WCAG 2.1). As of 2023, a draft version of WCAG 2.2 has been made available (W3C, 2023). According to data from W3C WAI website and the Scopus database, between 1999 and mid-2023, issues related to WCAG standards were discussed in 2,273 articles.

Since the release of the first version, the guidelines and success criteria of the WCAG standards have been structured around four fundamental principles that serve as the foundation of web accessibility: *perceivable*, *operable*, *understandable*, *and robust* (W3C, 2023).

The primary objective of efforts related to Digital Accessibility is to develop web content that is perceivable, operable, understandable by the broadest possible audience, and robust while also being compatible with a wide range of assistive technologies, particularly screen readers (W3C, 2004; W3C WAI, 2019). Perceivable entails presenting information and user interface components in a manner that users can perceive through one or more of their senses. Operable means that users should have the capability to interact with the website and all its features. Understandable involves ensuring that web content and usage are easily comprehensible. Robust signifies that websites should function reliably across various technologies and be prepared for emerging technologies (University of Minnesota, 2021; mozilla, 2023).

Research conducted in numerous countries among individuals with disabilities has revealed various issues concerning the accessibility of existing websites (Kulkarni, 2019; Ismail, Kuppusamy, 2019).

2.4. Digital accessibility skills - challenges for new professions

One of the significant challenges associated with the digital inclusion of people with disabilities and the elderly is to create facilities that enable them to navigate the digital world as effectively as possible

Despite the implementation of the Directive, which obliges all public organizations to create web content in an accessible manner (EU Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016), a mandatory number of public institution websites do not adhere to accessibility standards. The latest evaluation by WAD has revealed this situation in various EU countries (European Union, 2023).

One of the reasons contributing to this unfavourable state may be the scarcity of individuals with the necessary skills to create and design accessible web content in the job market. Addressing this skills gap is achievable by preparing individuals capable of creating and designing websites in an accessible manner.

The response to the demand for individuals proficient in creating accessible web content was the project titled *Certified Digital Accessibility Training* (DigitalAccessibility).

It's worth noting that, at the time of the project's inception, digital accessibility professions were already present in the labour markets, primarily in the United States and Australia (WebAxe, 2019; Šumak et al., 2019). Today the number of digital accessibility jobs in Europe is on the rise. According to Europe's largest job offer database, EURES, there were 144 accessibility-related job vacancies in the information and communication sector as of July 12, 2023 (European Commission, 2023).

Digital Accessibility poses numerous challenges for those involved in designing, creating, and administering websites. A. Ismail and K.S. Kuppusamy emphasize that "awareness about web accessibility is the initial step for web developers and designers to design and develop accessible websites" (Ismail, Kuppusamy, 2019).

As part of the Certified Digital Accessibility Training project, specific competency areas in the field of digital accessibility were identified for two existing professions, enriched with Digital Accessibility skills: Web Developer with expertise in Digital Accessibility and Web Designer with expertise in Digital Accessibility. Additionally, two non-technical professions were identified: Digital Accessibility Manager and Digital Accessibility Tester. A comprehensive description of the skills required for each of these professions was presented in the project reports (Digital Accessibility, 2019). It's important to recognize that accessible web content is not solely the responsibility of website authors. In various types of organizations, the success of accessibility also hinges on its integration into the organizational culture, existing processes, and practices. This entails aligning digital accessibility with existing organizational approaches, setting clear and measurable goals, and involving stakeholders to ensure understanding and support throughout the organization. Hence, it is crucial for all involved parties to possess skills related to digital accessibility (W3C, 2011). It should be noted that in terms of the availability of training and courses in the field of digital accessibility for professionals, there have been significant developments. As of July 2023, according to data published on the W3C website, there were 80 courses, training and certifications on digital accessibility are offered from various providers in 17 countries. Among them, there are 66 training courses, 6 professional certifications, 2 graduate/undergraduate programs and 6 others. Considering the audiences, the courses/training are: 36 for content writers, 38 for designers, 41 for developers, 25 for managers, 37 for testers, 38 general and 21 others. Among them, there are 59 courses at basic level and 21 at intermediate level, in face-to-face (4), online (45) and hybrid (31) formats. Some of these are free/non-fee, with certificates to purchase (9); paid, with a reduced fee for some (14) and 57 (W3C WAI, 2022).

3. Methodology and characteristics of the research sample

3.1. Development of hypotheses

The basic research problem is: What challenges related to acquiring new competencies are currently being faced by stakeholders involved in ensuring website accessibility? To address this problem, three specific research questions were formulated:

RQ1. What is the relationship between stakeholders' level of awareness and knowledge of digital accessibility and their occupation, age, country, level of education and employment status?

RQ2. What is the relationship between stakeholders' level of competence in the field of digital accessibility and their occupation, age, country, level of education and employment status?

RQ3. What is the relationship between stakeholders' training plans to increase (acquire new) digital accessibility skills and their occupation, age, country, level of education and employment status?

The research objective of this article is to identify the current status and challenges faced by stakeholders involved in ensuring web accessibility.

The results of the research conducted under the DIGITAL ACCESSIBILITY project have allowed for the verification of the main hypothesis, which posits that to increase the level of digital inclusion, website accessibility training activities should be pursued. These training activities will enable individuals to enhance or acquire the new digital accessibility skills necessary to ensure digital accessibility.

In line with the research questions, the following research hypotheses have been formulated:

H1: There is a positive relationship between stakeholders' level of awareness and knowledge of digital accessibility and their occupation, age, country, level of education, and employment status.

H2: There is a positive relationship between stakeholders' level of competence in the field of digital accessibility and their occupation, age, country, level of education, and employment status.

H3: There is a positive correlation between stakeholders' training plans to enhance or acquire new digital accessibility skills and their occupation, age, country, level of education, and employment status.

3.2. Data collection

The research component of the *Certified Digital Accessibility Training project* was based on quantitative data collection methods. The survey questionnaire was developed with the assistance of the online tool "1KA OneClick Survey" (1ka Online Survey, 2019) and was distributed to interested stakeholders, such as marketing and PR specialists, IT specialists, web content authors, etc. through email and social networks such as Facebook and LinkedIn. The questionnaire was made available in five language versions: Slovenian, Greek, Spanish, Polish and English. It was sent to stakeholders in four countries: Slovenia, Spain, Greece and Poland. The questionnaire consisted of 49 questions with different types of response scales, including those with only one possible answer (e.g. Likert scale) or with several possible answers. All questions were grouped in three main areas: I - *Awareness and proficiency in online content accessibility*; II - *Current practices*; III - *Learning preferences and stakeholder training related to the digital accessibility of web content* (Digital Accessibility, 2019).

3.3. Research sample

Initially, a total of 3,049 respondents participated in the survey. However, during the initial stages 2,616 of them discontinued their participation. It is highly likely that the complexity and length of the questionnaire, which took approximately 30 minutes to complete, contributed to

this dropout rate. In the final stage of the survey, aa additional 191 individuals withdrew their participation. Ultimately, 244 participants completed the survey, providing responses to all the questions. Consequently, all percentage analyses for specific questions pertain to the number of participants who responded to that particular question, not to the initial total number of participants, unless otherwise stated. Among those who answered all the questions, 60% (N = 148) were men, 32.4% (N = 79) were women, and 7% (N = 17) chose not to indicate their gender.

For a more comprehensive view of the respondents, including their occupational field and language preferences, please refer to Table 1.

Table 1.
Field of occupation and respondents' language

Field of occupation or studies	Slovene	Polish	Greek	Spanish	English	Total
IT/Web development/programming	125	24	31	10	0	190
Design/web design	22	2	14	7	0	45
Management	3	25	10	7	2	47
PR/marketing	10	6	5	1	1	23
VET teaching/training	0	16	20	1	0	37
Other	13	62	9	9	0	93
Total	**173**	**135**	**89**	**35**	**3**	**435**

Source: own study based on the Stakeholder Survey for Digital Accessibility report (Digital Accessibility, 2019).

It's important to note that the overwhelming majority of respondents, accounting for 80.3% (N = 196), fell within the age bracket of up to 44 years. For a more detailed breakdown of respondent age distribution, please refer to Figure 3.
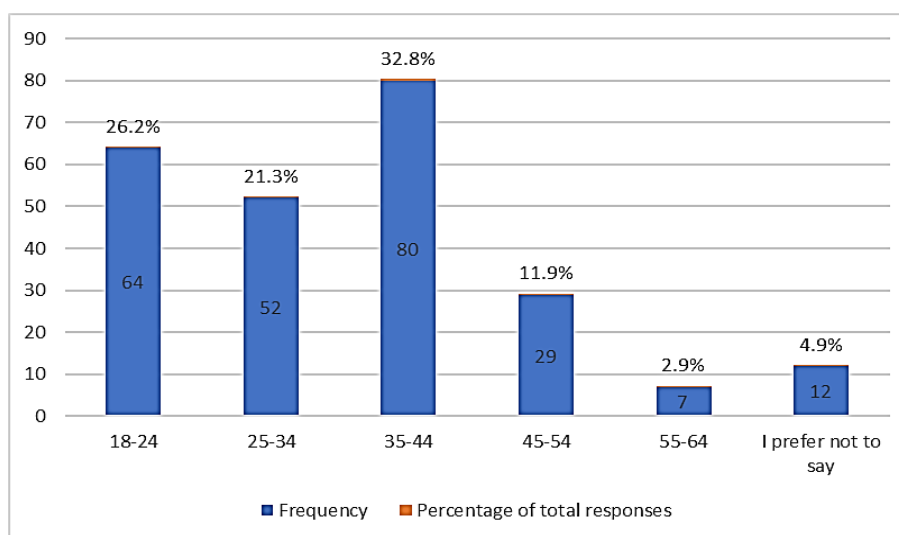
Figure 3. Percentage and number distribution of respondents according to the age.

Source: own study based on the Stakeholder Survey for Digital Accessibility report (Digital Accessibility, 2019).

The percentage and number distribution of respondents by country of origin is illustrated in Figure 4.
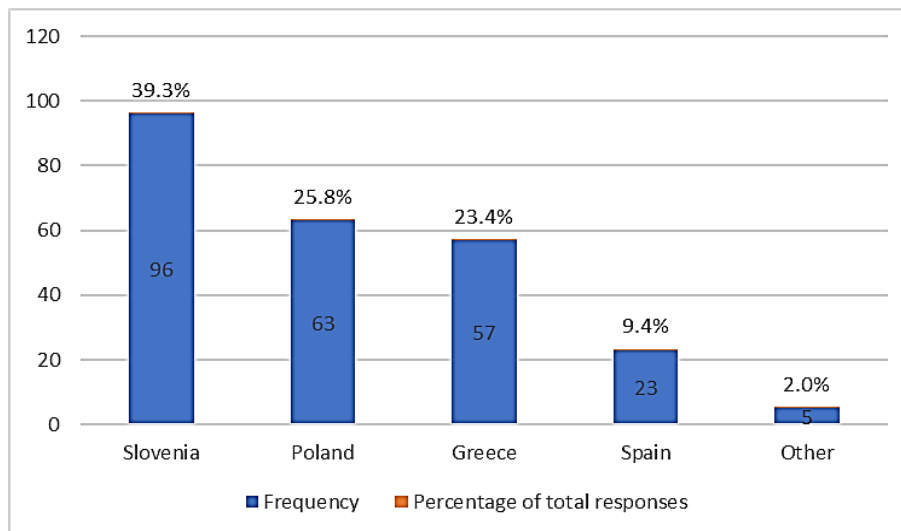
Figure 4. Percentage and number distribution of respondents according to country of origin criterion.

Source: own study based on the Stakeholder Survey for Digital Accessibility report (Digital Accessibility, 2019).

The level of education of the respondents, assessed according to categories based on the ISCED International Standard Classification of Education (UNESCO Statistical Institute, 2011) is presented in Table 2.

Table 2.
Level of education of respondents according to the ISCED classification

Respondents' level of education	Frequency	Percent
ISCED level 3 – Upper secondary education	30	12.3
ISCED level 4 – Post-secondary non-tertiary education	28	11.5
ISCED level 5 – Short-cycle tertiary education	11	4.5
ISCED level 6 – Bachelor's or equivalent level	75	30.7
ISCED level 7 – Master's or equivalent level	83	34.0
ISCED level 8 – Doctoral or equivalent	12	4.9
Other	5	2.0
Total	**244**	**100.0**

Source: own study based on the Stakeholder Survey for Digital Accessibility report (Digital Accessibility, 2019).

Table 3 provides an overview of the employment status of the respondents.

Table 3.
Respondents' employment status

Employment status	Frequency	Percent
Student	63	25.8
Employed	166	68
Unemployed	8	3.3
Other (freelancer, self-employed, contract worker, student and employee)	7	2.9
Total	**244**	**100**

Source: own study based on the Stakeholder Survey for Digital Accessibility report (Digital Accessibility, 2019).

The majority of respondents who completed the entire survey (N = 244) were employed, making up 68% (N = 166) of the total. Students accounted for 25.8% (N = 63), while the unemployed represented 3.3% (N = 8), and 2.9% (N = 7) did not fit into any of the specified employment categories. Of those employed, 50.6% of survey participants (N = 84) worked in the public sector, and 53.6% (N = 89) in the private sector (7 participants worked for both private and public companies). In terms of enterprise size, 27.1% of participants (N = 45) were employed in micro-enterprises, 19.9% (N = 33) in small enterprises, 24.7% (N = 41) in medium enterprises, and 28.3% (N = 47) in large enterprises.

4. Results

The results of quantitative research presented in this part are based on 432 surveys collected among project stakeholders in four countries: Slovenia (N = 173), Poland (N = 135) Greece (N = 89) and Spain (N = 35).

4.1. The level of awareness and knowledge about digital accessibility in the selected European Union countries

Table 4 shows the results from the I part of the Survey on the level of awareness of digital accessibility. For the purpose of this article, the focus was on the responses for four questions: Q1_2: How well are you familiar with the concept of web accessibility? Q2: How important is it to provide accessibility to the web in your opinion? Q3: Are you aware of the EU directive 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies? Q4: Are you aware of any other national or international directive/legislation about web accessibility?

Table 4.
Survey results regarding the level of awareness and knowledge about digital accessibility in the selected European Union countries

Variable	Median	St. Deviation	Variance	Minimum	Maximum
Slovenia					
Q1_2	4	1.994	3.975	1	5
Q2	4	2.158	4.659	1	5
Q3	1	1.68	2.823	1	5
Q4	2	1.633	2.667	1	3
Poland					
Q1_2	4	2.576	6.636	1	5
Q2	4	2.917	8.507	1	5
Q3	2	2.474	6.122	1	5
Q4	2	2.257	5.096	1	3

Cont. table 4.

Greece					
Q1_2	3	1.651	2.724	1	5
Q2	5	1.693	2.866	1	5
Q3	3	1.617	2.614	1	5
Q4	2	1.206	1.454	1	3
Spain					
Q1_2	4	1.931	3.728	1	5
Q2	5	1.88	3.534	1	5
Q3	3	1.9	3.61	1	5
Q4	2	1.577	2.487	1	3

Q1_2: 1 - Not familiar at all (have never heard of it), 2 - Not familiar, 3 - Somewhat familiar, 4 - Familiar, 5 - Very familiar.

Q2: 1 - Not important at all, 2 - Not important, 3 - Somewhat important, 4 - Important, 5 - Very important.

Q3: 1 - I have never heard of it, 2 - I have heard of it, 3 - I have some basic knowledge, 4 - I know it, 5 - I know it very well.

Q4: 1 - Yes, 2 - No, 3 - I don't know/I don't remember.

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019).

From the results presented in Table 4, it can be concluded that the values of the standard deviation for Slovenia, Greece and Spain do not show large differences. On the other hand, significant differences were observed in the case of data obtained in Poland. This proves that respondents from Poland gave more extreme answers in their opinions.

Table 5.
Spearman rank order correlations - the level of awareness and knowledge about digital accessibility in the selected European Union countries

Variable	Means	Std. Dev.	Occupation (Q1)	Age (Q25)	Country (Q26)	Level of education (Q27)	Employment status (Q28)
Q1_2	3.623	0.873	-0.064	0.035	-0.007	0.108	0.012
Q2	4.443	0.623	0.189	0.065	-0.047	-0.030	-0.126
Q3	2.373	1.157	0.400	0.263	-0.027	0.112	-0.119
Q4	2.225	0.631	-0.114	-0.150	-0.156	-0.161	-0.028

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019) (Note: Marked correlations are significant at p <,05000).

Considering the results of the correlation analysis (Table 5), it can be concluded that: first, people in the IT/Web development/ programming field of occupation consider that it is important to ensure the accessibility of online content and have better knowledge of EU Directive 2016/2102 on the accessibility of public sector bodies' websites and mobile applications compared to other professions (Q2, Q3). Spearman's rank correlation coefficient for the variables Q2, Q3 and occupation is 0.189 and 0.400, respectively. Second, 18-24 and 25-34 year old are more aware of national or international regulations on online content accessibility than representatives of other age groups (Q3). The Spearman rank correlation coefficient for the Q3 variable and age is 0.263. However, no correlations were observed between respondents' country of origin, employment status and level of education and Q1_2, Q2, Q3, Q4.

4.2. The current level of competence in the field of digital accessibility

Table 6 shows the results of the second part of the survey on current practices. For the purposes of this article, the focus was on responses to three questions: Q5a - Do you know the WCAG 2.0 web accessibility standard? Q5b - Do you know the WCAG 2.1 web accessibility standard? and Q6 - How proficient do you feel you are in web accessibility?

Table 6.
Survey results regarding the current level of competence in the field of digital accessibility

Variable	Median	St. Dev.	Variance	Minimum	Maximum
Slovenia					
Q5a	1	1.549	2.401	1	5
Q5b	1	1.518	2.305	1	5
Q6	3	2.084	4.344	1	5
Poland					
Q5a	2	2.678	7.174	1	5
Q5b	1	2.412	5.817	1	5
Q6	3	2.772	7.681	1	5
Greece					
Q5a	2	1.689	2.851	1	5
Q5b	2	1.655	2.74	1	5
Q6	3	1.735	3.01	1	5
Spain					
Q5a	2	2.351	5.526	1	5
Q5b	2	2.203	4.852	1	5
Q6	3	2.265	5.129	1	5

Q5a/Q5b: 1 - I have never heard of it, 2 - I have heard of it, 3 - I have some basic knowledge, 4 - I know it, 5 - I know it very well.
Q6:1 - Not proficient at all, 2 - Not proficient, 3 - Somewhat proficient, 4 - Proficient, 5 - Very proficient.

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019).

From the results presented in Table 6, it can be concluded that in terms of the availability of online content, respondents from Spain and Poland showed more extreme opinions (they know or do not know at all) compared to Greece and Slovenia, where the respondents' answers were not so extreme. Moreover, the knowledge of WCAG 2.0 and WCAG 2.1 is lower in Slovenia than in the other surveyed countries. Whereas the lowest level of proficiency in web accessibility is among respondents from Greece, and the highest among ones from Poland. In turn, there is a similar average level of proficiency among people from Slovenia and Spain.

Table 7.
Spearman rank order correlations - the current level of competence in the field of digital accessibility

Variable	Means	Std. Dev.	Occupation (Q1)	Age (Q25)	Country (Q26)	Level of education (Q27)	Employment status (Q28)
Q5a	2.131	1.260	0.474	0.317	-0.060	0.227	-0.081
Q5b	1.889	1.085	0.397	0.293	-0.044	0.172	-0.020
Q6	3.045	0.913	0.041	0.145	-0.037	0.050	0.167

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019) (Note: Marked correlations are significant at $p < 0.05000$).

Considering the results of the correlation analysis (Table 7), it can be concluded that those in the IT/web development/programming fields of occupation are more familiar with WCAG 2.0 and WCAG 2.1 than respondents from other fields of occupation or study. The Spearman's rank correlation coefficient for the variables Q5a, Q5b and occupation is 0.474 and 0.397, respectively. Those aged 18-24 and 25-34 are more familiar with WCAG 2.0 and WCAG 2.1 than representatives of other age groups. Spearman's rank correlation coefficient for the variables Q5a, Q5b and age is 0.317 and 0.293, respectively. Those with higher levels of education (ISCED levels 6, 7, 8) are more familiar with WCAG 2.0 and WCAG 2.1 web content accessibility standards than those with educational levels below ISCED level 5 (Q5a, Q5b). The Spearman rank correlation coefficient for the variables Q5a, Q5b and level of education is 0.227 and 0.172, respectively. For Q6, no correlation was observed between the analysed variables.

4.3. The employees' plans to improve their digital accessibility competence

Table 8 shows the results for the three questions from Part III of the Survey: Q18a - Do you think it is important for your work to gain some additional knowledge in web accessibility? Q22 - If you were to join a web accessibility training/course, how long would you prefer it to be? And Q23 - Is it important to you that the web accessibility training/course that you would take was (internationally) certified?

Table 8.
Survey results regarding the employees' plans to improve their digital accessibility competence

Variable	Means	Std. err.	Median	St. Deviation	Variance	Minimum	Maximum
Slovenia							
Q18a	3.600	0.177	4.000	0.968	0.938	1	5
Q22	2.100	0.268	2.000	1.470	2.162	1	7
Q23	1.667	0.161	1.000	0.884	0.782	1	3
Poland							
Q18a	3.786	0.166	4.000	0.876	0.767	2	5
Q22	2.464	0.339	2.000	1.795	3.221	1	7
Q23	1.536	0.150	1.000	0.793	0.628	1	3
Greece							
Q18a	4.091	0.285	4.000	0.944	0.891	3	5
Q22	1.818	0.296	2.000	0.982	0.964	1	4
Q23	1.273	0.195	1.000	0.647	0.418	1	3
Spain							
Q18a	3.867	0.114	4.000	0.991	0.982	1	5
Q22	2.800	0.171	3.000	1.480	2.189	1	7
Q23	1.400	0.078	1.000	0.678	0.459	1	3

Q18a: 1 - Not important at all, 2 - Not important, 3 - Somewhat important, 4 - Important, 5 - Very important.
Q22: 1 - A day or two, 2 - One week, 3 - Two weeks, 4 - A month or two, 5 - six months/half a year, 6 - One year, 7 - Other.
Q23: 1 - Yes, 2 - No, 3 - I don't know.

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019).

From the results presented in Table 8, it can be concluded that acquiring some additional knowledge on web accessibility is equally important for respondents from all countries (Q18a). Regarding the duration of additional training on web accessibility, respondents from Spain, Poland and Slovenia are interested in either long or short training - opinions are more polarized, while responses from Greece are more uniform in this regard and point to monthly or bi-monthly training duration of such courses (Q22). Moreover, for respondents from all countries, it is equally important that web accessibility training was (internationally) certified (Q23).

Table 9.
Spearman rank order correlations - the employees' plans to improve their digital accessibility competence

Variable	Means	Std. Dev.	Occupation (Q1)	Age (Q25)	Country (Q26)	Level of education (Q27)	Employment status (Q28)
Q18a	3.791	0.952	0.170	-0.002	-0.025	0.009	-0.043
Q22	2.463	1.683	0.424	0.079	-0.075	-0.020	-0.111
Q23	1.525	0.777	-0.185	0.064	0.007	0.035	0.012

Source: own study based on the Stakeholder Survey (Digital Accessibility, 2019) (Note: Marked correlations are significant at p <,05000).

Considering the results of the correlation analysis (Table 9), it can be concluded that respondents' training plans to increase (acquire new) digital accessibility skills Q18a, Q22 and Q23) are positively correlated only with their occupation. People with an IT/web development/programming field of occupation are interested in the development of web content accessibility and visual design of websites, taking into account the principles of web content accessibility (Q18a). It is also important for them that the training would last for 1-2 days (Q22) and internationally certified (Q23). Spearman's rank correlation coefficient for variables Q18a, Q22 and Q23 and occupation is 0.170, 0.424 and 0.185, respectively. However, there is no correlation between questions Q18a, Q22 and Q3 and respondents' age, country of origin, level of education or employment status.

5. Discussion

To achieve full inclusion of individuals with disabilities in the digital space, it is essential to create online content that is accessible to people with various disabilities. This article's main premise is that increasing digital accessibility in European Union countries requires not only legal measures but also social and training initiatives.

Legal actions have been taken through the introduction of Directive (EU) 2016/2102 by the European Parliament and the Council on the accessibility of public sector websites and mobile applications, as well as the European Accessibility Act in 2019 (EAA). These directives mandate that both public and private entities adhere to accessibility principles, including digital accessibility.

However, as discussed in this article, the implementation of these provisions still faces challenges. These challenges include issues with Internet access in certain regions (Eurostat, 2023), low digital competence in specific social groups, in terms of age, disability, economic reasons, etc. (Pérez-Escolar, Canet, 2023) and a shortage of digital accessibility experts (European Union, 2022). Additionally, the lack of official skill-certification systems in most Member States hinders the identification of appropriately trained experts and the assessment of auditors' expertise. Monitoring bodies often rely on the expert's professional experience rather than formal qualifications (European Union, 2022).

It's worth noting that globally, the Internet user base has expanded significantly, with over 1 billion new Internet users added in the last five years, and the COVID-19 pandemic has further accelerated Internet adoption, with an estimated 466 million new Internet users in 2020 (ITU, 2022).

By 2021, the share of individuals using the internet in the EU had risen to 90%, some 20 percentage points higher than in 2011. In 2022, the share of individuals interacting online with public authorities in the EU had risen to 63% (for 25 to 64 years old) and 38% (for 65 to 74 years old) 57 from 48% and 17% respectively in 2012 (European Union, 2022).

Addressing the challenges arising from the expanding internet user base requires a combination of technical expertise, ongoing learning, collaboration, and a deep understanding of accessibility principles. New professionals entering the digital accessibility field should seek training opportunities, stay updated with industry advancements, collaborate with experienced accessibility experts, and engage with the broader accessibility community. In addition to professional training, training citizens in digital competencies is a vital aspect of the knowledge society (Morte-Nadal, Esteban-Navarro, 2022).

Apart from training initiatives also social activities, often overlooked but with significant potential for change, can greatly enhance digital inclusivity. Among the initiatives undertaken by communities and individuals, noteworthy initiatives include awareness campaigns - organized by communities - aimed at educating the public about the importance of digital accessibility. These campaigns can be as simple as sharing informative posts on social media or conducting workshops within neighbourhoods.

It is especially worth paying attention to initiatives led by users with disabilities who often take the initiative in organizing events and activities that highlight their challenges and successes in navigating the digital world. By sharing their experiences, they can foster understanding and empathy among the wider community (Integracja.org, 2023).

Mentoring programs also play an important role among social activities, in which people with technical knowledge will mentor people less familiar with digital technologies. Such personalized guidance can brighten up the digital world and enable individuals to use technology effectively. Valuable social initiatives also include: digital inclusion workshops for seniors, who often face barriers in using digital technologies. Such a workshop can be tailored to their needs and teach them basic digital skills, online safety or how to access relevant resources. More and more often initiatives such as Accessible Gaming Tournaments or Adaptive Esport Tournaments are also organized. Accessible games and esports not only promotes inclusion but also showcases the importance of accessible design in the gaming industry (Logitech Adaptive Esports Tournaments, 2023).

These examples of social action have a significant impact on increasing digital accessibility. They not only benefit people with disabilities but also contribute to a more inclusive and equitable digital landscape for society as a whole.

In terms of increasing the number of specialists in digital accessibility, it is necessary to include digital accessibility content in school curricula as well (Oncins et al., 2020; Inal et al., 2020; Cielemęcki, 2021). In addition, organizing training/courses for employees not directly related to the creation of accessible websites (managers, marketers, HR, etc.) is also necessary to increase their awareness and skills to work on and with accessible websites (Gay, 2023).

6. Conclusions

The basic research problem was: What challenges related to acquiring new competencies are currently being faced by stakeholders involved in ensuring website accessibility? The research objective of this paper was to identify the current status and challenges faced by stakeholders involved in ensuring website accessibility. The main hypothesis assumed that to increase the level of digital inclusion, website accessibility training activities should be pursued. These training activities will enable individuals to enhance or acquire the new digital accessibility skills necessary to ensure digital accessibility.

Based on the results of the conducted quantitative research and the statistical analysis of correlations between selected variables, several conclusions can be drawn.

The first hypothesis was partially confirmed, as only the occupation and age of stakeholders exhibited a positive correlation with their level of awareness and knowledge regarding digital accessibility. Individuals in IT-related occupations and those of a younger age tended to rate their awareness and knowledge in the realm of creating websites in accordance with accessibility standards higher than individuals in other professions.

The second hypothesis was partly validated, with positive correlations observed for the occupation, age, and level of education of stakeholders with their competence in digital accessibility. Individuals in IT-related occupations, younger individuals, and those with higher levels of education tended to rate their knowledge in creating websites in compliance with accessibility standards more highly compared to representatives of other professions, older individuals, and those with lower levels of education.

The third hypothesis was partially supported, as only the occupation of stakeholders demonstrated a positive correlation with their inclination to pursue training for enhancing or acquiring new digital accessibility skills. Individuals in IT-related occupations expressed interest in participating in short-term and certified digital accessibility training. Interestingly, individuals in IT-related occupations noted that knowledge and skills in digital accessibility were of lesser importance to a larger group of individuals responsible for web content accessibility.

In our rapidly evolving digital age, a significant challenge is the need for specialized knowledge and skills, especially in achieving digital inclusion for people with disabilities and the elderly. Overcoming these challenges requires a combination of technical expertise, continuous learning, collaboration, and a deep understanding of accessibility principles.

Training citizens in digital competencies is a primary challenge in our knowledge society. To address this, it's crucial to provide digital accessibility (DA) training to various professions and age groups. Organizations can offer DA training to employees from diverse backgrounds, and educational institutions at all levels play a crucial role in equipping the next generation with digital competencies.

Another challenge in digital accessibility is the lack of recognition systems and complex procedures for digital accessibility qualifications, both nationally and internationally. Streamlining the recognition of DA qualifications, similar to the European Credit System for Vocational Education and Training (ECVET), is vital to ensure global recognition of these skills.

In summary, the path to digital inclusion and competency comes with challenges. However, with a focus on specialized knowledge, accessibility, and qualifications recognition, we can navigate the digital landscape effectively and ensure that everyone can participate in our increasingly connected world.

Acknowledgements

Training (DigitalAccessibility) project implemented under the Erasmus + Program: KA2 - Cooperation for innovation and the exchange of good practices, type of action: *KA202 - Strategic partnerships for vocational education and training* (Project reference number: KA2-VET-16/18).

References

1. *1ka Online Survey* (2019). Retrieved from: https://www.1ka.si/d/en, December 14, 2022.
2. Beaunoyer, E., Dupéré, S., Guitton, M. (2020, October). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in Human Behavior, 111*, p. 106424. doi: https://doi.org/10.1016/j.chb.2020.106424
3. Costi Santarosa, L., Conforto, D. (2016, July). Educational and digital inclusion for subjects with autism spectrum disorders in 1:1 technological configuration. *Computers in Human Behavior, 60*, pp. 293-300. doi: https://doi.org/10.1016/j.chb.2016.02.021
4. Digital Accessibility (2019, February 28). *IO1 - A1 Desktop research: The analysis of digital accessibility*. Retrieved from: Digital Accessibility: https://digital-accessibility.eu/wp-content/uploads/2020/11/DA_IO1_A1-Desktop-reseach-report-FINAL_Acessible.pdf, November 17, 2023.
5. Digital Accessibility (2019, February 28). *IO1 – A2 Digital Accessibility Survey for stakeholders.* Retrieved from: Digital Accessibility: https://digital-accessibility.eu/wp-content/uploads/2020/11/DA_IO1_A2Survey-report_FINAL_Accessible.pdf, November 15, 2022.
6. European Commission (2015, December 2). *Commission proposes to make products and services more accessible to the disabled persons*. Retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/IP_15_6147, July 12, 2023.
7. European Commission (2020, March 3). *Communication From The Commission Europe 2020, A strategy for smart, sustainable and inclusive growth.* Retrieved from: EUR-Lex: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:en:PDF, December 20, 2022.
8. European Commission (2023, July 10). *Individuals using the internet for interaction with public authorities*. Retrieved from: data.europa.eu - The official portal for European data: https://data.europa.eu/data/datasets/mxkqqdbovbfreyxg3xwa?locale=en, August 15, 2023.
9. European Commission (2023). *Job results*. Retrieved from: EURES: https://ec.europa.eu/eures/portal/jv-se/search?page=1&resultsPerPage=10&orderBy=BEST_MATCH&keywordsEverywhere=accessibility&sector=j&lang=en July, 12, 2023.

10. European Commission (2023). *Persons with disabilities*. Retrieved from: Social protection & social inclusion: https://ec.europa.eu/social/main.jsp?catId=1137&langId=en, August 10, 2023.

11. European Union (2016, October 26). DIRECTIVE (EU) 2016/2102 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies. Retrieved from: EUR-Lex: https://eur-lex.europa.eu/eli/dir/2016/2102/oj, December 17, 2022.

12. European Union (2019, December 11). Communication from the commission to the european parliament, the european council, the council, the european economic and social committee and the committee of the regions. The European Green Deal. Retrieved from: EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640, December 16, 2022.

13. European Union (2019, April 17). Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (Text with EEA relevance). Retrieved from: EUR-Lex: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32019L0882, September 20, 2023.

14. European Union (2022, December 7). COMMISSION STAFF WORKING DOCUMENT EVALUATION Review of the application of Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies (WAD). Retrieved from: EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2022:410:FIN, August 17, 2023.

15. European Union (2023, January 27). *Web Accessibility Directive Review*. Retrieved from: European Union of the Deaf: https://www.eud.eu/web-accessibility-directive-review%EF%BF%BC/, June 25, 2023.

16. Eurostat (2023, August 1). *How many EU people can afford an internet connection?* Retrieved from: Eurostat: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/edn-20230801-1, August 15, 2023.

17. Fung, K.-K., Hung, S.S.-L., Lai, D.W., Shum, M.H., Fung, H.-W., He, L. (2023, June 23). Access to Information and Communication Technology, Digital Skills, and Perceived Well-Being among Older Adults in Hong Kong. *International Journal of Environmental Research and Public Health, 20*(12), p. 6208. doi: https://doi.org/10.3390/ijerph20136208

18. Gay, G. (2023, February 23). Open curriculum for teaching digital accessibility. *Frontiers in Computer Science*, p. 1113936. doi: https://doi.org/10.3389/fcomp.2023.1113936

19. Hill, R., Betts, L., Gardner, S. (2015, July). Older adults' experiences and perceptions of digital technology: (Dis)empowerment, wellbeing, and inclusion. *Computers in Human Behavior, 48*, pp. 415-423. doi: https://doi.org/10.1016/j.chb.2015.01.062

20. Inal, Y., Guribye, F., Rajanen, D., Rajanen, M., Rost, M. (2020). Perspectives and Practices of Digital Accessibility: A Survey of User Experience Professionals in Nordic Countries. In: D. Lamas, H. Sarapuu (Eds.), *NordiCHI '20: Proceedings of the 11th Nordic*

Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society (pp. 1-11). Tallin, Estonia: Association for Computing Machinery. New York, United States. doi: https://doi.org/10.1145/3419249.3420119

21. Integracja.org (2023). *Integracja*. Retrieved from: Integracja: https://www.integracja.org/, August 12, 2023.

22. ISAP (2019, April 4). *Polish Act of 4 April 2019 on the digital accessibility of websites and mobile applications of public entities*. Retrieved from: ISAP: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20190000848, June 7, 2023.

23. Ismail, A., Kuppusamy, K. (2019, April 1). Web accessibility investigation and identification of major issues of higher education websites with statistical measures: A case study of college websites. *Journal of King Saud University - Computer and Information Sciences, 34*, pp. 901-911. doi: https://doi.org/10.1016/j.jksuci.2019.03.011

24. ITU (2022, October). *Digital inclusion of all*. Retrieved from: ITU Committed to connecting the world, https://www.itu.int/en/mediacentre/backgrounders/Pages/digital-inclusion-of-all.aspx, May 5, 2023.

25. Kärnä, E., Aavikko, L., Rohner, R., Gallistl, V., Pihlainen, K., Müller, C. et al. (2022, November 25). A Multilevel Model of Older Adults' Appropriation of ICT and Acquisition of Digital Literacy. *International Journal of Environmental Research and Public Health, 19*(23), p. 15714. doi: https://doi.org/10.3390/ijerph192315714

26. Kulkarni, M. (2019, April 24). Digital accessibility: Challenges and opportunities. *IIMB Management Review*, pp. 91-98. doi: https://doi.org/10.1016/j.iimb.2018.05.009

27. Lin, Z., Yang, L., Zhi'an, Z. (2018). To include, or not to include, that is the question: Disability digital inclusion and exclusion in China. *New Media & Society, 20*(12), pp. 4436-4452. doi: https://doi.org/10.1177/1461444818774866

28. Logitech Adaptive Esports Tournaments (2023). *Logitech Adaptive Esports Tournaments*. Retrieved from: Logitech Adaptive Esports Tournaments: https://aet.gg/, August 12, 2023.

29. Martínez-Alcalá, C., Alejandra, R.-L., de los Ángeles Alonso-Lavernia, M., Ramírez-Salvador, J., Jiménez-Rodríguez, B., Cepeda-Rebollar, R., Agis-Juárez, R. (2018, August 28). Digital Inclusion in Older Adults: A Comparison Between Face-to-Face and Blended Digital Literacy Workshops. *Frontiers in ICT, 5*, pp. 1-17. doi: https://doi.org/10.3389/fict.2018.00021

30. Media Access Australia (2014, March 12). *European Union Legislates For Web Accessibility*. Retrieved from: Media Access Australia: https://mediaaccess.org.au/latest_news/general-online-media-policy-legislation-international-policy-and-legislation-news/european-union-legislates-for-web, December 18, 2021.

31. Morte-Nadal, T., Esteban-Navarro, M. (2022, January_December 18). Digital Competences for Improving Digital Inclusion in E-Government Services: A Mixed-Methods Systematic Review Protocol. *International Journal of Qualitative Methods, 21*. doi: https://doi.org/10.1177/16094069211070935

32. mozilla. (2023). *What is accessibility?* Retrieved from: developer mozilla: https://developer.mozilla.org/pl/docs/Learn/Accessibility/What_is_accessibility, June 17, 2023.

33. Nguyen, M., Hargittai, E., Marler, W. (2021, July). Digital inequality in communication during a time of physical distancing: The case of COVID-19. *Computers in Human Behavior, 120*, p. 106717. doi: https://doi.org/10.1016/j.chb.2021.106717

34. Notley, T., Aziz, A. (2024). The unjust burden of digital inclusion for low-income migrant parents. *Policy & Internet*, 1-15. https://doi.org/10.1002/poi3.383

35. NIK (2018, October 30). *Dostępność przestrzeni publicznej dla osób starszych i niepełnosprawnych.* Retrieved from: Najwyższa Izba Kontroli: https://www.nik.gov.pl/ kontrole/P/17/094/LKA/, May (1)7, 2022.

36. OECD (2021). *Bridging digital divides in G20 countries.* OECD. doi: https://doi.org/10.1787/35c1d850-en

37. OECD (2022). *Access to computers from home*. doi:10.1787/a70b8a9f-en

38. Oncins, E., Armony, A., Fitzpatrick, D. (2020). *Mapping The European Digital Accessibility Field: The IMPACT Project.* 9th International Conference on Software Development and Technologies for for Enhancing Accessibility and Fighting Info-exclusion (pp. 33-37). Portugal: Association for Computing Machinery. New York, United States. doi: 10.1145/3439231.3440608

39. Pérez-Escolar, M., Canet, F. (2023, August). Research on vulnerable people and digital inclusion: toward a consolidated taxonomical framework. *Universal Access in the Information Society, 22*, pp. 1059-1072. doi: https://doi.org/10.1007/s10209-022-00867-x

40. Polish Language Dictionary (2021). *Słownik języka polskiego (sjp).* Retrieved from: dostępny: https://sjp.pl/dostępny, June 3, 2021.

41. Rankin, J. (2005, January). *Mental Health and Social Inclusion.* Retrieved from: Mental Health in the Mainstream: https://www.ippr.org/files/images/media/files/publication/ 2011/05/mental_health_paper2_1342.pdf, August 25, 2023.

42. Spandler, H. (2007, November 01). From Social Exclusion to Inclusion? A Critique of the Inclusion Imperative in Mental Health. *Medical Sociology online, 2*(2), pp. 3-16. Retrieved from: From Social Exclusion to Inclusion? A Critique of the Inclusion Imperative in Mental Health: https://britsoc.co.uk/files/MSo-Volume-2-Issue-2.pdf#page=7, June 15, 2023.

43. Šumak, B., Podgorelec, V., Karakatič, S., Dolenc, K., Sorgo, A. (2019). Development of an Autonomous, Intelligent and Adaptive E-learning System. *42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)* (pp. 1492-1497). Opatija, Croatia: IEEE. doi: 10.23919/MIPRO.2019.8756889

44. The Americans with Disabilities Act (ADA) (1990). Retrieved from: https://www.ada.gov/law-and-regs/ada/, June 24, 2024.

45. Tsatsou, P. (2020). Digital inclusion of people with disabilities: a qualitative study of intra-disability diversity in the digital realm. *Behaviour & Information Technology, 39*(9), pp. 995-1010. doi: 10.1080/0144929X.2019.1636136

46. United Nations (1948, December 10). *Universal Declaration of Human Rights.* Retrieved from: United Nations: https://www.un.org/en/about-us/universal-declaration-of-human-rights, April 17, 2021.

47. United Nations (2007, January 24). *Convention on the Rights of Persons with Disabilities [A/RES/61/106].* Retrieved from: United nations. Department of Economic and Social Affairs. Dissability: https://www.un.org/development/desa/disabilities/resources/general-assembly/convention-on-the-rights-of-persons-with-disabilities-ares61106.html, December 3, 2021.

48. United Nations (2015, October 21). Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Retrieved from: United Nations. General Assembly: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf, May 25, 2022,

49. Verdegem, P. (2011, January). Social Media for Digital and Social Inclusion: Challenges for Information Society 2.0 Research & Policies. *TripleC, 9*(1), pp. 28-38. doi: 10.31269/vol9iss1pp28-38

50. W3C (2004, March 11). *Web Content Accessibility Guidelines 2.0: W3C Working Draft 11 March 2004.* B. Caldwell, W. Chisholm, G. Vanderheiden, J. White (Eds.). Retrieved from: W3C: https://www.immagic.com/eLibrary/ARCHIVES/TECH/W3C/W040311C.pdf, May 15, 2021.

51. W3C (2011, November). *Selecting and Using Authoring Tools for Web Accessibility.* Retrieved from: W3C Web Accessibility Initiative (WAI): https://www.w3.org/WAI/impl/software, November 3, 2021.

52. W3C (2023). *Web Accessibility Inititive WAI.* Retrieved from: Introduction to Understanding WCAG - Understanding the Four Principles of Accessibility: https://www.w3.org/WAI/WCAG21/Understanding/intro#understanding-the-four-principles-of-accessibility, August 7, 2023.

53. W3C (2023, July 20). *Web Content Accessibility Guidelines (WCAG) 2.2.* Retrieved September 10, 2023, from W3C: https://www.w3.org/TR/WCAG22/

54. W3C WAI (2019, October 4). *How to Meet WCAG (Quick Reference).* Retrieved from: Web Accessibility Initiative WAI: https://www.w3.org/WAI/WCAG21/quickref/, October 17, 2021.

55. W3C WAI (2022, September 15). *Course List - Digital Accessibility Education, Training, and Certification.* Retrieved from: W3C Web Accessibility Initiative: https://www.w3.org/WAI/courses/list/, July 17, 2023.

56. WebAxe (2019, November 17). *Digital Accessibility Jobs, November 2019*. Retrieved from: WebAxe: https://www.webaxe.org/digital-accessibility-jobs-november-2019/, September 17, 2023.

57. Wikipedia (2023). *Dostępność WWW*. Retrieved from: Wikipedia Wolna encyklopedia: https://pl.wikipedia.org/wiki/Dostępność_(WWW), July 15, 2023.

58. World Bank (2023). *Fixed broadband subscriptions (per 100 people)*. Retrieved from: The World Bank Data: https://data.worldbank.org/indicator/IT.NET.BBND.P2?end= 2022&locations=PL-ES-SI-GR&name_desc=false&start=2010&view=chart, August 12, 2023.