WP2. RESEARCH STUDY ON DIGITAL SKILLS

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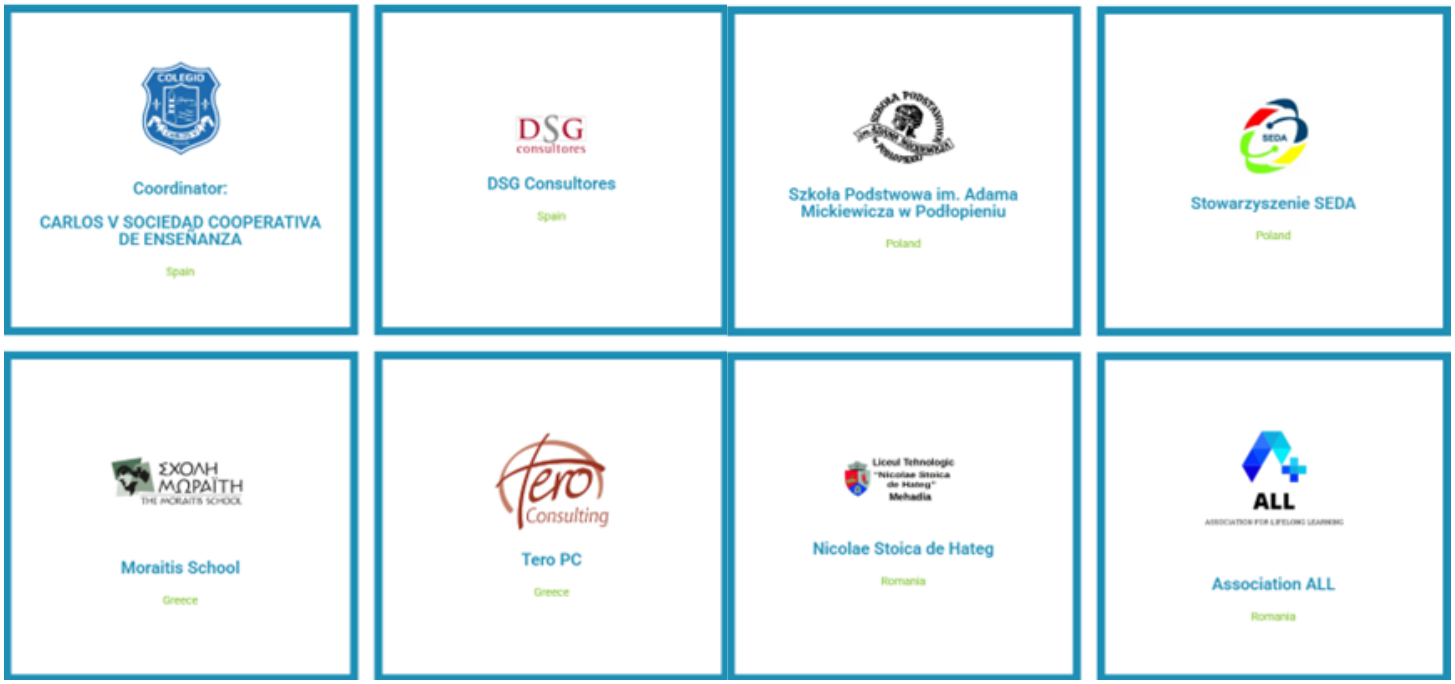

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CONTENTS

GREECE

1 Introduction

Digital skills are essential for Greece's economic and social development and play a crucial role in education, employment, and daily life. The integration of digital skills in education, families, and the workforce is essential for equipping students, teachers, employees, and elderly populations with the competencies required for the new digital era.

There are many valuable digital skills depending on the profession and/or lifestyle of every individual. Some basic digital skills include the knowledge to operate everyday digital devices (computer or smartphone), the ability to navigate and effectively find information on the internet (mindful usage of AI technologies), manage emails and communicate effectively (including social platforms and video conferencing tools), be aware of ways to protect personal data online (internet security and digital transactions) and be able to work on office tools like Microsoft Word and Excel (and store files on the cloud). In fact, digital competence is a combination of knowledge, skills and attitudes.

Greece has made significant progress in digitizing education and professional sectors, particularly following the COVID-19 pandemic, which accelerated the adoption of online learning tools, digital methodologies, and remote work practices. However, digital inclusion among families, elderly populations, and disadvantaged groups remains a challenge.

This report examines the current state of digital competences in Greece, aligning with the European Digital Competence Framework for Citizens (European Commission, 2023). It highlights key gaps, national policies, and trends compared to the broader European context. Such an analysis is vital to provide recommendations for improving digital competences and fostering digital inclusion across various demographics

2 National Context

Greece is undergoing a rapid digital transformation across education, family settings, and the workforce. As the digital economy expands, individuals must acquire essential skills to remain competitive and actively participate in society. Despite progress in national digital strategies, gaps remain in access to infrastructure, digital literacy, and targeted training for vulnerable groups, such as the elderly and disadvantaged communities. Understanding the current digital skill landscape in Greece is crucial to designing effective policies and programs that bridge the digital divide and foster inclusive participation in the evolving digital landscape

2.1 Statistics and Current State

Greece has made significant strides in digital transformation, yet gaps remain in key areas. Key statistics include:

- ·**Basic Digital Skills:** In 2024, 52.4% of individuals aged 16-74 in Greece possessed at least basic digital skills, slightly below the EU average of 55.6% (Digital Skills and Jobs Platform 2024, Eurostat 2023a).
- ·**Students' Digital Competence:** According to the ICILS 2023 global study (Institute of Educational Policy, 2023), conducted in 34 countries and involving almost 133,000 secondary school students, Greece lags significantly behind the average in computer literacy. Among the 31 countries for which complete data was collected, Greece ranks 23rd, with a score of 460 (compared to the average of 476). Most European countries exceed the average level.
- ·According to the same study (Institute of Educational Policy, 2023), a high percentage of students in all countries demonstrated only basic literacy skills – an average of 51%. Students at this level need clear, step-by-step instructions to perform simple activities related to finding information and communicating in a digital environment. In Greece, the percentage of students scoring at level 1 or below was 60%. In high-performing countries, the percentage was significantly lower: 27% in Korea, 28% in the Czech Republic and 32% in Denmark.
- ·**Teachers' Digital Literacy:** There is a strong 'pandemic effect': 68% of pre-primary teachers felt that they would in future teach differently, making more use of digital technology; the percentage of teachers at all levels placing themselves in expert, leader or pioneer category rose from 37% to 60% and the mean self-rated digital competence score rose from 3.0 to 3.8 (European Schoolnet, 2022).
- ·**Elderly Digital Literacy:** Only 12.84% of Greeks over 65 have basic digital skills compared to the EU average of 28.19%, one of the lowest rates in Europe, creating barriers to accessing e-services, banking, and social connections (Eurostat 2023a).
- ·**ICT Specialists**: The proportion of ICT specialists in Greece decreased from 2.5% in 2023 to 2.4% in 2024, significantly lower than the EU average of 4.8% (Eurostat 2023b).

2.2 Needs and Demands

There is an increasing demand for digital skills in education, households, and professional environments, particularly in:

- Blended Learning Methodologies
- Coding and Programming Education
- Cybersecurity Awareness for Students, Parents, Employees, and the Elderly

- Use of Digital Collaboration Tools in Schools and Workplaces
- Adaptive Learning Technologies and AI in Education and Business
- Digital Literacy Training for Seniors, Parents, and Employees
- Artificial Intelligence (AI) and Data Analytics
- Digital Marketing and E-commerce
- E-Government Services Usage.
- Programming and Software Development

Businesses in Greece highlight a shortage of professionals trained in cloud computing, AI, and digital transformation, which hampers economic growth. Families require better guidance on digital safety, ensuring children and older generations can navigate the digital world securely.
Employers are also seeking structured digital upskilling programs to maintain workforce competitiveness in an evolving digital economy.

2.3 National Policies

Greece has adopted several policies to enhance digital skills. These are summarised in the following sections.

2.3.1 National Digital Transformation Strategy 2020-2025

National Digital Transformation Strategy 2020-2025 (Ministry of Digital Governance, Greece, 2020) focuses on digital literacy (also across all educational levels), workforce upskilling, and public sector digitalization.

Strengths:
- Comprehensive framework addressing education, employment, and public services.
- Alignment with EU digital initiatives, ensuring funding and best practices.
- Encourages digital infrastructure investments, including broadband expansion.

Weaknesses:
- Slow implementation due to bureaucratic challenges.
- Limited targeted initiatives for disadvantaged groups (e.g., rural areas, low-income populations).
- Insufficient monitoring and evaluation mechanisms to track progress.

2.3.2 Greek Education Reform

The Greek Education Reform (European Commission, Eurydice, 2024) introduced digital skills as part of primary and secondary education curricula, ensuring students acquire foundational digital literacy.

Strengths:
- Early exposure to digital tools, coding, and cybersecurity.
- Supports the transition towards a more tech-oriented workforce.
- Aligned with the European Digital Education Action Plan (2021-2027).

Weaknesses:

- ·Teachers lack digital training, limiting the effectiveness of the initiative.
- ·Insufficient ICT infrastructure in public schools, especially in rural areas.
- Digital competencies are not yet fully integrated into all subjects

2.3.3 Public-Private Partnerships

Collaborations with tech companies such as Google's 'Grow with Google' initiative, Microsoft's digital skilling programs, and national efforts like 'SKILLS4ALL' (Skills4All Initiative, 2023).

Strengths:

- Leverages private-sector expertise and resources.
- rovides free or subsidized training for students, job seekers, and SMEs (Small Medium Enterprises).
- Helps align industry needs with digital training curricula.

Weaknesses:

- Lack of coordination between private and public stakeholders, leading to fragmented efforts.
- Limited outreach to marginalized communities, as private sector initiatives often target urban populations.

2.3.4 Government-Funded Upskilling Programs

These programs (DYPA 2023) provide training in digital technologies to improve employability in various sectors

Strengths:

- Helps bridge the digital skills gap for unemployed individuals.
- Provides financial incentives for SMEs to adopt digital tools.
- Supports reskilling and lifelong learning.

Weaknesses:

- Many small businesses lack awareness of available funding and training.
- Programs focus more on basic digital literacy rather than specialized skills like AI, cybersecurity, or cloud computing.
- Limited long-term tracking of participants' employment outcomes.

Weaknesses:

- Teachers lack digital training, limiting the effectiveness of the initiative.
- Insufficient ICT infrastructure in public schools, especially in rural areas.
- Digital competencies are not yet fully integrated into all subjects

2.3.5 Digital School Initiative

A government program (Ministry of Education, 2022) providing digital content, interactive textbooks, and e-learning platforms for secondary education

Strengths:

- Enhances access to digital learning resources.
- Supports blended learning models, allowing for flexible education.
- Aligned with EU digital education policies.

Weaknesses:

- Limited infrastructure in many schools, reducing effectiveness.
- Lack of training for teachers on how to use digital resources effectively.
- Not all subjects integrate digital content equally

Greece has made substantial progress in developing digital skills policies, with strong national strategies and collaborations. However, implementation challenges remain, particularly regarding infrastructure, teacher training, SME engagement, and digital inclusion. Addressing these gaps through more targeted investments, better coordination, and stronger outreach efforts is crucial for ensuring long-term digital transformation success

3 European-Level Analysis

3.1 Alignment with DigComp Framework

These programs (DYPA 2023) provide training in digital technologies to improve employability in various sectors

The Digital Competence Framework for Citizens (DigComp) provides a structured approach to evaluating digital skills. Greece aligns with the five key areas of DigComp:
1.Information and Data Literacy: Improving citizens' ability to locate, evaluate, and use digital information.
2.Communication and Collaboration: Enhancing digital communication skills, especially in education and remote work.
3.Digital Content Creation: Promoting coding and content production, particularly in creative industries.
4.Safety: Addressing cybersecurity awareness and digital privacy concerns.
5.Problem Solving: Encouraging digital problem-solving skills for personal and professional contexts.

3.2 Comparison with European Trends

- Greece lags behind in digital upskilling programs compared to leading EU countries like Denmark, Finland, and Germany.
- Greece is increasing investment in digital education, aligning with EU initiatives like the Digital Education Action Plan (2021-2027).
- Greece is below the EU average in teacher digital training, workforce digital upskilling, family digital awareness, and the use of educational technology in classrooms.
- Digital learning and remote work are expanding, but funding limitations affect widespread adoption of digital tools in schools, workplaces, and community programs for families.
- The digital inclusion of seniors remains a major challenge, as Greece has one of the lowest levels of elderly digital participation in the EU.

4 Key Findings & Recommendations

4.1 Key findings

·Strengths:

- Strong national strategy and policy initiatives.
- Naional initiatives for teacher, family, and workforce training in digital literacy.
- Growth in digital education and online learning.
- Increasing collaboration between the government and private sector.

·Weaknesses:

- Insufficient infrastructure in many public schools, businesses, and low-income households.
- Digital divide between urban and rural communities.
- Low adoption of digital tools in SMEs.
- Limited digital skills training for older populations.

·Opportunities:

- EU funding for educational, workforce, and family digitalization projects.
- Expansion of remote work and e-commerce sectors.
- Development of AI and cybersecurity training programs.

Threats:

- Slow pace of digital transformation in traditional industries.
- Cybersecurity risks and digital safety concerns.
- Resistance from traditional educators, employers, and older populations to adopt digital methodologies.
- Socioeconomic disparities affecting digital access for students, professionals, and families.

4.2 Recommendations

To foster a more digitally inclusive and resilient society, a multifaceted approach is essential. Expanding teacher training programs will ensure educators are equipped with modern digital methodologies, enhancing the quality of digital education. Simultaneously, targeted digital inclusion initiatives should bridge the urban-rural divide by improving infrastructure and accessibility. Encouraging lifelong digital learning will further support individuals of all ages in acquiring necessary digital skills. Strengthening public-private partnerships can accelerate innovation by fostering collaboration between government entities, tech companies, and educational institutions.

Moreover, boosting support for SME digitalization through grants and resources will help small businesses thrive in an increasingly digital economy. Addressing gender disparities by promoting women in tech initiatives is crucial for fostering a more diverse and equitable digital workforce. Finally, national cybersecurity awareness campaigns should be implemented to educate citizens on digital safety and privacy protection, ensuring a secure and informed digital society

5 Conclusions

Greece is on a progressive path toward digital transformation, yet significant challenges remain. While national policies and EU support play a crucial role, continued investment in digital education, workforce upskilling, and inclusive policies is necessary to bridge existing gaps. The findings of this report serve as a foundation for strategic actions aimed at enhancing digital competence across Greek society.

By aligning with the DigComp framework and addressing identified gaps, Greece can foster a digitally inclusive and competitive future, ensuring that all citizens and businesses are equipped for the digital age

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ROMANIA

1 Introduction

1.1. Context

Digitalization is transforming how people across Europe learn, work, and participate in civic life. The European Commission, through initiatives like the Digital Education Action Plan and the European Skills Agenda, highlights the need for strong digital competences to promote social inclusion and drive economic growth. These strategies aim to close the digital divide among Member States, improve infrastructure, and encourage lifelong learning, helping citizens keep pace with the demands of today's interconnected global economy.

In Romania, however, this shift toward digital transformation faces persistent challenges. Studies consistently rank Romania among the lowest in the EU for digital literacy, with a significant gap between urban and rural areas. The Digital Economy and Society Index (DESI) 2023 reflects this, showing Romania trailing in digital public services, business digital integration, and overall digital skills.

This digital lag contributes to socio-economic disparities, limiting job opportunities and the potential for innovation. As a result, policymakers, educators, civil society groups, and businesses are increasingly focused on understanding Romania's specific digital gaps and how they affect workforce development, social inclusion, and economic resilience. The DigiGap project aims to explore how targeted efforts can improve digital skills in education and vocational training, with special attention to underserved areas and populations

1.2. Purpose of the Study

This study provides a research-based overview of digital competences in Romania, highlighting current challenges and potential growth opportunities. Unlike broader policy reports, it focuses on identifying the most in-demand digital skills and where Romania falls short. By examining different educational levels—from primary to adult learning—and comparing them with EU trends, the study offers a thorough understanding of how digital skills are developing in Romania.

The study's key objectives are to:

1. Map the demand for digital skills in Romania, focusing on what employers and educational systems prioritize.
2. Identify underdeveloped digital competences, especially when comparing rural and urban areas and different socio-economic groups.

3.Compare national trends to EU benchmarks, like the European Digital Competence Framework (DigComp), to see where Romania aligns or diverges from European standards.
4.Explore the social and economic factors that influence digital skill development, such as income, infrastructure, family background, and support from civil society and the private sector.

The findings will help guide future DigiGap activities, such as developing training programs and curricula. This report doesn't propose specific policies but instead outlines the current situation in Romania in relation to broader European goals.

1.3. Methodology

The study used a mixed-methods approach, combining desk research, comparative analysis, and qualitative insights:

1.Desk Research

Secondary data was collected from national and international reports, policy documents, statistical databases, and academic studies. Key sources included:

- Eurostat and the Digital Economy and Society Index (DESI)
- Romanian National Statistics Institute (INS) for data on internet use, computer literacy, and socio-demographic factors
- Reports from UNESCO, UNICEF, and the World Bank, placing Romania's digital development in a global context
- Publications from Romanian civil society groups like Code4Romania and Digital Nation
- Documents from the Romanian Ministry of Education and the Romanian Academy detailing current curricula and digital education policies.

2.Comparative Analysis

The European Digital Competence Framework (DigComp) was used to categorize digital competences. Data from high-performing EU countries like Estonia, Finland, and Denmark were also reviewed to highlight best practices and compare them with Romania's progress.

3.Qualitative Insights

In addition to desk research, interviews were conducted with educators, IT professionals, Ministry of Education representatives, and NGO members. These conversations helped identify which digital competences are most lacking in schools and workplaces and provided context on how policies are implemented on the ground.

3.Qualitative Insights
The study focuses on developments from 2021 to 2023, referencing earlier data for historical context. While it includes perspectives from both rural and urban areas, it doesn't aim to provide an exhaustive account of every community. Instead, it highlights broad national trends aligned with European competence frameworks

Part 2: National Context

2.1. Current State of Digital Competences

Romania's digital landscape shows low proficiency in key areas like office productivity tools, safe internet use, and online collaboration platforms. According to Eurostat (2023), only 28% of Romanians possess above-basic digital skills, far below the EU average of 54%. This gap highlights several challenges, including limited ICT infrastructure in rural schools, a lack of structured teacher training, and low digital literacy within families.

2.1.1. Urban vs. Rural Disparities

One of the most striking features of Romania's digital landscape is the gap between urban and rural areas:

- Urban Communities: Cities like Bucharest, Cluj-Napoca, Timisoara, and Iasi benefit from better broadband access and more public Wi-Fi hotspots. Students in these areas often have exposure to basic coding classes or office tools through extracurricular programs or tech-savvy teachers. Many families own at least one digital device, offering children opportunities to develop their skills at home.
- Rural Communities: In contrast, broadband coverage in rural areas averages around 47%, with many households lacking reliable internet. According to EU Kids Online Romania (2021), up to 45% of children aged 9–16 in rural regions don't have regular access to a digital device for educational purposes. The digital skills they do acquire are often self-taught or very basic, like texting or using social media. Schools in these areas struggle with outdated computer labs, unreliable internet, and limited funding for technology upgrades, further widening the skills gap

2.2. Digital Literacy in Primary and Middle Schools

2.2.1. Core Skills and Curriculum Coverage

Romania's national curriculum includes Information and Communication Technology (ICT) subjects, typically introduced in grades 3 or 4 and continuing through middle school. However, the quality and consistency of these lessons vary widely:

- **Basic Computer Use**: Younger students usually receive brief lessons on using a mouse, keyboard, and basic drawing or text-editing software.
- **Internet Navigation**: Some schools teach students how to use search engines and access online resources, but many lack stable internet connections, limiting hands-on practice

- **Productivity Tools:** Instruction in word processing, spreadsheets, and presentation software is inconsistent. The Ministry of Education (2022) reported that less than 30% of middle school students are competent in creating and formatting documents for school assignments

Teachers often lack the confidence or training to teach more advanced digital skills. Only 18% of rural teachers have participated in significant digital upskilling programs, limiting the range of digital tools and learning methods they can introduce to students.

2.2.2. Extracurricular Activities and ICT Clubs

Some urban schools have extracurricular ICT clubs, supported by NGOs, parent-teacher associations, or private sponsors. These clubs teach coding, robotics, and other digital skills, helping some students master advanced competences like programming in Scratch, C++, or Python. However, these opportunities rarely extend to rural areas, leaving many students without access to such resources.

2.3. Early Childhood and Family Digital Literacy

2.3.1. Parents as Influencers of Child Literacy

In Romania, many children are first exposed to digital tools at home through smartphones or shared computers. However, Eurobarometer (2022) data shows that 56% of people aged 55 and older have little or no digital skills, meaning many parents can't effectively guide their children in using technology safely or productively. This can lead to:

- **Unsupervised Online Activity:** Children using gaming or social media platforms without parental oversight.
- **Limited Support for Learning**: Parents struggling to help their children with e-learning platforms or digital homework.

While some urban families are more digitally literate, they represent a minority. UNICEF Romania studies highlight the connection between family-level digital literacy and children's academic performance, showing how intergenerational learning plays a key role in developing digital skills

2.3.2. Cultural and Socio-Economic Factors

Economic challenges deepen the digital divide. Low-income families often can't afford devices or stable internet connections. In Roma communities, digital exclusion rates exceed 80%, reflecting broader patterns of marginalization. The lack of adult education programs in underserved areas also limits opportunities for parents to improve their digital skills alongside their children.

2.4. Impacts of COVID-19 on Digital Learning

The COVID-19 pandemic exposed and amplified existing digital skill gaps in Romania. About 32% of students lacked internet access at home, with nearly 50% of rural students affected (UNICEF 2022).

While the government provided tablets to disadvantaged students, this didn't automatically translate into better digital skills. Many teachers relied on basic tools like WhatsApp or Facebook groups, highlighting their discomfort with more advanced technologies like virtual whiteboards or learning management systems.
Students also faced challenges, struggling with tasks like uploading homework or collaborating online. The pandemic served as a stress test, revealing how unevenly digital competences are distributed across the country.

2.5. Gaps and Needs in Specific Digital Skills

Research highlights several key areas where Romania faces significant digital skills gaps:

1. Basic Device Use and Online Navigation: Many people, especially in rural areas, struggle with simple tasks like managing email accounts or attaching files.
2. Office Productivity Tools: Romanian small businesses often fail to use tools like spreadsheets or data-management software, limiting efficiency and growth potential (World Bank SME Digitalization Report, 2022).
3. Safe Internet Practices: Many users are unfamiliar with cybersecurity basics, such as two-factor authentication or strong password creation.
4. Online Collaboration: Platforms like Microsoft Teams or Google Workspace are underused, particularly outside urban areas.
5. Digital Content Creation: Skills in areas like video editing or graphic design are limited to niche professionals, with little exposure in schools.
6. Data Interpretation and Analysis: Romania lags behind the EU average in data literacy, affecting sectors from business to education.
7. Coding and Advanced Technical Skills: While coding clubs exist in urban areas, most students don't receive systematic programming education, and advanced technical skills are scarce outside major cities like Cluj and Bucharest.

2.6. National Policies and Strategies

2.6.1. SmartEdu National Strategy

The SmartEdu National Strategy aims to certify more educators in digital competences and increase access to digital resources in schools. By 2025, the goal is to formalize digital literacy training for teachers across multiple subjects and equip 90% of schools with modern technology by 2030. However, progress has been uneven. The Romanian Academy (2023) reports delays in rolling out teacher training and acquiring up-to-date digital tools. Challenges include poor coordination between ministries and mismatched timelines that slow implementation

2.6.2. National Recovery and Resilience Plan (2021–2026)

Romania's National Recovery and Resilience Plan (PNRR) allocates over €2 billion for digital education initiatives, focusing on connectivity, equipment, and curriculum modernization. However, by mid-2023, less than 35% of these projects had met their milestones. Administrative hurdles and difficulties aligning local and national priorities are common barriers.

2.6.3. Role of NGOs and Private Sector

NGOs and private companies play a role in promoting digital literacy. Code4Romania offers workshops on safe internet practices, while Digital Nation runs coding bootcamps for youth and adults. Some tech companies sponsor hackathons or donate hardware to schools. Despite these efforts, many rural and marginalized communities remain underserved due to limited resources and logistical challenges.

Part 3: European-Level Analysis

3.1. Overview of DigComp

The European Digital Competence Framework (DigComp) is a key tool for defining and assessing digital skills across five main areas:

1. Information and Data Literacy. This involves finding, evaluating, and managing digital information—skills like identifying credible sources and avoiding misinformation, which are crucial in today's media landscape.
2. Communication and Collaboration.This focuses on interacting effectively in digital environments, using tools like email, social media, and online collaboration platforms.
3. Digital Content Creation. This includes designing, editing, and producing digital content (text, images, audio) while understanding intellectual property rights.
4. Safety. This covers digital security, including privacy settings, safe device usage, data protection, and responsible online behavior.
5. Problem-Solving. This is about using digital tools to tackle specific challenges, from technical troubleshooting to creative solutions.

The latest version, DigComp 2.2, incorporates emerging trends like AI, critical thinking, and managing disinformation. In countries with high DESI rankings, like Estonia, Finland, and Denmark, these competences are deeply embedded in education systems and workplace training, fostering a culture of strong digital literacy

3.2. European Trends and Comparisons

Romania's digital development lags behind many EU countries. In places like Estonia, digital education starts in primary school, with coding lessons and strong teacher training programs. Finland emphasizes teacher autonomy and continuous professional development, integrating ICT across all subjects. Denmark's e-government services require a baseline of digital literacy, encouraging citizens to develop these skills.

In contrast, Romania's lower DESI scores point to inconsistent digital skill development. National and EU reports highlight issues like uneven broadband access, fragmented teacher training programs, and reliance on short-term projects that don't scale effectively across the country

3.3. Relevance to Romania's Context

Applying DigComp's framework to Romania reveals several key areas for improvement:

- Information and Data Literacy: With uneven internet access, many Romanian students lack instruction in fact-checking, evaluating websites, or managing data safely. This impacts both education outcomes and civic participation.
- Communication and Collaboration: As remote work and online learning have expanded, digital collaboration tools have become essential. Romania's workforce, especially in rural areas, often lacks familiarity with these platforms, putting them at a disadvantage.
- Digital Content Creation: Romania's creative industries could benefit from a new generation skilled in video editing, graphic design, and podcasting. However, most schools offer only basic exposure to these tools, limiting students' potential in these growing fields.
- Safety: With more services moving online, cybersecurity awareness is increasingly important. Phishing scams and malware attacks remain common in Romania, and many users are unaware of how to protect themselves.
- Problem-Solving: Using digital tools to solve problems—whether for filing taxes online or conducting academic research—is underemphasized in Romanian education. Strengthening this competence aligns with broader EU goals of fostering a digitally empowered citizenry.

These insights suggest that Romania could benefit from adopting European best practices, ensuring that digital competence frameworks are fully integrated into educational and training programs.

Part 4: Conclusions

4.1. Key Observations about Romania's Digital Competences

This study highlights several critical issues within Romania's digital competence landscape:

1. **Urban vs. Rural Divide.**

There are stark differences in broadband access, device availability, and teacher training between urban and rural areas. These disparities affect not only students but also adults seeking to transition into digital jobs.

2. Teacher Preparedness
Many teachers, especially in rural areas, lack formal training in digital teaching methods. Even when digital resources are available, they are often underused due to a lack of confidence or skills.
3. Family-Level Digital Literacy
Many Romanian parents lack basic digital skills, limiting their ability to support their children's learning at home. This is especially true in low-income families and Roma communities, where digital exclusion often overlaps with other forms of socio-economic marginalization.
4. Limited Integration of Advanced Skills
Advanced digital skills like coding, data analysis, and AI literacy are taught only in select urban areas or extracurricular clubs. This creates a mismatch between the growing demands of Romania's IT sector and the average digital literacy level.
5. Policy Implementation Challenges
While policies like the SmartEdu National Strategy and the National Recovery and Resilience Plan aim to improve digital education, their implementation has been inconsistent. Administrative hurdles, poor coordination, and a lack of monitoring slow progress.

4.2. Specific Digital Skills Most in Demand

Based on data from sources like the World Bank, DESI, and national statistics, as well as stakeholder interviews, the following seven digital skills are in highest demand in Romanian schools, workplaces, and communities:

1.Basic Device Operation and Online Navigation
Skills like turning devices on and off, connecting to Wi-Fi, updating systems, and safely browsing the internet are fundamental.
2.Office Productivity Tools
Proficiency in word processing, spreadsheets, and presentation software is essential in both educational and professional settings.
3.Online Collaboration Platforms
Tools like Google Workspace, Microsoft Teams, and Slack are crucial as remote and hybrid work environments expand.
4.Safe Internet and Cybersecurity Awareness
Understanding how to avoid phishing scams, secure personal data, and manage privacy settings is increasingly important.
5.Digital Content Creation and Editing
Basic skills in creating videos, editing images, and producing multimedia content are in demand across various industries.
6.Data Literacy
The ability to collect, interpret, and present data is vital in modern workplaces. Basic spreadsheet skills, including sorting data, using formulas, and creating graphs, are part of this competence.

7.Coding Basics and Computational Thinking
Exposure to coding fosters logical thinking and problem-solving skills, which are valuable in many areas of the digital economy. Romania's growing tech sector highlights the need for introductory programming in schools.

4.3. Alignment with European Competence Frameworks

While Romania has taken steps to introduce aspects of the DigComp framework, the coverage is inconsistent. Many students experience fragmented or one-time exposure to topics like data literacy or cybersecurity, without continuous reinforcement through school curricula or adult education.
Bridging rural infrastructure gaps is important, but it must be coupled with better training for teachers to ensure technology is used effectively. According to DESI data, only a small percentage of Romanian teachers regularly participate in digital upskilling programs. By comparison, EU best practices include ongoing professional development, peer learning networks, and support systems that integrate digital skills into all subjects—not just isolated ICT classes

Annexes

Annex 1: National Statistics on Digital Competences (INS 2023)

- Household Internet Connectivity
  - Urban: ~84%
  - Rural: ~47%
- Above-Basic Digital Skills (Ages 16–74): ~28%
- Teacher Participation in Digital Training
  - Urban: ~55%
  - Rural: ~18%
- Use of Productivity Tools (National Average): ~20%

Annex 2: Skill Areas Within DigComp and Their Relevance to Romania

1.Information and Data Literacy
- Moderate coverage in some urban schools; limited in rural areas.
- Gaps in fact-checking and verifying online sources

2.Communication and Collaboration
- Essential due to remote learning and work.
- Teachers and students often unfamiliar with collaboration tools.

3.Digital Content Creation

- Growing need in marketing and education.
- Lack of structured training in video/image editing and multimedia creation.

4.Safety

- Rising cybersecurity threats as digital activity increases.
- Low awareness of secure password practices and data protection.

5.Problem-Solving

- Key workforce skill for adapting to new technology.
- Teachers often rely on rote instruction instead of encouraging digital problem-solving.

Annex 3: Policy Documents and Reports

1.Romanian Academy Report (2023)

This report examines how investments in digital infrastructure correlate with educational outcomes across Romania's counties. It identifies gaps in teacher training, student access to technology, and the effectiveness of digital education initiatives.

2,**Digital Economy and Society Index (DESI) 2023**

The DESI provides a comprehensive assessment of Romania's progress in areas like connectivity, digital skills, and the adoption of e-government services. Romania continues to rank among the lowest in the EU, highlighting the need for targeted interventions.

3.Ministry of Education – Digital Education Report (2022)

This document outlines teacher training initiatives, the distribution of digital devices to schools, and the integration of ICT into curricula. It emphasizes the uneven implementation of digital education policies, particularly between urban and rural areas.

4.**World Bank SME Digitalization Report (2022)**

The report evaluates the digital maturity of Romania's small- and medium-sized enterprises (SMEs), noting that limited digital skills among employees hinder innovation and business growth.

5.**Code4Romania Impact Report (2023)**

This NGO-led report highlights the reach and impact of digital literacy workshops across Romania. It details the demographics served, the geographical spread of initiatives, and the measurable improvements in digital skills among participants.

6.**Digital Nation Survey (2023)**

The survey examines the adoption of digital tools like cloud services and data analytics within Romanian businesses. It points out that while urban companies are rapidly embracing these technologies, rural areas lag due to a lack of digital skills and resources.

7.UNICEF Romania Reports (2020–2022)
These reports focus on child welfare and education during the COVID-19 pandemic, linking gaps in digital competence to disruptions in learning. They underscore the critical role of digital skills in maintaining educational continuity during crises.
8.EU Kids Online Romania Study (2021)
This study explores how Romanian children use the internet, their exposure to online risks, and the availability of parental guidance. It highlights the need for better digital safety education in both schools and homes

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Final Thoughts

This research provides a detailed snapshot of Romania's digital competences, highlighting both the challenges and opportunities ahead. While significant gaps remain—particularly between urban and rural areas—there is clear potential for growth through targeted policies, better infrastructure, and comprehensive digital education initiatives. By aligning more closely with European frameworks like DigComp and learning from high-performing EU countries, Romania can bridge these gaps and build a digitally skilled workforce that drives future economic growth and social inclusion

Key Takeaways and Recommendations

1**. Prioritize Rural Digital Inclusion**
The stark urban-rural divide in digital access and competences is one of Romania's most pressing challenges. Investments should focus on expanding broadband infrastructure in rural areas, ensuring that students and adults alike have access to reliable internet and digital tools. Beyond infrastructure, targeted training programs for rural teachers and community members will be crucial to bridge this gap

2. Strengthen Teacher Training and Support

Teachers are pivotal in fostering digital competences. Expanding access to professional development programs, especially in rural areas, will help educators feel more confident in integrating digital tools into their classrooms. Continuous training, peer-learning opportunities, and access to updated teaching resources should be standard practice.

3. Integrate Digital Skills Across All Education Levels

While ICT is included in the national curriculum, digital competences should be woven into all subjects, not just taught in isolation. From primary school through to adult education, students should consistently engage with digital tools, from basic device handling to advanced skills like coding and data analysis.

4. Promote Family and Community Digital Literacy

Improving digital literacy isn't just about schools. Family-level education initiatives, such as community workshops or online courses for parents, can help create supportive environments where children can thrive digitally. NGOs and local organizations have already made strides in this area, but more widespread efforts are needed to reach underserved populations.

5. Enhance Digital Safety Awareness

With increasing reliance on digital platforms for everything from banking to education, cybersecurity must become a top priority. Both children and adults need to understand basic digital safety practices, such as creating strong passwords, recognizing phishing attempts, and protecting personal data.

6. Align National Policies with European Best Practices

Romania can benefit from looking to high-performing EU countries like Estonia and Finland, where digital competences are deeply embedded in education systems and public services. Policy frameworks like the SmartEdu National Strategy and the National Recovery and Resilience Plan are steps in the right direction, but consistent monitoring, better coordination among ministries, and a focus on scalability will be key to their success.

7. Foster Public-Private Partnerships

Collaboration between the government, private sector, and civil society can drive innovation and resource sharing. Tech companies, for example, can play a role in providing equipment, training, and mentorship programs, while NGOs can continue to fill gaps in underserved communities.

Future Outlook

The path forward for Romania's digital transformation is both challenging and promising. While the data highlights critical gaps in digital competences, particularly in rural areas and among marginalized groups, the growing awareness and strategic initiatives in place suggest that change is on the horizon. By building on the foundations laid by the DigiGap project and leveraging insights from this study, Romania has the potential to close the digital divide, fostering a more inclusive, innovative, and resilient society.

The next steps for the DigiGap initiative will involve using the insights from this research to develop tailored training modules and curriculum designs that address the unique needs identified in different regions. By focusing on both foundational skills and advanced digital competences, the initiative can help prepare Romania's future workforce for the demands of a rapidly evolving digital economy.

SPAIN

The next steps for the DigiGap initiative will involve using the insights from this research to develop tailored training modules and curriculum designs that address the unique needs identified in different regions. By focusing on both foundational skills and advanced digital competences, the initiative can help prepare Romania's future workforce for the demands of a rapidly evolving digital economy.

Part 1: Introduction

Context

The main objective of the DigiGap project is to train students as authentic digital natives who can act as agents of transformation in their families. The initiative seeks to close the intergenerational digital divide by training young people in essential digital skills, such as the use of technological tools, online safety and responsible use of the Internet, so that they can share this knowledge with their families. This not only improves families' technological skills, but also fosters greater social cohesion and community empowerment.

The relevance of the project lies in its inclusive approach, which recognizes students as a strategic way to disseminate digital skills and reduce technological inequalities. In a context where access and mastery of digital tools are key to personal and professional development, DigiGap innovatively addresses the lack of digital literacy in homes, contributing to society's digital transformation objectives.

The joint research study is crucial to the objectives of the project, as it allows us to analyze the real impact of the training on students and their families, identify good practices and adjust strategies to maximize results. Furthermore, it provides evidence on the effectiveness of intergenerational approaches in promoting digital competencies, which can serve as a model for future initiatives in other educational and community contexts.

Purpose of the Study

The purpose of the documentary research study to be carried out by the Carlos V school is to identify the key digital competencies needed at both national and European levels and analyze their alignment with the Digital Competencies Framework for Citizens (DigComp).

This framework, developed by the European Commission, establishes a common standard for assessing and developing digital competences, covering essential areas such as information literacy, communication in digital environments, content creation, security and problem solving (Vuorikari et al ., 2016). The study seeks not only to provide an accurate diagnosis of the most relevant digital skills in the Spanish context, but also to ensure that educational initiatives, such as the DigiGap project, are designed in line with European guidelines.

This approach is essential to create training programs that not only respond to local needs, but also prepare students to participate in a digitalized and globalized society. In addition, the study will evaluate the compatibility of the skills promoted in DigiGap with international standards, promoting inclusive and quality education that facilitates the digital integration of families. This type of analysis contributes to the continuous improvement of educational projects, ensuring their relevance and sustainability over time.

In this case it was necessary to make a comparative study between countries, including Spain, in order to create a common framework for the project and adapt it to the needs.

Methodology

This report on digitization in Spain has been prepared on the basis of an exhaustive process of collection and analysis of information from various official sources, national and international statistics, and specialised studies

Sources of information

- Strategic and policy documents

Key plans and strategies have been reviewed, such as the Digital Spain Agenda 2026 and the Recovery, Transformation and Resilience Plan, as well as European regulations such as the Digital Services Regulation (DSA) and the European Digital Strategy.

- Statistics and official data

Indicators from the National Statistics Institute (INE), the National Technology and Society Observatory (ONTSI) and the National Markets and Competition Commission (CNMC) have been analysed. References from the European Commission's Digital Economy and Society Index (DESI) have also been incorporated to assess Spain's position in the European context.

- Sectoral reports and academic studies

Studies by entities such as Red.es, the Cotec Foundation for Innovation and the Bank of Spain have been consulted, together with analyses by universities and research centres specialising in digital transformation

The data collected has been subjected to a comparative and statistical analysis to identify trends, challenges and opportunities in the digitalisation of the country. A critical evaluation of the policies implemented and their alignment with European objectives has been carried out, contrasting the results with international best practices.
In addition, the literature review has allowed contextualising the findings and examining the impact of digitisation in key sectors such as industry, education and public administration.
This comprehensive approach ensures an accurate and up-to-date picture of the state of digitalisation in Spain, providing key information for decision-making and the design of future strategies.

In short...
Important documents at the national level were analyzed, such as the National Digital Skills Plan of the Government of Spain, which establishes objectives to improve digital skills in the country. Statistics from the National Statistics Institute (INE) were also consulted, which offer updated information on access to technology and the digital divide in different population groups.
At the European level, reports were used such as the Digital Economy and Society Index (DESI), which measures digital progress in European Union countries, and the DigComp 2.2 Framework, which describes essential digital skills for citizens. In addition, OECD studies were reviewed to have a broader and more global vision of trends in digital skills.
The information collected was organized and analyzed to identify the most important digital competencies and compare them with the DigComp standards. This allowed us to evaluate how relevant they are to the DigiGap project.

Part 2: National Context
Current State of Digital Competences

In Spain, the digital divide refers to the difference in access, use and skills related to digital technology between different groups of people. This gap can be determined by socio-economic, geographical, educational and generational factors.

In the case of low-skilled adults, the digital divide can affect them in several ways:

- Limited access to information: Those without access to digital technology may find it difficult to obtain up-to-date and relevant information in areas such as news, public services, banking or health, among others.

- Social exclusion: Digital technology has transformed the way we communicate and socialise. Adults who do not have access to or knowledge of technology may feel excluded from social interactions and opportunities to participate in the digital society.
- Barrier to service delivery: More and more services, both public and private, are delivered online. Adults who are unable to use these digital services may find it difficult to access them, which may limit their access to basic services or restrict their participation in everyday activities.
- Isolation and loneliness: Digital technology can help maintain contact with family, friends and communities through social networks, email or video calls. Lack of digital access or skills can contribute to social isolation and loneliness.
- Limitations in learning and personal development: The digital divide can make it difficult to access online learning opportunities such as courses, workshops or educational resources. This can limit personal development, the acquisition of new skills and participation in intellectual activities.

It is important to address the digital divide in adults through digital literacy, training and technology access programmes tailored to their needs. This will enable them to benefit from the opportunities and services offered by the digital environment, thus fostering greater social inclusion and a better quality of life.

In 2022 in Spain, 94.5% of the population aged 16 to 74 will have used the Internet in the last three months, 0.6 points more than in 2021. This represents a total of 33.5 million users. Internet users have risen in recent years and the gender gap value has gone from 1.8 points in 2017 to 0.0 points in 2022.

As age increases, internet usage decreases, with the lowest percentage in the 65-74 age group (76.4% for men and 76.5% for women).

The highest value of the gender gap in 2022 in Spain corresponds to the 45-54 age group, with 0.8 points in favour of women.

The percentage of people aged 16-74 who have used the internet in the last three months of 2021 is higher in Spain (94%) than in the EU-27 (89%), with a gender gap value of 0 percentage points for both (Croatia reaches the highest value, with 9 percentage points).

The most common online activity for both men and women is the use of instant messaging (via WhatsApp, Skype, Messenger...).

Only 17.8% of employable women have a STEM (science, technology, engineering and mathematics) background. In 2020, there were 12.3 female STEM graduates per 1,000 population in that age range compared to 29.2 graduates. The gender gap is widest in Computer Science and Engineering, with only 13.5% and 27.9% of female graduates in 2020-2021.

On the other hand, less than 20% (19.4%) of digital technology specialists are women. Moreover, salaries in the sector are higher for men, although this gap is larger in the rest of the EU than in Spain.
35.9% of people over 74 years of age have used the Internet in the last three months, 1.6 million people.
24.1% use the Internet on a daily basis (compared to 20.6% in 2021) and 7.4% have shopped online in the last three months (7.0% in 2021). online in the last three months (7.0% in 2021).
By gender, the gap in favour of older men narrows in 2022 with respect to internet use, both in the last three months and in 2021. Internet use, both in the last three months and in daily use. However, it grows with respect to online shopping in the last three months.
Among the online activities carried out by the over 74s in the last three months, the following activities stand out communication applications such as WhatsApp for instant messaging, as well as for telephoning instant messaging, telephoning or making video calls over the Internet.
In addition, 21.3% read the press and current affairs magazines online.
Fuente:https://www.ine.es/ss/Satellite?c=INESeccion_C&cid=1259925528782&p=1254735110672&pagename=ProductosYServicios%2FPYSLayout

Level of digital literacy of households in Spain.

The level of digital skills literacy of households in Spain is an issue of growing concern, especially in the context of the accelerated digital transformation experienced in recent years. According to the European Commission's DESI 2023 report, Spain presents a mixed picture in terms of the digital skills of the population, with notable differences between different age groups, geographical areas and educational levels. Despite efforts to promote digital literacy, especially through initiatives such as the National Digital Skills Plan (PNCD), a significant percentage of families still do not have the digital skills needed to take full advantage of the opportunities offered by the digital society.
The Ministry of Education and Vocational Training's Report on the Digitalisation of Education in Spain (2022) highlights that while most Spanish families have access to the internet and digital devices, their use of these devices is often not geared towards the development of advanced digital skills. In many cases, families limit themselves to using devices for entertainment purposes, such as social networks or the consumption of multimedia content, without engaging in activities that foster the learning of more complex digital skills, such as programming, cybersecurity or the use of collaborative tools

Moreover, the intergenerational digital divide is also significant. According to Fundación Telefónica's Study on the Digital Divide in Spain (2021), families with members over 55 years old have a considerably lower level of digital literacy compared to younger generations. This age group, which represents a significant percentage of Spanish households, often faces barriers related to lack of knowledge of digital tools and lack of confidence in using them, which limits their ability to access public services, carry out online transactions or actively participate in the digital economy. Although 85% of households in Spain have access to the internet, only 60% of people over the age of 65 consider themselves digitally competent (Fundación Telefónica, 2021).

Regional disparities also play an important role in the digital literacy of households. Rural areas, especially those with less telecommunications infrastructure, face greater difficulties in accessing digital training and technological resources. According to the Government of Spain's Digital Inclusion Report (2022), rural areas have a much lower digital literacy rate than urban areas, which amplifies inequality in access to digital education and training. This particularly affects families who do not have the means to access modern technological devices or high-speed internet, limiting opportunities for learning and participation in the digital society.

On the other hand, initiatives to improve digital literacy in Spanish families have shown positive results, although much remains to be done. Programmes such as Digitaliza, which offers training in digital skills for families and people in vulnerable situations, and the aforementioned PNCD, are helping to improve the digital skills of citizens. However, these programmes do not always reach all families equally, especially those from the most disadvantaged backgrounds. Inclusive digital education is key to ensuring that all social groups have access to the same training opportunities, regardless of their socio-economic level or geographical location

Finally, in Spain, the digital divide between men and women has been decreasing in recent years, with a deviation of less than 5 percent.

According to the data extracted from the report, 92.8% of Spanish women aged 16 to 74 use the Internet at least once a week, two tenths of a percentage point less than men. Compared to the European average, Spanish women use the Internet more, with a difference of 4.7 percentage points. Moreover, Spain, together with Denmark, is the EU country closest to gender parity in regular Internet use.

There has been significant progress in the last two decades, since at the beginning of the century the gap in Internet use was around ten percentage points in favour of men, a gap that has been progressively closing.

Age also plays an important role. **Fewer women over 75 have ever used the Internet than men of this age (39.7% compared to 44.6%).** In the 10-15 age group, girls have a higher use of computers and mobile phones, but not the Internet.

Spain has risen four places compared to last year in the dimension of Internet use according to the Women in Digital Scoreboard, ranking eleventh.

Level of digital skills literacy of teachers in Spain

The level of digital skills literacy of teachers in Spain has improved in recent years, but there are still important challenges to be addressed to ensure effective integration of technologies in the classroom. According to the Fundación Telefónica Report (2021) on the state of digital education, teachers in Spain have shown progress in the use of digital tools, especially after the COVID-19 pandemic, which forced a massive transition towards distance education and the use of digital platforms. However, the study also points out that while many teachers have mastered the basic tools of educational technology, advanced skills in areas such as digital content creation, programming and data analysis remain limited among a significant proportion of teachers.

The European Commission's Report (**2022**) **on the Digital Competence of Teachers** (**DigCompEdu**) **reveals that only a small percentage of teachers in Spain have digital competences at high levels, such as the ability to integrate technologies strategically into their pedagogy or to use digital tools creatively in the classroom. According to the Study on the Use of ICT in Educational Institutions** (**2021**)**, conducted by the Spanish Ministry of Education and Vocational Training, approximately 60% of teachers in Spain regularly use digital technologies for activities such as searching for information or communicating with students, but only a small percentage use them for more complex teaching activities, such as designing interactive educational resources or fostering collaborative learning through digital platforms.** This phenomenon suggests that, although teachers have access to technology, they do not yet use it to its full pedagogical potential

The DESI 2023 Report also points out that teachers' digital skills vary considerably according to age, educational background and professional experience. Younger teachers tend to be more familiar with new technologies, having grown up in a digital environment. In contrast, older teachers, while many possess basic skills, often face greater difficulties in adapting to advanced digital tools, such as the use of learning management platforms or the design of interactive content. This generation gap is reflected in the urgent need for ongoing training and support for those teachers who do not have a solid background in the pedagogical use of technology

In addition, disparities between the Autonomous Communities and the lack of uniform training are factors contributing to the heterogeneity of teachers' digital skills in Spain. While some regions have implemented highly advanced and accessible digital training programmes, others still lack specific plans to train their teachers in the use of ICT (information and communication technologies). **The Digital Initiative in Education** (**2021**)**, promoted by the Ministry of Education and Vocational Training, has been instrumental in establishing teacher training frameworks, but the implementation of these programmes remains uneven.**

In terms of specific policies to improve teachers' digital skills, the National Digital Skills Plan 2021-2025 includes measures to provide training for teachers, with a focus on integrating technology in the classroom. However, Fundación Telefónica (2021) stresses that while initial training and continuous training are essential, it is also necessary for teachers to be given adequate time and resources to experiment with new technologies in their educational environment, as lack of time and institutional support are major barriers to pedagogical innovation.

Digital literacy level of pupils in Spain.

The digital literacy level of students in Spain has improved over the last decades, thanks to increased access to technologies and the incorporation of ICT (information and communication technologies) in educational curricula. However, according to the European Commission's DESI 2023 Report, Spanish students still face challenges in terms of the depth and diversity of their digital skills, especially in comparison with other EU countries. Although a high percentage of students have access to devices and the internet at home, the quality and extent of the training they receive on the use of these technologies varies significantly.

The Study on the Use of ICT in Education in Spain (2022) conducted by the Ministry of Education and Vocational Training reveals that more than 90% of secondary school students in Spain use the Internet and digital devices on a regular basis for learning-related activities. However, this widespread access does not necessarily guarantee full digital literacy. Although students are often familiar with basic digital tools, such as surfing the internet, using social networks and viewing multimedia content, advanced competence in the use of technologies for problem solving, content creation or programming remains limited. According to the Fundación Telefónica Report (2021), only 30% of students in Spain can be considered competent in the use of digital tools for the creation and production of interactive content or in the application of technology for complex tasks

IA particularly worrying aspect is the digital divide affecting students from lower socio-economic backgrounds or those residing in rural areas. According to a report by the Bank of Spain (2021), students from lower income families have less access to adequate devices and high-quality internet connections, which limits their opportunities to develop advanced digital skills. Despite policies promoted in recent years, such as the Network of Digital Resource Centres and connectivity grants for vulnerable students, there are still significant inequalities affecting digital literacy in different social groups.

Gaps and Needs

In Spain, digital skills have made considerable progress in recent years, but there are still areas where there are noticeable differences between what individuals and groups can do with technology and areas where gaps remain. The following highlights the areas where digital skills are strongest and those where there are significant gaps.

Areas with Strong Digital Competencies

1.**Programming and Computational Thinking.**
One of the most prominent areas where significant gaps exist is in programming and computational thinking. Although some educational programmes such as the Digital Education Action Plan in Spain include training in advanced technological skills, the teaching of programming remains limited and is not integrated in a transversal way at all educational levels. According to the European Commission Report (2022), only a small percentage of students in Spain have the opportunity to learn programming from an early age, which limits their ability to participate in advanced technological professions. Moreover, the integration of these skills in educational curricula is not uniform, leading to disparities between autonomous communities.

2.Cybersecurity and Privacy Protection.
Cybersecurity and privacy protection is another area where digital skills are weak. Although students and workers are increasingly familiar with the use of technology, many do not have the necessary skills to protect themselves from digital threats such as phishing, personal data theft and online scams. According to INCIBE's Report on Cybersecurity in Spain (2022), only a fraction of the population has sufficient knowledge to implement good cybersecurity practices. Moreover, the lack of systematic cybersecurity education in schools contributes to the fact that many students lack the necessary skills to manage their privacy and security in the digital environment.

3.Advanced Digital Content Creation.
The creation of advanced digital content, such as the design of websites, mobile applications, interactive videos and multimedia educational materials, is a skill that is still underdeveloped in a large part of the population. Although digital content creation tools, such as video editors, graphic design and programming software, are more accessible, competence in their use to develop quality digital products remains limited in many educational and professional environments. The Digital Economy Report (2023) highlights that only a small percentage of Spanish students are trained in the development of complex digital projects, which puts them at a disadvantage compared to other economies that have integrated digital creation as a key skill from an early stage

4.Critical Digital Literacy.

Finally, critical digital literacy is a skill that remains scarce, especially in terms of the ability to assess the quality of online information, detect fake news or manage the impact of algorithms on users' behaviour. The Telefónica Foundation (2021) mentions that many people do not have the necessary skills to discern between reliable and unreliable information, which can lead to the spread of misinformation, especially on social networks. Although some educational programmes attempt to address this issue, digital media literacy remains a major gap in the Spanish education system

We can confirm that there are significant gaps in Spain in critical areas such as programming, cybersecurity, advanced digital content creation and critical digital literacy. Addressing these gaps through education policies and lifelong learning programmes will be essential to ensure that citizens and professionals in Spain can effectively and safely participate in the digital economy and society

- **Needs and Demands:**
  - Look for reports or studies that identify the most in-demand digital competences
  - Focus on skills relevant to education, family settings, and the workforce.

The most in-demand digital skills encompass communication and collaboration in digital environments, technological problem solving, and specific skills in areas such as digital marketing, software development, cybersecurity and artificial intelligence. These skills are essential for education, family life and employability in the contemporary labour market.

National Frameworks and Policies

National Digital Skills Plan:

The aim of this measure is to ensure the digital inclusion and training of all citizens, leaving no one behind in the process of digital transformation. It is aimed at the entire population, but focuses especially on training in areas in demographic decline and on eliminating the gender gap. This plan is divided into four main lines of action:

- Basic digital skills training for groups with the greatest problems of digital inclusion, such as the elderly, women, people with low levels of education and income, as well as non-urban areas.
- Ensure that students have advanced digital skills by the end of secondary education.
- Train workers with the digital skills needed to perform their jobs, as well as to increase and promote productivity and remote working.
- Address the demand for both advanced and generalist digital specialists in Spain's economy, with a focus on reducing gender gaps.

In Spain, the 'National Digital Skills Plan' and the 'Digital Skills Framework for Citizenship' (DIGCOMP) are the main instruments to improve digital skills. In education, the 'Marco de Referencia de la Competencia Digital Docente' seeks to strengthen the technological training of teachers (portal.mineco.gob.es, intef.es).
Although Spain stands out in terms of connectivity thanks to its fibre optic network, according to the OECD, there are still shortcomings in terms of labour inclusion and gender equality in the technology sector (elpais.com). Programmes such as the 'Digital Kit' have been criticised for implementation problems, limiting their effectiveness in supporting disadvantaged companies and regions (cadenaser.com).

Part 3: European-Level Analysis
Overview of DigComp

The Digital Competence Framework for Citizenship (DigComp) is a European Union tool that defines the digital skills needed for full participation in the digital society. It is structured in five key areas:
-Information and digital literacy: Ability to search for, evaluate and manage information in digital environments.
-Communication and collaboration: Ability to interact, share and collaborate through digital technologies.
-Digital content creation: Competence to develop and edit digital content, understanding copyright and licensing rules.
-Security: Knowledge to protect devices, personal data and privacy in digital environments.
-Problem solving: Ability to identify technological needs and solve technical problems.
These areas are broken down into 21 specific competences, each with descriptors and levels of mastery that facilitate their assessment and development (DigComp 2.2).
In Spain, national priorities in digital skills are closely aligned with the areas defined by DigComp. The National Plan for Digital Skills seeks to guarantee the digital training and inclusion of citizens, emphasising digital literacy, online safety and the ability to create digital content (National Plan for Digital Skills).
In addition, initiatives such as the Digital Competence Framework for Teachers focus on strengthening communication and collaboration skills, as well as the creation of digital content among educators (Digital Competence Framework for Teachers).
In summary, the DigComp areas provide a structured basis that is reflected in Spain's national strategies to address digital skills gaps, ensuring comprehensive training adapted to the current needs of society.

European Trends and Statistics

According to Eurostat data, in 2023, 56% of EU citizens will have basic or advanced digital skills. However, there is significant variability between Member States. Sweden, Luxembourg and Finland lead with 8-9% of their population employed as ICT specialists, while Spain is around 4%, slightly below the European average.

ESMARTCITY

The European Commission's State of the Digital Decade 2024 report highlights that while progress has been made in digitisation, significant differences persist between countries in areas such as digital infrastructure, technology adoption by businesses and digital skills of citizens.

Shaping Europe's digital future

In Spain, 64% of the population has basic digital skills, exceeding the EU average. However, the country faces challenges in the adoption of advanced technologies and in the training of ICT specialists.

España Digital

While the EU as a whole is moving towards digitisation, disparities between Member States in digital skills and technology adoption underline the need for policies tailored to national realities to achieve the Digital Decade goals

Relevance to National Context

The European findings and the national analysis on digital skills in Spain are closely related, as both highlight advances in connectivity and access to technological tools, but also identify common challenges.

At both European and national levels, an intergenerational digital divide persists, where older adults and families with lower socioeconomic status face difficulties in accessing and using basic digital tools, limiting their participation in the digital society. Furthermore, the education system, although it has made progress in digitalisation, faces significant shortcomings in teacher training.

Many teachers in Spain and Europe lack the necessary skills to integrate technological tools into their methodologies, which restricts the impact of technology on learning. There is also a widespread deficit in advanced digital skills, such as programming or data analysis, which are key to employability in growing technological sectors. However, both Spain and Europe have shared opportunities, such as their strong technological infrastructure, including advanced fibre optic and 5G networks, and the implementation of digital literacy initiatives.

These opportunities, together with the alignment of national objectives with European frameworks such as DigComp, reinforce Spain's capacity to take advantage of best practices and collaborate on international projects that foster an inclusive digital transformation

Part 4: Conclusions and Recommendations
Key Findings

In Spain, despite progress in digital skills, there are still significant gaps that hinder the full integration of the population and the labour market into the digital economy. One of the main gaps is the generation gap, with only 27% of people over 65 years old possessing basic digital skills, compared to 85% of 16–24-year-olds, according to Eurostat (2023). This inequality limits older adults' participation in essential digital activities, such as access to online public services or digital communication. Moreover, educational and economic inequality is also notorious: 85% of people with higher education have digital skills, compared to 38% of those with lower levels of education, showing a direct correlation between educational attainment and digital skills (Economist, 2023). This disparity is more acute in rural areas, where access to training and digital infrastructure is more limited (COTEC, 2023).

Another relevant shortcoming is the lack of advanced digital skills. Although Spain exceeds the European average in basic skills, specialised training in areas such as cybersecurity, data analytics and programming is insufficient to meet labour market demand. According to the Digital Economy and Society Index (DESI, 2023), more than 57% of Spanish companies identify the lack of skilled digital talent as a major barrier to their growth. Areas such as cybersecurity are especially critical, as the increase in digital threats has generated a high demand for professionals who can protect business systems and data, a field where the labour supply does not meet market needs (INCIBE, 2023). Similarly, data analysis and big data are highly valued skills, as they allow companies to make decisions based on large volumes of information, although only 10% of workers in Spain possess skills in this area (DESI, 2023).
In addition, sectors such as digital marketing and software development are experiencing a growing demand for professionals. With the rise of e-commerce and social media, companies are looking for specialists in digital strategies, SEO/SEM optimisation and digital platform management (Cadenaser, 2025). In programming, developers with experience in languages such as Python, Java and SQL are needed, especially in emerging industries such as artificial intelligence, fintech and educational technology (Fundación Telefónica, 2023). However, another significant challenge is the gender gap in STEM (Science, Technology, Engineering and Mathematics) areas. Only 19% of ICT specialists in Spain are women, reflecting an under-representation that needs to be addressed through equality policies and specific programmes to encourage female participation in these fields (Eurostat, 2023).

In conclusion, Spain faces considerable challenges in closing the existing gaps in basic and advanced digital skills. The generation gap, educational and economic inequality, and the shortage of specialised talent are priority areas that require comprehensive solutions. Investing in inclusive training programmes that enable the integration of older adults and people from disadvantaged backgrounds into the digital economy is essential. Also, fostering training in advanced areas such as cybersecurity, data analytics and programming is essential to meet labour demand and boost the country's competitiveness. Finally, addressing the gender gap in technological areas is a key step towards a more equitable and sustainable digitalisation. According to sources such as Eurostat (2023), Fundación Telefónica (2023) and COTEC (2023), these efforts can position Spain as a benchmark in digital skills in Europe, provided that inclusive and future-oriented strategies are implemented.

Recommendations

To address gaps and improve digital skills in Spain, it is essential to prioritize inclusive training, access to technology and public-private collaboration. An effective strategy is to strengthen digital literacy from primary education to university training, incorporating practical content on digital tools, programming and cybersecurity in the study plans (Redecker & Punie, 2017). In addition, it is crucial to promote continuing training programs for adults, especially in sectors with low technological adoption, taking advantage of online learning platforms and subsidies for workers (OECD, 2021).
To integrate these findings into project activities, community workshops can be designed that combine in-person and virtual training, adapted to different levels of digital competence

Collaboration with technology companies would allow the development of initiatives such as access to equipment and connectivity for vulnerable groups, closing the digital divide (European Commission, 2020). It is also essential to measure the impact of these activities through clear indicators, such as the increase in the use of digital tools or access to employment in technological sectors, aligning the project objectives with the commitments of the National Digital Skills Plan (Government of Spain, 2021).

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POLAND

Part 1: Introduction
Context

The main objective of the DigiGap project is to minimise a digital gap between generations (students, parents and grandparents or other relatives living in the same households). The first step on this project consists in teaching students in our school basic digital skills such as using technological tools, responsible and safe use of the Internet so that they become digital agents in their families and provide these skills to their families. That way in our students' homes will be carried out a digital transformation. This project is inclusive because it increases the level of digital competences and the possibility of their development according to needs at all stages of life.
The joint research study is significant for the project's objectives because it will provide us with data which we will be able to use to analyse and identify digital gaps between generations and the real impact of the training on students and their families

Purpose of the Study

The main goal of this desk research study to be carried out by Primary School in Podłopień, is showing the level of digital competences in Poland, comparing these internal results to European countries and analysing their alignment with the Digital Competences Framework for Citizens (DigComp). This study will show that the DigiGap project is designed in line with European guidelines and also responds to local needs. Furthermore, this study ensures that the digital competences promoted in the DigiGap project are compatible with European standards promoting inclusive education and families digital integration.

Methodology

This report is based on statistical data from such websites as: Eurostat, European Commission, as well as reports form Polish Digitisation Ministry.
At the national level were analysed statistics showing the updated information on access to technology, the digital divide in different population groups, level of basic digital competences in Poland and EU countries. At the European level were focused on reports from the DigComp 2.2 Framework which describes essential digital skills for citizens.

The collected information was organised and analysed to identify the most crucial digital competences and compare them standards in the DigiGap project. In that we as partners of the DigiGap project will know which competences we should focus on.

Part 2: National Context Current State of Digital Competences

The broader competences of the future are fundamental to the development of the digital sphere in the state. Citizens must not only be able to use digital technologies, but also do so in a healthy way, know the principles of digital hygiene or be able to recognise disinformation. Digital competences themselves are crucial for the efficiency, innovation and competitiveness of the Polish economy. According to Eurostat, in 2023 only 44% of Polish citizens will have at least basic (EU average - 56%) and 20% will have more than basic digital skills (EU average - 27%).

The digital competences deficit is particularly evident among older people (aged 65-74), where 87% lacked even basic digital skills (EU average 72%), and in the 55-64 age group, where such people accounted for 76% (EU average 56%), as well as among farmers and people with disabilities - 77%. There was also a significant disparity between urban and rural residents: the percentage of rural residents with at least basic digital competences was 33% (EU average 47%), 22 percentage points lower than for urban residents. Digital competences should enable citizens to understand and find their way in an environment that uses technology in almost every aspect of life. People with low digital skills are much more likely to be misinformed and unable to verify information received digitally. In 2023, the share of ICT specialists in the total number of employed people in Poland will reach 4.3% (EU average - 4.8%). In view of the projected increase in demand for this category of workers and the percentage of 10% planned for the EU in the Digital Decade for 2030, this state should be considered unsatisfactory. Women in Poland, like in the EU, accounted for 19% in the group of ICT specialists. This imbalance works to the disadvantage of women themselves, as well as the ICT sector and the economy. According to the data, the Polish education system does not guarantee that secondary school graduates obtain a basic level of digital competence - in 2023, only 58% of 16-19 year-olds had at least basic digital skills. There is a lack of a systemic solution for raising digital competences of public administration employees, thanks to which the level of provision of e-government services and the level of citizens' satisfaction would increase.

Gaps and Needs

The biggest differences in the Polish population were in terms of:
·safety skills - 54%,
·digital content creation skills - 60%, problem-solving skills - 77%.
Digital natives in Poland use the web less intensively and not as comprehensively as the average EU citizen.
Gaps in digital competences are observed in the following areas, among others: using the Internet for learning, using online banking, searching for a job online, searching for health information, making video calls or using Skype, Messenger, WhatsApp, Viber.

	Residents of Poland	**EU average**
using the Internet for learning	18%	31%
making phone calls, making video calls or exchanging messages, e.g. via Skype, Messenger, WhatsApp, Viber	72%	82%
using electronic banking	59%	64%
looking for a job online	6%	15%
seeking health information	53%	56%

National Frameworks and Policies

In February 2023. The Council of Ministers adopted the Programme for the Development of Digital Competences (PRKC), which is valid in Poland until 2030. The Ministry of Digitalisation is responsible for coordinating the implementation of the PRKC.

The Programme envisages the development of citizens' digital competences from pre-school education to senior citizenship. Support under the Programme will be aimed at all those who wish to improve their digital competences - from the digitally excluded, through the economically active, to the digitally talented, who in the future will join the ranks of ICT specialists with the highest competences.

Key objectives of the 2030 Digital Competence Development Programme:

80%	of the Polish population will have at least basic digital
40%	of Poland's population will be digitally literate
6%	of those working will be ICT specialists
29%	ICT specialists will be women

One of the key initiatives of the Digital Competence Development Programme is the creation of digital competency acquisition sites in Polish municipalities, i.e. Digital Development Clubs, which will support residents in the skilful and safe use of digital technologies. In 2025, about 60 municipalities in Poland will establish the first Clubs as part of the pilotBetween 2026 and 2027, all willing municipalities will be able to join the KRC network, offering their services to the local community to support the development of digital competences. Clubs will be set up at existing facilities, such as libraries, community centres, community centres and others, to help interested people become familiar with new technologies and develop digital competences

A particular group to be catered for in this regard will be older people who, in addition to the training offer, will also be able to count on emergency assistance with digital problems. The establishment and operation of the KRC is funded by the European Funds for Social Development (the budget of the project is PLN 1 046 million).

By mid-2026, over 320,000 people are planned to be trained under the NIP in the following four groups: citizens (40% of people to be trained), digitally excluded people (20%), civil servants (20%) and school and pre-school teachers (20%). The training sessions are expected to lead to the acquisition of at least a basic level of digital competence, and digital hygiene and online safety will be an important component of the classes. The total estimated budget for the implementation of these tasks is over PLN 783 million

Part 3: European-Level Analysis Overview of DigComp

The European Commission's Communication 'A new skills agenda for Europe. "A New Skills Agenda for Europe: Working together to enhance human capital, employment and competitiveness" shows ways to address the competence challenges Europe is currently facing. The aim of this initiative is for every citizen to have the key set of skills necessary for personal development, social inclusion, active citizenship and employment. These competences include literacy, numeracy, science knowledge, foreign language skills, as well as more transversal skills - such as digital competence, entrepreneurship, critical thinking, problem solving and learning. The Digital Competence Framework for Citizens, also known as DigComp, offers tools to improve citizens' digital competences. The DigComp framework was developed by the European Commission's Joint Research Centre (JRC) in a scientific project based on consultation and active participation of a wide range of stakeholders and decision-makers from industry, education and training, employment, NGOs etc. The project started in the Directorate-General for Education and Culture and was then continued on behalf of the European Commission's Directorate-General for Employment, Social Affairs and Inclusion. The DigComp framework was published for the first time in 2013 and has since become the reference for the development and strategic planning of digital competence initiatives - both at European level and within individual Member States. However, as the digitisation of society, work and education is progressing rapidly, there has been a need to update the concepts and vocabulary of the DigComp framework.

The objective of DigComp was to improve the digital competences of citizens, to help policy makers formulate policies that would support the building of digital competences and to properly plan education and training initiatives undertaken to improve the digital competences of specific target groups. The DigComp framework also introduced a common language for identifying and describing the main areas of digital competences, thus offering a common reference point at European level.

Areas of competence	**Framework competences**
Information and data literacy	• Browsing, searching and filtering data, information and digital content • Evaluation of data, information and digital content • Management of data, information and digital content
Communication and cooperation	• Digital communication • Sharing information and resources using digital technologies • Active citizenship using digital technologies • Digital collaboration • Netiquette • Digital identity management
Digital content creation	• Digital content creation • Integration and content processing • Compliance with copyright law and licensing • Programming

Security	• Protection tools • Data protection and privacy • Protecting physical health, mental health and well-being from the dangers of using information and communication technologies • Environmental protection
Problem solving	• Resolving technical problems • Identifying the needs and tools required to solve problems • Creative use of digital technology • Identifying digital competence gaps

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European Trends and Statistics

The European Commission has been carrying out systematic activities for the development of digital competences for many years. In line with the principle of subsidiarity, the Commission's actions are defined to complement the activities undertaken by the Member States. EU strategy documents emphasise that all countries undertake some action in this area. The Commission focuses on tasks that have added value at Union level. European Commission communications published every few years update the European approach to einclusion and digital competences. It can also be seen that the strategies defined at Union level have a significant impact on the courses of action defined by the Member States. An example of this is the Digital Skills and Employment Coalition - established at the initiative of the EC, it is supported by national coalitions in individual countries

The EC announces greater commitment and support for Member States in their efforts to enhance cooperation and information sharing on digital education within the community. It therefore decides to set up a European Digital Education Hub, whose tasks are to:

- pooling of experience and exchange of good practice between Member States, national and regional education initiatives, the private sector and the research community,
- monitoring the implementation of the Digital Education Action Plan,
- support cross-sectoral cooperation and the development of common, high-quality digital education standards,
- to act as a think-tank on digital education, which will work to shape education policy and also support innovation.

Important issues related to the implementation of strategies and policies for the development of digital competences are the regular diagnosis of needs and the effects of actions taken, as well as the description of new global and European trends and recommendations based on analysis. Finally, evaluation and monitoring of activities should be important elements of strategy implementation.
According to the Digital Compass, the European Commission has set a target for at least 80% of EU citizens to have at least basic digital skills by 2030. The latest Eurostat data, published in December 2023, shows that only two EU countries - the Netherlands (83%) and Finland (82%) - have reached this figure, while the EU average is much lower (56%). In Central Europe, the Czech Republic (69%), Estonia (63%), Croatia and Hungary (both 59%) performed above this average. Lithuania (53%), Slovakia (51%) and Slovenia (47%) were slightly below the average. Latvia (45%), Poland (44%), Bulgaria (36%) and Romania (28%) had the lowest results in the region and in the EU as a whole

For the latter countries, the results in the two extreme age groups are worrying: among the youngest (16-24) and the oldest (65-74). Among young people, less than half of Romanians (47%) and just over half of Bulgarians (53%) have basic digital skills, as well as around twothirds of Polish (63%) and Latvian (66%) citizens. In comparison, Malta and Finland hold the record in this age group (96% and 94% respectively). Against this background, the results of the Central European countries are all the more surprising as they concern digital natives, people brought up in the digital age. In the case of seniors, on the other hand, only a small percentage of them have basic digital skills in Romania (6%), Bulgaria (7%), Poland (13%) and Latvia (15%). In comparison, the highest results in this age group were reported in the Netherlands and Norway (67% and 60% respectively).
Research shows that in Poland, 44% of the population aged 15+ had at least basic digital skills, with 24% having basic skills and the remaining respondents (20%) having more than basic skills. Thus, more than half of our country's population had very poor digital skills.

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Relevance to National Context

Polish residents do not have very high digital skills compared to other European Union (EU) citizens. The difference in the percentage of people with at least basic digital skills between Poland and the EU was 11 percentage points in both 2023 and 2021. In two years, the percentage increased by only 1 percentage point in Poland, while it increased by 2 percentage points in the EU.

The most common skills among Polish citizens include at least basic digital skills related to using information and data (82%) and communication and collaboration (81%), while the least common skills are related to security. In contrast, EU citizens performed best in communication and collaboration, followed by digital skills related to problem solving, and in third place by skills related to using information and data.
Both men in Poland and in the European Union were slightly more likely than women to have digital skills at least at a basic level. In this context, the percentage of men was 3 percentage points higher than that of women. For both genders, the value of the indicator in the EU was 11 percentage points higher than in Poland.
The report "Digital Decade 2023" prepared by the European Commission recommends that Poland should include digital literacy education at all levels of education.
Improving digital competences is also important for the citizens of EU countries themselves, as confirmed by a special edition of the Eurobarometer survey on the digital decade. According to this research, 70% of Poles believe that increasing the provision of education and training in digital services would make it much easier for them to use digital technologies on a daily basis. Polish society recognises the need to improve its digital skills and appreciates the importance of education in this area.

Part 4: Conclusions and Recommendations

Key Findings

There is a significant digital skills deficit in Poland. This is due to the lack of sufficient educational initiatives at various levels of education, both formal and informal, which would be aimed primarily at groups particularly at risk of digital exclusion, such as the elderly, residents of rural areas or people with low incomes.
In Poland, as in most European countries, there is a digital skills gap. The main gap is the generation gap - only 13% of people aged 65+ have basic digital skills, compared to 63% of 16-24 year olds (according to Eurostat 2023).
The digital skills gap is also observed among those with higher education. They score around 40 percentage points higher than those with secondary or primary education.
The third major digital skills gap, at 22 percentage points, is between rural areas and large cities.
Poland should increase efforts in the area of digital skills. In particular, Poland should strengthen digital skills in primary, secondary and vocational education and increase the upskilling of the workforce, paying particular attention to advanced and new technologies.
The most relevant digital competences from the point of view of the project objectives are:

- digital competence including the use of computers and other electronic devices, safe use of the Internet,
- information and communication competences, including the ability to search for information as well as to communicate at a distance using digital technologies,
- functional competences, such as finances, maintaining relationships, health, hobbies, civic engagement, in line with the principles of safe digital use.

Recommendations

In order to bridge the gaps and raise the level of digital literacy in Poland, it is recommended, among other things:

- implementation of training and technology workshops. Workshops can include basic operation of computer equipment or remote communication skills.
- Introducing e-learning tools. They are an excellent way to expand your knowledge of digital solutions. In this way, you can learn on your own with online courses and interactive learning materials.
- cooperation with technology companies. Providing companies with computer equipment, implementing digital technologies, increasing access to digitisation of society.

Annexes

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