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SCIENCE FOR POLICY BRIEF

What drives workers' participation in digital skills training? Evidence from Cedefop's second European skills and jobs survey

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HIGHLIGHTS

Context:

→ Digital skills mismatches have been high on the EU policy agenda for some time.

→ Skills mismatches are a concern for policymakers and researchers as they are closely associated with negative labour market outcomes such as wage penalties, absenteeism, high turnover, and lower levels of job satisfaction.

→ Training is one policy instrument that can be implemented to address skills mismatches.

Objectives:

→ This brief contributes to policy on provision of digital skills. It uses data from Cedefop's second European skills and jobs survey (ESJS2) and provides new evidence by (i) describing the characteristics of the digitally-underskilled in the EU workforce; and (ii) identifying characteristics of EU workers undertaking digital skills education and training.

Research implications:

→ More research on motivation and incentives for training, quality of training and its impact is needed.

→ More comprehensive measures of digital skills mismatch may enable better targeting and implementation of education and training.

Key policy messages:

→ Around 13% of EU workers are affected by digital skills mismatch to a great extent.

→ While new technologies do not necessarily cause mass unemployment, there is a need for upskilling and reskilling of workers who are likely to face marked changes in their job tasks due to the advent of new digital technologies.

→ Policy efforts could be targeted to those reporting a digital skills mismatch but not participating in any digital skills training, and workers with a higher chance of reallocation due to new digital technologies.

→ Job-skills requirements, i.e. the level of skills demanded in individuals' jobs, are the strongest drivers of participation in digital skills training.

→ Individual attitudes and perceptions (e.g. fear of automation) towards technology are also important drivers of digital skills training participation.

→ Design and implementation of education and training initiatives should take both individual attitudes and specific job-skills requirements into account.

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POLICY FRAMEWORK

The European Year of Skills[1], launched in May 2023 and running until May 2024, provided a new momentum to reach the EU 2030 target[2] of ensuring that at least 60% of adults are in training every year (with 2022 rates estimated at 39.5%)[3], and the Digital Decade skills targets[4] of 80% of the adult population having at least basic digital skills by 2030; reaching 20 million employed ICT specialists in the EU; and promoting the access of women to the ICT sector to close the persistent gender gap. Moreover, the European Commission's Digital Education Action Plan 2021-2027[5] considers the development of digital skills and competences as a strategic priority; the Skills Agenda supports the development of digital skills at all levels; and the 2022 European Declaration on Digital Rights and Principles for the Digital Decade[6] states that everyone "should be able to acquire all the basic and advanced digital skills they need".

In November 2023, the Council adopted two sets of recommendations on improving the provision of digital skills and competences in education and training; and on enabling factors for a successful digital education[7]. These recommend that Member States agree on national/regional strategies for digital skills (competences), invite them to set or review national objectives for the provision of skills, take measures targeting 'priority or hard-to-reach groups', give adults opportunities to acquire digital skills, and address the shortage of ICT professionals.

Furthermore, the Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience (2020)[8] underlines the importance of a modern and digital provision of VET, according to the current and future requirements of the labour market, while the 2020 Osnabrück Declaration[9] defines VET as an enabler of recovery and just transitions to digital and green economies.

The ongoing policy debate on the future of work is featured in the above policy initiatives. A strong theme in this debate is the impact of AI and automation on jobs and skills (Arregui Pabollet et al., 2019). On one hand, job losses are predicted, although estimates vary widely[10]. On the other hand, new technologies also create new job opportunities with strong policy implications for upskilling and reskilling[11].

This brief contributes to policy on the provision of digital skills of the workforce. By focusing on analysis of Cedefop's second European Skills and Jobs Survey (ESJS2, 2021), it provides new information and evidence by (i) describing the characteristics of the digitally-underskilled in the EU workforce; (ii) identifying characteristics of EU workers undertaking digital skills education and training; and (iii) establishing main policy messages and research implications.

We also consider the theme of AI and automation by examining the extent to which both fear and experience of automation drives adult workers' participation in education and training to improve their digital skills.

LITERATURE REVIEW AND RESEARCH QUESTIONS

The concept of skills mismatch (of which digital skills mismatch is a subset) in the economic literature is multifaceted and encompasses a variety of types which are very different in terms of their measurement, determinants and impact. Measures of mismatch can be typically sub-divided into those measured at individual or worker level and employer or organisation level (Cedefop, 2010; McGuinness et al., 2018):

1. **Individual level**
   - Vertical mismatch
     a. *Over-/Under-education*[12]
     b. *Over-/Under-skilling*[13]
   - Horizontal mismatch[14]
   - Skill obsolescence[15]
2. **Organisation/Employer level**
   - Skills gaps[16]
   - Skill shortages.[17]

In this study, the main skill mismatch measures fall into the **vertical skills mismatch** category, and more specifically focusing on **under-skilling** (see below, under *Main Definitions*).

Skills mismatch is an issue of concern for policymakers and researchers for a variety of reasons. Low job match quality (which encompasses education and skills mismatch as well as worker's perceptions of the job; Zhang et al., 2021), is closely associated with wage penalties, absenteeism, high turnover, lower levels of job satisfaction and other negative labour market outcomes (Cedefop, 2018; Shevchuk et al., 2019; Somers et al., 2019; Bischof, 2021; Brunello and Wruuck, 2021).

[1] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-year-skills-2023_en
[2] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3782
[3] This target is based on the percentage of adults aged 25-64 who have participated in at least one formal or non-formal education or training activity (excluding guided-on-the-job training activities) during the 12 months before the survey. The 2022 participation estimate of 39.5% is from the Adult Education Survey (AES) https://circabc.europa.eu/ui/group/d14c857a-601d-438a-b878-4b4cebd0e10f/library/ac6f3889-ab25-4f75-9c7a-de997f65e2db?p=1&n=10&sort=modified_DESC
[4] Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030, OJ L 323, 19.12.2022, p. 4–26.
[5] COM(2020) 624 final
[6] OJ C 23, 23.1.2023, p. 1.
[7] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202401030 and https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202401115
[8] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A32020H1202%2801%29
[9] https://www.cedefop.europa.eu/files/osnabrueck_declaration_eu2020.pdf
[10] https://knowledge4policy.ec.europa.eu/visualisation/impact-automation-number-jobs_en
[11] https://knowledge4policy.ec.europa.eu/foresight/topic/changing-nature-work/AI-and-automation_en
[12] Where a worker may have higher or lower qualifications than those needed by their job. Often calculated by obtaining workers' self-assessment of the formal level of qualification required 'to get' or 'to do' the job, or by computing the 'mean' or 'typical' qualification level required in an occupation, which is compared to the highest level of education attained by the worker. This is called both education mismatch and qualification mismatch in the literature.
[13] Where an individual's skill level may be higher or lower than that required by their job. Frequently measured on the basis of a comparison between the skill level required by a job and the skills possessed by an individual worker, who can then be categorised as skill-matched, over-skilled or under-skilled.
[14] This is the extent to which workers, typically higher education graduates, are employed in an occupation that is unrelated or not closely related to their principal field of study.
[15] This is the process by which workers' skills become obsolete as they lose market value or because of physical atrophy.
[16] This is quantified employers' view on the extent to which workers lack the skills necessary to perform their current job to a proficient level.
[17] This is the extent to which employers are unable to fill / find it hard to fill vacancies due to a lack of suitably qualified candidates.

At the same time, training is one policy instrument that can be implemented to mitigate skills mismatches, particularly when there are skills deficiencies and also when it may contribute to higher job quality and better skills utilisation. Training has been shown to reduce skills mismatches (Pouliakas and Wruuck, 2022), although the positive effect of training on skill mismatches can vary across occupations, industries or regions (Messinis and Olekalns, 2007; Ferreira et al., 2017; Brunello and Wruuck, 2021). Additionally, training has significantly positive short- and long-term effects on job match quality (Zhang et al., 2021) and is positively associated with job satisfaction and negatively associated with turnover intention (Haepp, 2022; Park and Luo, 2022; Wen et al., 2023).

Existing research which has identified factors related to participation in training shows that low-skilled workers are less likely than high-skilled ones to participate in adult learning than (OECD, 2020, 2023). Aside from the policy priority to increase the level of basic skills in the population, this finding is of concern when we consider that low-skilled workers are also at increased risk of displacement due to job automation (Lassébie and Quintini, 2022; Nedelkoska and Quintini, 2018; Pouliakas, 2018). And, even though fear of automation is positively associated with individuals' intentions to undertake training (Innocenti and Golin, 2022), the low-skilled are also less likely to be concerned about the potential negative consequences of digital technology compared to those exposed to digitalisation (Cedefop, 2022b). Furthermore, when looking at institutional factors, it appears that workers in occupations at high risk of automation are consistently less likely to participate in job-related adult education and training, irrespective of welfare regime (Ioannidou and Parma, 2022).

Recent literature on automation has investigated the implications of different technologies on employment share (Klenert et al., 2022; Hu et al., 2023), and on the changing structure of skills and job tasks (Fernández-Macías and Bisello, 2022; Guo et al., 2022; Fernández-Macías et al., 2023). Evidence shows that automation, robotics and information technologies in general affect industries heterogeneously, inducing employment growth in some and decline in others (McGuinness et al., 2021; Fossen and Sorgner, 2022; Restrepo, 2023). Risk of automation is higher for those occupations that rely on tasks that can be more easily carried out by computers or machines, such as those with high focus on routine-middle-skilled, manual-routine and manual-non-routine tasks.[18]

The advent of new digital technologies in EU workplaces, including AI and other Industry 4.0 computerised machines, has been associated with positive labour market outcomes, such as growing workplaces and better overall markers of job quality (Cedefop, 2022b), higher job satisfaction and safety, reduction in repetitive taks, and wage increases (Lane et al., 2023), as well as with negative impact on specific dimensions of job quality, such as work intensity (Antón et al., 2022).

For digital skills specifically, it is often claimed that the labour market for IT occupations is tight, with increasing demand for IT professionals who are in scarce supply. **But digital skill needs far transcend IT occupations.** In recent years, fostered also by the Covid-19 pandemic, a growing number of sectors and occupations have been rapidly experiencing a digital transformation, resulting in growing demand for digital skills in non-IT jobs as well (Cedefop, 2023). Even prior to the pandemic, evidence existed for a digital skills gap that is broader than that associated with IT professions. A study on digital skills gaps in the EU that used data collected prior to the pandemic has confirmed priority groups for policy support which go well beyond the IT sector (Centeno et al., 2022).

This policy brief is guided by two research questions:

- **Who are the digital under-skilled in the EU workforce?**
- **Which characteristics are associated with undertaking digital skills training?**

THE DATA

Cedefop's second European skills and jobs survey (ESJS2)[19]

The European skills and jobs survey (ESJS) is a Cedefop periodic EU-wide survey. It provides robust information from representative samples of adult workers on a core set of measures, including sociodemographic characteristics; job characteristics; job-skill requirements (literacy, numeracy, digital, analytical, manual and interpersonal skills); skill mismatches (vertical, horizontal, mismatches in specific skills, skill gaps); initial and continuing vocational education and training participation; and labour market outcomes (wages, job insecurity, job satisfaction).

The second wave of the survey (ESJS2), carried out in 2021, aims to inform the ongoing policy debate about the impact of digitalisation on the future of jobs and the changing nature of work, as well as heightened concerns about the long-term effect of the Covid-19 crisis on EU digital skill needs and new forms of digital and distance learning. It does so by analysing comparative information from 46,213 adult employees from all EU Member States plus Norway and Iceland (EU+) (Cedefop, 2022a, 2022b)[20].

Among others, the ESJS2 provides new evidence on the following areas: (i) what tasks EU+ workers do in their jobs and the skill needs implied, with particular emphasis on digital skill needs; (ii) the exposure of EU+ adult workers to new digital and automating technologies in a cross-country comparative context; (iii) the extent of technological change and digitalisation in EU workplaces and its impact on workers' skill needs, skill mismatches and overall job quality; and (iv) the extent to which EU+ workers are adapting to digitalisation via continuing learning and supportive workplace practices[21].

[18] This means that the job-specific knowledge of medium-skilled or manual workers is likely to become obsolete more rapidly, while the skill content of cognitive-non-routine and cognitive-routine occupations is less exposed to automation.

[19] https://www.cedefop.europa.eu/en/projects/european-skills-and-jobs-survey-esjs

[20] In partnership with the European Training Foundation (ETF), the ESJS2 has been carried out in 2022-23 in an additional five Western Balkan countries plus Israel, collecting information from paid adult workers from a total of 35 EU and neighbourhood countries.

[21] An online data explorer for the ESJS2 is available at *https://www.cedefop.europa.eu/en/tools/european-skills-jobs-survey*

Main definitions

This analysis is based on the following main concepts and ESJS2 survey questions:

- **Digital skills:** The digital skill level of adult workers is defined on the basis of their use of computing devices or related computerised machinery as part of their main job, as well as the intensity of the digital activities users regularly carry out when doing their work. Non-users are also asked about their knowledge in carrying out specific digital activities.
- **Digitally under-skilled**: Defined at the level of the individual worker by asking respondents "To what extent do you need to further develop your computer/IT skills to do your main job even better?" Throughout this analysis when we refer to "digital under-skilled workers" we focus on workers who responded "a great extent".[22]
- **Qualification mismatch:** Has a lower, higher or matched qualification compared to that needed for the job, based on a comparison between respondents' highest level of education and that required for the job.
- **General training participation**: Based on answering 'yes' to participation during the past 12 months to any of the following (formal or non-formal) education or training activities: (a) Courses; (b) Workshops or seminars; (c) On the job training with the support of a designated trainer.
- **Digital skills training participation**: [Following from the previous question and asked to those answering 'yes' to it] "And was at least one of these education or training activities done to further develop your computer/IT skills needed for your job?"
- **Experience of technological change:** Based on answering yes to the question "In the last 12 months, have you had to learn any new computer software or computerised machinery to do your main job?". Whether such technological upskilling is associated with job-task automation or augmentation is captured as follows: "As a result of the new[23] computer programs or software/new computerised machinery you learnt for your main job in the last 12 months, did your job tasks change in the following way:
  - **With task replacement:** *You now do not do some tasks you did before*?"
  - **Without task replacement:** (a) *You now do some different or new tasks*; (b) *You now do some of your tasks at a faster pace than before*?"

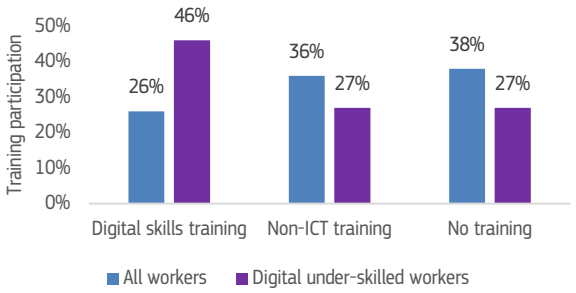
SIZE OF THE PROBLEM

Digital skill mismatches and training in EU+ from ESJS2 data

In 2021, **62% of EU+ workers participated in some form of (formal or non-formal) training** (i.e., courses, seminars, on-the-job training)[24]. Overall in the EU+ workforce, **26% participated in digital skills training**, 36% in non-ICT training and the remaining 38% do not participate in any training (Figure 1).

Around **13%** of EU+ workers **reported being digitally under-skilled to a great extent** (and another **39%** to a **moderate** extent). Of the 13% with marked digital underskilling, 73% participated in some form of training (**46% in digital skills training** and 27% in non-ICT training) while 27% did not participate in any training (Figure 1).

Figure 1 – EU+ workers training participation



Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

RESULTS

Who are the digitally under-skilled in the EU workforce?

We compare workers who report being digitally under-skilled with those who are not and find that, on average, **workers who report being digitally under-skilled** are **more likely** to be: **younger**, **male**, living in **urban** areas and **highly educated**. They are **mostly** employed in the **ICT** or **education** sectors or in **skilled** occupations. They are, overall, **more experienced** workers, in **larger organisations**, under a **permanent** contract and on **higher salaries**. **This finding illustrates that many digitally under-skilled workers are highly digitally skilled** and are **in jobs with high or changing digital job-skill requirements.** Indeed, the **digitally under-skilled** measure relates to both a person's digital skills and his/her job-skill requirements, and so is **distinct from the low digitally-skilled**, which is inferred from an assessment of digital skill/competence levels in absolute terms.

We next describe the factors that are associated with EU workers participating in digital skills training, to understand if they undertake actions aimed at closing any skill gap they may have relative to their job's digital skill requirements.

[22] Answer options are: "great extent"; "moderate extent"; "small extent"; "not at all"; "don't know"; "no answer". This **relative** measure of digital underskilling differs to other measures aiming to detect the digital skill/competence level of individuals in more **absolute** terms, such as Eurostat's Digital Skills Index (DSI 2.0), which comprises five competence areas that are based on the European Digital Competence Framework for Citizens (DigComp). https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220330-1.

[23] From the ESJS2 survey questionnaire: "By 'new' we mean those you started using for your main job in the last 12 months. (The ESJS2 includes guidelines and examples of both software and machines and advises respondents to include only major updates.

[24] Note that this is not identical to the measure on which the EU social target of 60% is based, since the ESJS2 measure used here includes on-the-job training, while the EU social target measure excludes it.

Which characteristics are associated with undertaking digital skills training?[25]

Box 1: Summary of main results

Participation in training for digital skills is more likely for workers who have the following characteristics:

Individual characteristics	Job characteristics	Individual perceptions and experience of technological change
• Reporting being digital under-skilled for their job, Under-educated for their job • Female, older • With lower formal education, who attended general education (vs vocational)	• Employed in skilled occupations, in more digital-intensive sector, in larger organisations, new entrants, working less hours per week, paid higher salaries, employed in public sector • Working in a job environment with a more systematic approach to training, including skills needs awareness raising	• Feel job insecure (fear losing job in next 12 months) • Fear automation (feel the need to upskill/reskill and fear task replacement due to new digital technologies) • Have a positive attitude towards technology • Experience technological change with task replacement

To answer this second research question, we analysed the data on training participation in the EU workforce (Figure 1) to find out **what makes EU workers more likely to undertake digital skills training**, or non-ICT training, or no training at all. Our analysis considers several characteristics simultaneously to reduce possible sources of unobserved bias. However, since the ESJS2 is a cross-sectional survey, it provides a snapshot of a single point in time and does not allow us to definitively conclude that certain characteristics are related to training participation in a causal way.

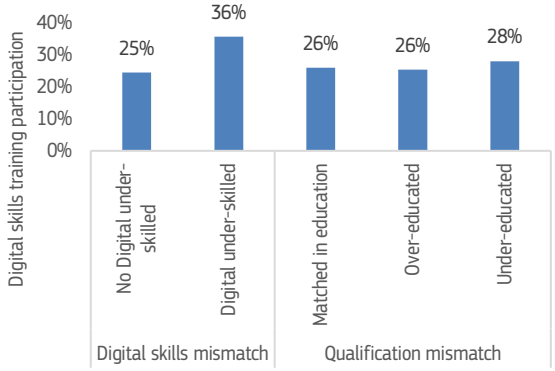
By focusing on participation in digital skills training, we find that three main sets of factors drive participation, namely: (a) individual characteristics; (b) job characteristics; (c) individual perceptions and experience of technological change.

All graphs presented in the following sections report **the likelihood of participating in digital skills training** (i.e. marginal effects of the *multivariate logit model described in footnote 25*). We report statistically significant differences only. Differences between specific population categories relative to a reference group are expressed in **percentage points (pp)** (e.g., the difference between a value of 20% and one of 22% is of 2pp).

Individual characteristics

While both measures of mismatch (digital skills and educational qualification) are related to participation in digital skills training, digital skills mismatch, particularly being digitally under-skilled, is more important than qualification mismatch. Being aware that one has a digital skills mismatch is an important driver of training participation, as **workers who are digitally under-skilled are 11pp more likely to undertake digital skills training** than workers who do not report a digital skill mismatch. In contrast, **under-educated[26] workers are 2pp more likely** to undertake digital skills training, compared with workers who are over-educated or education-matched (Figure 2).

Figure 2 – Digital skills training participation by skill mismatch



Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

Additionally, participation in training for digital skills is more likely among workers who are **female**, **older**, with **lower** levels of formal **education**, and who attended **general** education (vs vocational), although **differences** between these groups are **small**.

Job characteristics

The ESJS2 allows for the simultaneous analysis of several job characteristics such as job-skill requirements, workplace size, tenure, sector, working conditions, and job environment. This makes it possible to better understand the relationship between job characteristics and training participation.

Novel information collected in the ESJS2 aimed at measuring job-skill requirements, following a task-based approach, allows us to construct the following scales (which are categorised into very low, low, medium and high levels):

- basic job-skill requirements (literacy and numeracy)
- social/interpersonal job-skill requirements
- manual/physical job-skill requirements
- digital job-skill requirements
- job complexity
- work routinisation.[27]

We find that participation in **training for digital skills is more likely among workers employed in skilled occupations**. For example, workers in skilled occuations are 4pp more likely to participate in digital skills training than workers in elementary occupations.

Workers in **occupations requiring high levels of basic (general literacy and numeracy) skills are 16pp more likely** to participate in digital skills training than workers in jobs requiring very low basic skills. **Jobs requiring medium and high levels of interpersonal skills are also associated with higher participation** in digital skills training than ones requiring

[25] To answer this question we run a multivariate logit model on a sample of around 42,000 observations where the dependent variable takes on three values: 0 for no training – baseline outcome; 1 for digital skills training; and 2 for non-ICT training. We include in the model the following covariates: **Individual** - Age, gender, rural/urgban area, highest education completed, vocational/other qualification, perception of losing job, fear of automation, need to digitally upskill/reskill, attitude towards technology (consider technology to increase performance at work, to be useful for learning at work, to be easy to learn to use at work, to be enyojable to use at work) individual experience of technological change (with task replacement vs task alteration); **Job characteristics** - industry (NACE1), occupation (ISCOD1), Cedefop's digital skills intensity index, basic skill needs of job (read, write, mathematics), interpersonal skill needs, manual skill needs; job complexity, job routinisation; tenure, private/public sector, workplace size, contract status, hours worked per week, monthly net payband; organisation's approach to training (training needs are systematically reviewed, job performance is formally appraised and pay varies according to job performance).

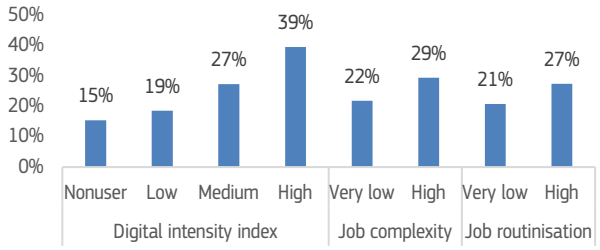
[26] See footnotes 12 and 13 for a detailed definition of the qualification mismatch measures.

[27] See Cedefop (2022b) and Pouliakas et al. (2024) for further details.

very low interpersonal skills. **Manual skill requirements of jobs are not related to participation** in digital skills training, possibly because of higher occupational safety and health (OSH) regulations in such jobs or a greater need to use digital machinery.

As might be expected, the **digital intensity of jobs is a very strong driver of digital skills training participation** – workers in high digital intensity jobs are 20pp more likely to participate in digital skills training than workers in low digital skills intensity jobs. Also, **higher job complexity is associated with higher rates of digital skills training.** This is the case also for **higher levels of job routinisation.** Although surprising, this can indirectly reflect the fact that **routine jobs tend to have a higher automation risk** (Figure 3).

Figure 3 – Digital skills training participation by job-skill complexity



Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

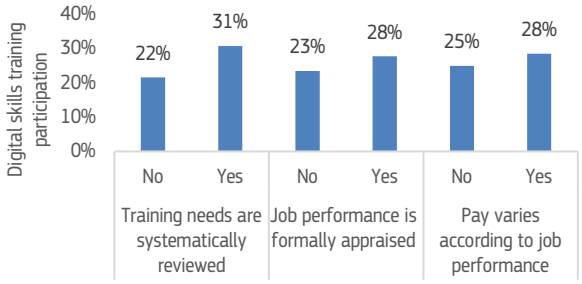
When looking at specific job characteristics, we find that participation in **digital skills training is 3pp higher** for workers employed in **larger organisations**, around **4pp higher** for **new job entrants** and for those employed in the **public sector**. Working conditions such as weekly **hours worked** and **salary** are also important factors in the decision to undertake digital skills training, with less hours worked and higher salaries being positively associated with the uptake of training.

Another important question on participation in digital skills training is whether the overall workplace environment and practices offer fertile ground for upskilling and reskilling. Indeed, **workers in organisations where training needs are systematically reviewed are 9pp more likely to participate** in digital skills training than those in organisations without such a system in place. Appraisal of job performance and salary varying according to job performance are also positive correlates of digital skills training by around 5pp and 3pp, respectively (Figure 4).

Individual perceptions and experience of technological change

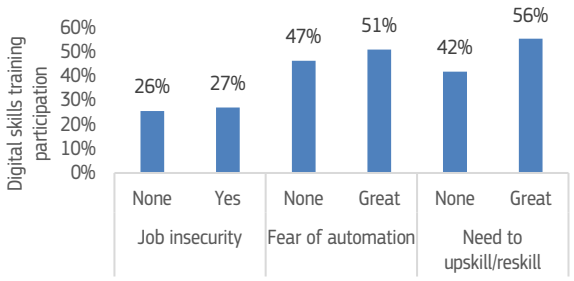
Workers who **fear automation** (i.e. who believe new digital or computer technologies have the potential to do part or all of their job[28]) engage in digital skills training by **4pp more** than those who are not fearful of potential job automation. Additionally, workers who believe **new digital or computer technologies** will help them to **upskill and reskill**[29] participate **14pp more** in digital skills training. General sense of job insecurity[30] has a smaller positive impact on participation in digital skills training (Figure 5).

Figure 4 – Digital skills training participation by workplace practices



Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

Figure 5 – Digital skills training participation by job insecurity and fear of automation

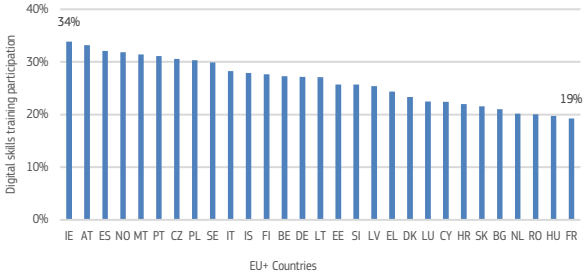


Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

Around **35%** of EU+ workers **experienced** some form of **technological change**, and among them, those who actually **experienced task automation are 4pp more likely** to engage in training to develop digital skills than those who experienced digitalisation without task replacement. Finally, having a **positive attitude** towards technology **increases** the chances of undertaking digital skills training between 1-3pp.

Over and above individual and job characteristics, **there are large differences across countries in digital skills training participation rates**, ranging from 19% in France to 34% in Ireland (Figure 6).

Figure 6 – Digital skills training participation by EU+ countries



Source: Authors' calculation based on Cedefop's second European Skills and Jobs Survey (ESJS2).

[28]This measure was collected by asking respondents "To what extent do you think new digital or computer technologies in your company or organisation can or will do part or all of your main job?"

[29]This measure was collected by asking respondents "To what extent do you think new digital or computer technologies in your company or organisation need or will need new knowledge and skills you currently do not have?"

[30] his measure was collected by asking respondents "Do you think there is any chance at all of you losing your main job in the next twelve months?"

POLICY AND RESEARCH IMPLICATIONS

Based on ESJS2 2021 estimates, **62%** of EU workers have participated in some form of formal or non-formal education and training (courses, seminars, on-the-job training) in the 12 months prior to the survey. **Excluding on-the-job** training, this figure corresponds to **50%**[31], therefore the **EU still needs to exert significant efforts to reach the EU 2030 target of 60%** of adults participating in training every year. Findings underline the importance of actions under Recommendation 9 to Member States in the Council Recommendation on improving the provision of digital skills and competences in education and training.[32]

Digital under-skilling, measured in the ESJS2 on the basis of **awareness of one's skill development need, tends to affect about one in eight EU workers to a great extent**. This share is compatible with existing evidence from other skills surveys (e.g. OECD PIAAC; Cedefop ESJS1) (see Centeno et al., 2022). Policy efforts could hence be targeted to those reporting a digital skills mismatch but who receive no digital skills training (Figure 1).

Even though there are important digital divides between different population groups (e.g. by gender, age, education level, geographical area, sector or occupation), **digital skills training appears generally well targeted to the ones who are aware that they need it**, **although** the evidence suggests that **there is room to increase digital skills training participation** (Figure 2). Indeed, workers who report being digitally under-skilled are more likely to undertake digital skills training than workers who do not. Nonetheless, **policy attention is required** to stimulate the **uptake of digital skills training by workers** who are (or are unaware they are) **underskilled in order to prevent an overall widening in the digital divide** (UNESCO, 2022).

ESJS2 analysis reveals that **female workers who are employed in jobs with similar job-skill requirements and characteristics as those of men, are more likely to undertake training in digital skills**. Given the lower presence of females in high-skilled, complex jobs, including in ICT, the policy challenges are to get them in such jobs and retain them.

Digital skills mismatch rates are generally lower among people with an initial VET qualification. While this may suggest that **VET provides a better fit to digital (and overall) skills needs in the workplace**, further research on this is needed such as how to strengthen links between employers and VET systems (see for example Herrero, 2023).

Job-skills requirements, i.e. the level of skills demanded in individuals' jobs, **are the strongest drivers of participation in training**. Our results indicate that we need to take into account several job characteristics to accurately understand the main drivers of digital skills training participation and, by extension, design suitable digital skills policies. These should focus on digital skill development from the supply side as well as spurring digital workplace practices from the demand side.

Importance of individual-level attitudes and perceptions (e.g. fear of automation) towards technology should not be overlooked: training institutions and employers should take these seriously into account when designing education and training initiatives. This is the case since both fear and actual experience of automation are relevant drivers of training participation.

New technologies imply a need for upskilling and reskilling of workers who are likely to face marked changes in their job tasks. Even in cases with limited displacement effects, policy reactivity is continuously needed to facilitate the retraining, upskilling and reskilling of workers and the adoption of new skills in industries and occupations affected by automation (Bessen, 2019). The introduction of new digital technologies in workplaces is associated predominantly with new task generation and growing staff size (Cedefop, 2022b).

Employers and educational institutions have an important role to play: workers in organisations with a more systematic approach to training, including skills' needs awareness raising, are more likely to participate in digital skills training. ESJS2 results also further confirm the **need to support SMEs**, which may face challenges in providing a systematic approach to training. This is consistent with recent findings from the European Company Survey (Eurofound 2019)[33]. Some of our findings align with recent studies (Cedefop, 2020; OECD, 2022), which highlight **time constraints as a relevant factor in the decision to participate in training,** which needs to be **convenient** and **accessible**.

Nonetheless, more information on **motivation** and **incentives** to train, as determined also by the quality of the workplace environment (e.g. learning communities of practice, reciprocity between managers-workers, relations with peers) and **quality** and **impact** of training is needed.[34]

Large differences between countries in training participation also merit further study, as they may be related to national digital skills/training policies and/or distinct institutional characteristics. The 2023 Council Recommendation on improving the provision of digital skills and competences in education and training, suggests the need for Member States to set or review national objectives for the provision of digital skills and competences and ensure their regular review and update. This should also serve to **identify 'priority or hard-to-reach groups'** (e.g. those living in rural areas, disadvantaged or marginalised groups, or not in education, employment or training) and establish appropriate measures to facilitate their participation in digital skills education and training, taking into account accessibility, territorial and socio-economic gaps in digital skills.

There is a **need to clearly understand measures of digital skills across various sources of data** as well as to

[31] Although this 50% is higher than the 39.5% estimate from the 2022 AES, recall that the AES includes all adults aged 25-64 while the ESJS2 covers only those in the workforce.

[32] Recommenation 9 emphasises the importance of developing digital skills of adults, and of offering equal opportunities, by: mainstreaming digital skills opportunities across the adult learning system; promoting public-private partnerships in digital skills initiatives; running targeted awareness-raising; promoting and recognise digital skills trainining; strengthening efforts to embed SMEs in the existing ecosystems; and promoting Digital Skills and Jobs Coalitions. https://data.consilium.europa.eu/doc/document/ST-15740-2023-INIT/en/pdf

[33] Eurofound's 2019 European Company Survey we see that small establishments are most likely to train less than 20% of their workers during working time or to provide on-the-job training with respect to medium-sized and large establishments, also, SMEs present the lowest proportion of managers adjusting work schedules so that workers can participate in training.

[34] Cedefop's European Training and Learning Survey (ETLS), carried out in Fall 2023, is expected to provide novel evidence on such determinants of in-work, non-formal and informal learning.

align them where possible. This would enable us to integrate the analysis of different sources of information towards a common policy goal (e.g., using DigComp as a reference framework) (Centeno et al., 2022). In doing so, it will be important to distinguish between relative and absolute digital skill deficiency measures, which have complementary policy functions. For example, the ESJS2 measure is relative, as it is measured taking the skill needs in a respondent's current job as yardstick. In contrast, the DSI 2.0 measure is absolute, since it is calculated in the same way across individuals, regardless of their job or other characteristics.

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ADDITIONAL INFORMATION

Results tables of the multivariate analysys are available upon request. For information, contact: *Eleonora.Bertoni@ec.europa.eu*.

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