ANALYSIS

LABOUR AND SOCIAL JUSTICE

DIGITAL INCLUSION AND HUMAN CAPITAL IN GREECE

- Reinforcing mechanisms and programmes to improve the digital skills of human capital in the context of formal and informal training
- Eliminating the obstacles that prevent access to reskilling and upskilling mechanisms and programmes for socially vulnerable groups
- Using national and European resources for the digital inclusion of human capital, and especially socially vulnerable groups, to avoid dual exclusion

FES "Education & Employment" Working Group of Experts
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FRIEDRICH EBERT STIFTUNG

LABOUR AND SOCIAL JUSTICE

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Introduction

The exponential increase in the use of Information and Communication Technologies (ICT) in all aspects of our lives, coupled with the increasing need to acquire digital skills, to the same extent as literacy and numeracy, are major changes posing new challenges in the modern world.

The recent emergency situation brought about by the COVID-19 pandemic further highlighted the 'readiness' of modern economies and societies to replace traditional models of employment, education, communication and entrainment with new ones, where digital technology plays a decisive role. And this did not happen only in certain already advanced local or national communities, but in many places across the globe at different levels of digital maturity.

In the current environment, systems and assumptions are being deconstructed and a new reality is taking shape, where the existence and prosperity of a person and a society are linked to new technologies. However, a significant portion of the population is unable to participate in this digitally-dependent reality that is being shaped, either because they lack access or infrastructure, or because they lack the knowledge and skills necessary to use and make the most of digital tools and capabilities. This divide has resulted not only in the perpetuation of longstanding social inequalities, but also in the creation of new ones. People without access to ICT and/or the basic skills to use them are also under threat of exclusion, given that they may be unable to work or secure a decent wage, pursue an education, stay informed, communicate, carry out transactions with the state or benefit from public services, meaning that they may not be able to be active members of this new reality. Women, the elderly, people with disabilities, the unemployed, low-income earners and people with low levels of education are large groups that are especially vulnerable and exposed to the risk of digital and, by extension, social exclusion.

This publication by the Friedrich Ebert Foundation (Friedrich-Ebert-Stiftung – FES) entitled *Digital Inclusion and Human Capital in Greece*, aims to showcase the various facets and issues arising from all this, focusing on Greece and its human capital. Greece is a European country where marked inequalities are seen in access to and use of digital technologies, both domestically and compared to other EU Member States. This raises obvious questions as to the impact this digital divide is having and will have in the immediate future on citizens, the economy, society and the country in general, but also as to the policies that must be adopted in order to bridge this divide. In other words, questions that pertain to the future of the country, both in terms of its development with social and economic cohesion, and in terms of its place in the modern European and global reality.

This publication consists of two parts and includes nine original and short texts by experts participating in the FES "Education & Employment" Working Group of Experts. The topics relate to issues such as digital skills in the labour market and education, gender digital divide, and the impending risk of double exclusion of the elderly, the unemployed and people with disabilities and social problems due to their lagging behind digitally.

The first part includes texts that delve into the relationships between digital skills and human capital, in their entirety and in comparison to other European countries (Gavroglou); based on demographics and social traits such as gender (Paidousi), age (Kaminioti), profession (Efstratoglou); or in individual groups, such as socially vulnerable groups (Tsimpoukli) and the unemployed (Kokkosis). The second part includes texts that review the relationships between digital skills and education: issues such as the use of digital skills in the educational process (Filinis, Roma) and digital skills in primary and secondary education (Kaltsas), and issues that arise when transitioning from education to employment (Fissaber).

The publication includes a presentation of short proposals to address the digital divide and improve/upgrade the digital skills of the country's human capital, and concludes with an extensive bibliography on the issues raised in it.

Chrysa Paidousi
Angelos Efstratoglou
September 2020

PART ONE: DIGITAL SKILLS AND SOCIAL INCLUSION OF HUMAN CAPITAL

1. DIGITAL READINESS OF HUMAN CAPITAL IN GREECE AND EUROPE

DR STAVROS GAVROGLOU

Transitioning to a digital economy and society is an evolving process in all the countries around the world. On the one hand, it is fuelled by the stealthy diffusion of digital technologies and, on the other, by targeted policies that recognise the significance of this transition in terms of economic competitiveness and social modernisation. The COVID-19 pandemic and mandated social distancing have rendered the need for digitalisation when communicating with companies, human capital and public services even more imperative.

Since 2014, the European Commission has been consistently monitoring the digitalisation process through the Digital Economy and Society Index (DESI). The DESI is the most reliable and comparable point of reference as to the digital readiness of the European Union Member States, providing reliable data on the progress of each country overall, and regarding 5 individual dimensions of digitalisation: connectivity, human capital, use of internet services, integration of digital technologies by businesses and digitization of public services (European Commission 2020)[1]. This index, along with relevant Eurostat data, will be used to showcase Greece's position in the digital transition process, focusing especially on the digital readiness of its human resources[2]. The following will be presented in particular: i. the score and position of Greece among the EU-28 both as to the overall DESI and as to its 5 individual indicators/dimensions, ii. the digital readiness of human capital as a component/dimension of the DESI and related data on human resources for Greece and the EU-28, and iii. the trends in the evolution of digital skills development in Greece and the EU-28.

General ranking

Based on the DESI overall index for 2020, Greece is significantly lagging behind the European Union countries, ranking 27th, marginally ahead of only Bulgaria[3]. Specifically, Greece is ranked 28th in connectivity, 25th in human capital and use of internet services, 24th in integration of digital technologies by businesses and 27th in digital public services (Figure 1.1).

Digital skills and human capital

As to the DESI 2020 for human capital, as evidenced, Greece is ranked 25th with a score of 34.8 as compared to 49.3 for the EU-28 average. According to the individual indicators for the human capital dimension, in 2019, 51% of individuals aged 16-74 had at least basic digital skills in Greece (58% in the EU). The percentage of individuals with at least basic software skills was 56% (61% in the EU-28). Information and Communication Technology (ICT) specialists as a percentage of total employees in Greece was low compared to the EU-28 average (1.8% as opposed to 3.9%). The percentage of female ICT specialists in Greece came to just 0.5%, three times lower than the EU-28 average (1.4%), while ICT graduates made up 2.9% of all degree holders (3.6% in the EU-28) (Table 1.1).

The level of digital skills differs depending on the degree of integration in the labour market. In Greece, 64% of the employed have at least basic digital skills, as opposed to 53% of the unemployed and 51% of the (economically inactive) population aged 16-74. In the EU-28, the situation is similar, with the exception of the unemployed, who have quite a low percentage of digital skills (46%)[4]. There are no significant gender-specific differences. Gender disparity is significant only when it pertains to individuals without digital skills, where men are proportionately fewer, as well as individuals with advanced digital skills, where men are ahead – both in Greece and in the EU-28.

Significant disparities are recorded in terms of digital readiness per industry. Cases in point are the agriculture, forestry

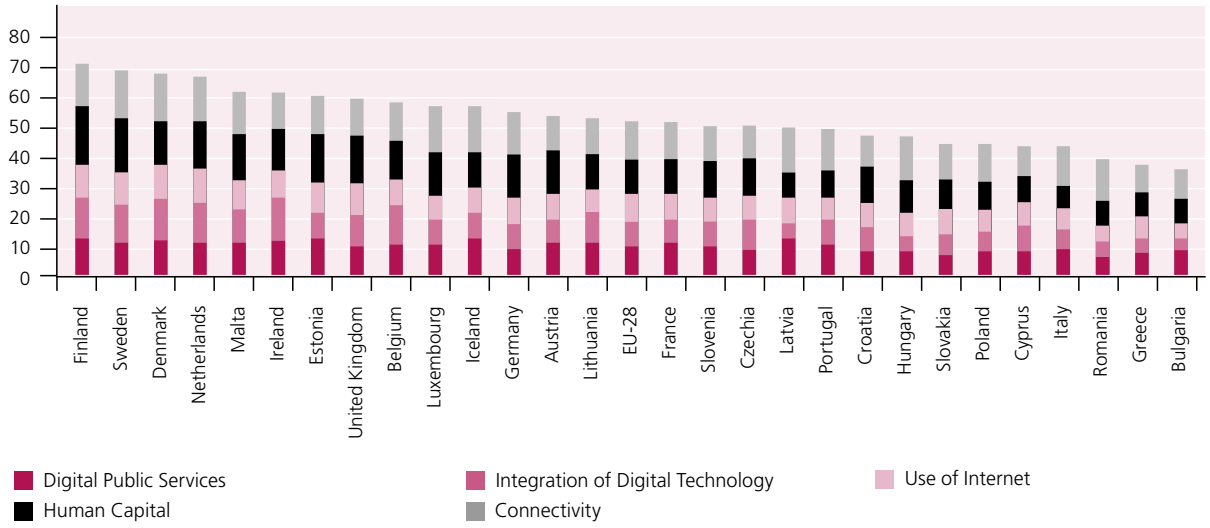
1 See also Gavroglou and Kotsios (2020).

2 Certain changes to improve the methodology and take into account recent advancements in technology, such as very high capacity networks (VHCNs), have been introduced in the 2020 edition of the DESI. The DESI was recalculated for previous years for all the countries, so as to reflect both the choice of indicators and the corrections to data on which said indicators were based. Therefore, the scores and rankings of countries have changed marginally compared to previous editions. For further information, see: https://ec.europa.eu/digital-single-market/en/desi

3 Given that the data relate to 2019, the United Kingdom continues to be included in the DESI 2020 and the EU averages have been calculated for 28 Member States.

4 Source for all these data as well as the data presented further down: Eurostat Database, variable [isoc_sk_dskl_i].

Figure 1.1
Digital Economy and Society Index (DESI) and its individual dimensions, 2020



Source: European Commission, DESI Composite Index https://rb.gy/rqs5rs

Table 1.1: DESI 2020 – digital skills of human capital, Greece and EU-28 (% of population aged 16-74)

	Greece	EU-28
At least basic digital skills	51%	58%
Above basic digital skills	23%	33%
At least basic software skills	56%	61%
ICT specialists	1,8%	3,9%
Female ICT specialists	0,5%	1,4%
ICT graduates	2,9%	3,6%

Source: European Commission (2020)

and fishery sectors, where individuals with basic digital skills are proportionately fewer, as expected, compared to other sectors, amounting to just 16% in Greece and 19% in the EU-28. What comes as more of a surprise is the percentage of individuals with basic skills in the public administration, defence, education and health sectors in Greece, where it does not exceed 12%, while the percentage of individuals with advanced digital skills is limited to 20% (32% and 45%, respectively, in the EU-28). In the more digitally-oriented information and communication sector, individuals with basic digital skills in Greece are at 42%, while just 12% have advanced digital skills, while the percentages in the EU-28 are 20% for individuals with basic digital skills and 73% for individuals with advanced digital skills.

With regard to the age distribution of individuals in relation to digital skills, which demonstrates to a large extent the future image of a country's digitalisation, very large differences are recorded. In the 16-24 age group, there are only a few individuals without digital skills, with the number of individuals increasing as the age group increases. In the 65-74 age group, 72% have no digital skills in Greece (41% in the EU-28), while just 7% have basic digital skills in Greece (19% in the EU-28). In addition, among individuals in the 16-24 age group, proportionately more individuals in Greece compared to the EU-28 have at least basic digital skills (47% as opposed to 23%), even if the EU-28 is ahead in the percentage of young people with advanced digital skills (59% as opposed to 45%). In contrast to the age distribution of individuals without digital skills, there are more individuals with advanced digital skills at younger ages, which decrease as age increases: 45% of people in the 16-24 age group in Greece and 59% in the EU-28 have above basic digital skills, while the corresponding rates for the 65-74 age group are just 2% in Greece and 8% in the EU-28.

Progress of digital skills

Apart from an overview of the digital readiness of Greece today, it is also important to review the corresponding progress of this readiness over time. It is becoming evident that from 2015 to 2020, the DESI overall index for Greece and the corresponding one for the EU-28 have been following a similar upward trend, with Greece showing a slowdown compared to the EU-28 over the last years. Specifically, in terms of human capital, the DESI for Greece slowed down slightly from 2015 to 2018, while, since then, it has been following a marginally higher rate compared to the EU-28[5].

Upon reviewing the growth rates of the individual dimensions of human capital compared to the growth rates of the

5 Source: European Commission DESI-Compare Countries Progress https://bit.ly/2ZvY8F8

EU-28, it is evident that Greece is ahead of some, but not enough to hope for a convergence. Greece is marginally ahead of the EU-28 in terms of the increase in individuals with at least basic digital skills, is marginally lagging behind in terms of the increase in individuals with advanced digital skills, is marginally ahead in terms of the increase in people with at least basic software skills, is at the same level in terms of the increase in employed individuals who are ICT specialists, is ahead in terms of the increase in female ICT specialists and is lagging behind in terms of the increase in ICT graduates. In its path towards digital transformation, Greece holds one of the last places and is also moving at a slow pace, which prevent it from achieving a convergence in the near future. There is a pressing need for systematic, coordinated and targeted intervention policies for the comprehensive development of the digital skills of its human capital.

2. GENDER DIMENSIONS OF THE DIGITAL DIVIDE

DR CHRYSA PAIDOUSI

Along with new exciting possibilities, digital transformation is giving rise to new forms of inequality and exclusion between men and women, which are linked to accessing, using, making the most of and participating in the new digital reality. Gender inequalities in Information and Communications Technology (ICT) are prompted by various factors. These include gender stereotypes, which affect the educational and professional paths that women and men follow, as well as their perceptions of the role of technology in personal and professional life. This article presents the aspects of digital inequality between genders in education and the labour market. The two sectors are considered crucial for the inclusion of individuals in general[6], and women in particular, in the digital era, not just as consumers of digital media and services, but also as creators and developers of digital products, projects and content (Porfyri, 2018).

Education

The development of advanced digital skills of human capital is necessary for the digital transformation of the economy and society, as well as for the recruitment of human resources to jobs and employment sectors that demand advanced digital skills. Various efforts are being made in this direction at a European and national level, so as to increase the number of individuals who choose tertiary education studies, especially in the disciplines of Science, Technology, Engineering and Mathematics (STEM).

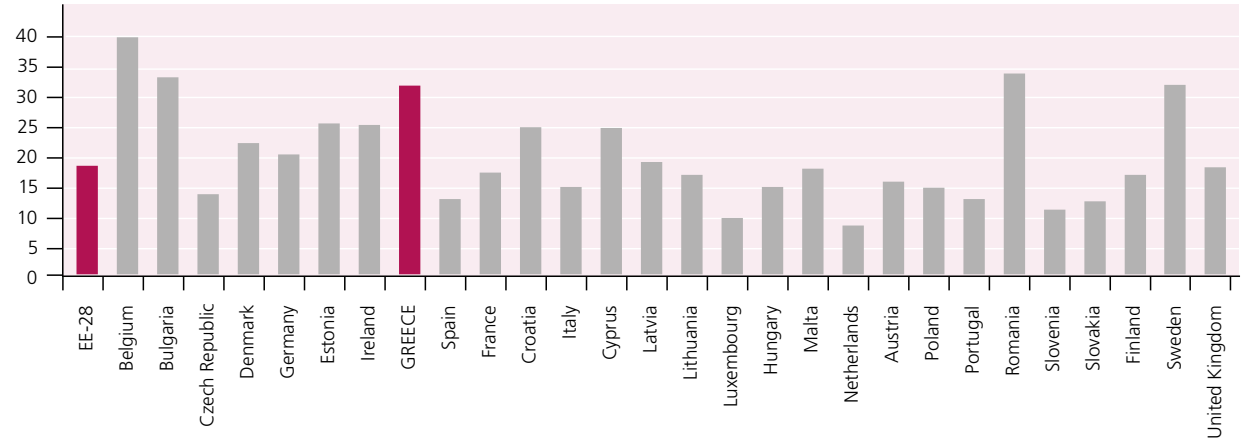
According to Eurostat figures (2020), in 2018, 1.3 million individuals in Europe were studying Information and Communications Technology (ICT) at an upper secondary and tertiary level, out of which just 17% were women. Among the EU-28 Member States, Belgium recorded the highest percentage of female ICT students, at 37%, followed by Romania at 32%, Bulgaria at 31%, and Sweden and Greece at 30%! The lowest percentage, 8%, for the ICT discipline was recorded the Netherlands (Figure 2.1).

In Greece, based on ELSTAT statistics, the percentage of students enrolled in study field 06 "Information and Communications systems", out of all tertiary education students was 2.25% for male students and around 1.1% for female students (Figure 2.2) at the end of the 2017-2018 academic year.

Specifically, based on 3-digit analysis, the percentage in specialisation 061 "Information and Communications Technologies" was 2.03% for men and 0.75% for women. The percentages of female students were higher in field 05 "Natural Sciences, Mathematics and Statistics", at 3.75%, as opposed to 5.14% of male students enrolled, while in specialisation 054 "Mathematics and Statistics", the percentages of the total number

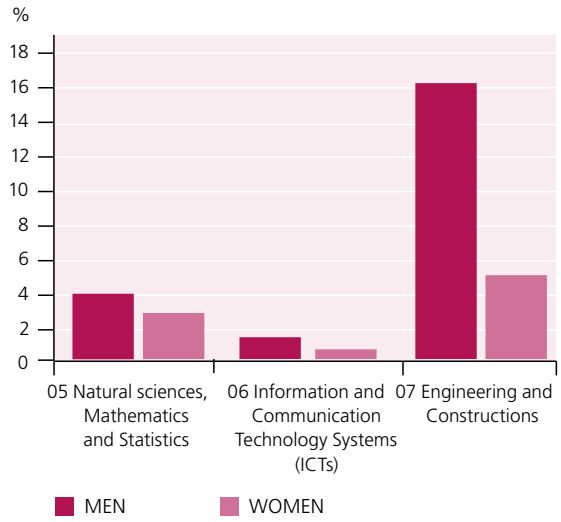
6 According to the European Commission, digital inclusion must ensure that everybody can contribute to and benefit from the digital economy and society. https://ec.europa.eu/digital-single-market/en/digital-inclusion-better-eu-society

Figure 2.1
Share of female students in ICT studies, 2018



Source: Eurostat, 2020

Figure 2.2
Share of students enrolled in the STEM disciplines per gender (2-digit analysis)



Source: ELSTAT, 2020

of enrolled students were 1.42% for women and 2.14% for men. In another ICT-related study field, 07 "Engineering and Constructions", the percentage reached 17.39% for men and 6.16% for women, while in specialisation 071 "Engineering and Art of Engineering", the corresponding percentages were 12.55% and 2.67%.

Another interesting point in this presentation of inequality is the performances recorded by men and women as to the skills surveyed by the PIACC-OECD[7]. Based on these findings, the performance average for women in the OECD countries reached 256 in numeracy, compared to 268 for men, while in Greece, these scores were 248 (average: women) and 256 (average: men). In literacy, the difference between the two genders was much smaller: OECD average for women was 265, as opposed to 267 for men. In Greece, as a matter of fact, women recorded a higher performance with an average of 256, as opposed to an average of 251 for men.

Furthermore, note that there is a small difference between men and women in Greece in proficiency in "Problem-solving in technology-rich environments", where the average was 14.8 for men and 13.2 for women. (Table 2.1)

Labour market

The different percentages between male and female students studying in the fields of Engineering and Technology in tertiary education has resulted in gender divides in ICT professions (European Commission 2018). Based on the Artificial Intelligence (AI) Index 2019 (Perrault, et al., 2019), published by Stanford University, there is a major difference in the share of men and women who participate in Research and Development conferences. According to this index, just 18% of talks at 21 conferences in total on AI had at least one female speaker (Stathoulopoulos and Garcia, 2019). A survey by the National Documentation Centre (EKT, 2020) has shown that in Greece in 2018, although the share of female PhD holders was 50% of all PhD holders, the lowest rate (33.9%) of female PhD holders is recorded in the field of Engineering and Technology, out of the six main scientific fields in the survey; a rate that also saw a slight drop compared to 2017 (37.8%). With regard to the women employed in the ICT sector in Greece, the Eurostat findings show that in 2018, the share of female ICT specialists was just 11.3%, while men accounted for 88.7% of ICT specialists. Also note that the share of female ICT specialists shrank significantly in the 2008-2018 period. Specifically, it dropped from 26% in 2008 to 11.3% in 2018, as opposed to the share of men, which increased from 74% to 88.7%. The average of female and male ICT specialists followed a similar pattern in the EU-28: from 22.2% in 2008, it dropped to 16.5% for women, while it increased from 77.8% to 83.5% for men. In general, a signif-

7 The Programme for the International Assessment of Adult Competencies (PIAAC) is an international comparative survey of the Organisation for Economic Co-operation and Development (OECD) that assesses the skills and competencies of adults, and specifically, it measures the proficiency of adults in literacy, numeracy and problem-solving in technology-rich environments.

Table 2.1
PIACC-OECD Survey of Adult Skills, 2018

Skills	General Average		Men		Women	
	OECD	GREECE	OECD	GREECE	OECD	GREECE
Numeracy	262	252	268	256	256	248
Literacy	266	254	267	251	265	256
Problem-solving in technology-rich environments	24.7 (level 2)	11.5 (level 2)	31,7	14,8	27,7	13,2
	5.1 (level 3)	2,5 (level 3)				

Source: PIAAC-OECD

Figure 2.3
Share of employment of women and men with ICT education, Greece

Source: Eurostat, 2020

icant reduction is observed in the employment of women with ICT education in Greece between 2009 and 2018, from 40.2% to 21.5% (Figure 2.3).

Another two interesting points arising from the European Commission survey are that women employed in ICT earn 20% less than men, while 93% of capital invested in European tech companies in 2019 went to all-male founding teams (European Commission, 2018). The lower participation of female professionals in the artificial intelligence (AI) sector is also demonstrated in the survey conducted by the LinkedIn Economic Graph Team[8]. According to that report, only 16% of all AI workers in Europe are women (84% are men). This rate is comparable to the USA, where around 20% are women. The low participation of women in these professions is evident even in countries that have the largest pools of AI professionals, such as the USA (23%) and Germany (16%), while, on the other hand, Italy, Singapore and North Africa record a higher rate, around 28%, of female AI professionals.

In addition, according to the AI Now Institute[9], even among the five largest technology companies worldwide[10] – known by the acronym FAANG: Facebook (FB), Amazon (AMZN), Apple (AAPL), Netflix (NFLX) and Alphabet (GOOG) – the divide between men and women is very high. For example, in 2018, women comprised only 15% of AI research staff at Facebook and just 10% at Google. Obviously, this fact may affect the architecture and philosophy of the technology goods produced globally.

Conclusion

Digitalisation is introducing radical changes to the everyday lives, communication and employment of citizens. This process of change is not gender-neutral and brings to light new inequalities between men and women. The reasons for the gender digital divide depend on many factors, and multi-level interventions are required to bridge it. Two major sectors for intervention are education and employment of women in ICT- and AI-related fields, given that, as evidenced by the findings presented in this text, women have lower participa-

8 AI Talent in the European Labour Market, November 2019, https://economicgraph.linkedin.com/

9 https://ainowinstitute.org/discriminatingsystems.pdf

10 Companies with the highest value worldwide.

tion compared to men both in related tertiary-level studies and in the labour market. Given that ICT and IA are rapidly shaping the present and future of societies and economies in the modern world, the small presence of women in these has and will have multiple consequences, from their employment, earnings and social participation to the design and development of ICT and, by extension, the digital transformation of society and the economy.

The need for equal participation of women in the digital state of affairs is not just an issue of securing equal opportunities for all within a democratic society – it is also an issue of introducing gender dimensions when designing the future digital society.

3. AGE-BASED DIGITAL INCLUSION AND DIGITAL SKILLS IN GREECE

DR OLYMPIA KAMINIOTI

The issue of digital inclusion or digital divide in Greece is of major concern, both compared to other countries and in relation to the momentum within the country and the performances recorded for individual social groups. On a personal level, technology affects our position in the labour market, our relationships, our ability to learn, our everyday lives and our quality of life in general. On a macro level, digital technologies can accelerate economic and social change, while the changes they bring about depend, inter alia, on enhancing and disseminating the digital skills within a society (Fonseca, 2010). The advent of technology also changes the way we address the issue of digital inclusion or digital divide. The first order digital divide is more linked to technological infrastructure and access to it, while the second order digital divide is linked to the digital skills required to make the most of technology (Seljan, et al., 2020). Therefore, the issue of digital skills seems to gain more profound significance in the digital inclusion discussion.

Various surveys have highlighted that Greece is lagging behind in digital skills in general and among certain population groups, such as older individuals, in particular. For example, a Cedefop survey has shown that: i. there are gaps in digital skills in the EU that are wider in Greece, ii. digital skills in Greece are not necessary in current jobs (compared to the EU), and iii. this applies mostly to employees aged 40-54 and, chiefly, to employees aged 55-64, women and those with a lower level of education (Cedefop, 2018). The OECD's Programme for the International Assessment of Adult Competencies (PIACC), which also focuses on proficiency in problem-solving in technology-rich environments, shows low proficiency levels in Greece compared to the OECD average, but does not record any differences in the use of this skill by employees compared to the OECD average (OECD, 2016)[11]. The fact that Greece is lagging behind in digitalisation is also evidenced in the country's low performances in the European Commission DESI[12].

This article will present certain findings that relate to the digital inclusion of various age groups in Greece. The presentation aims to highlight certain parameters that affect digital inclusion and how they relate to age in Greece. However, it mainly aims to present certain conclusions which will help in understanding the findings and contribute to formulating policy recommendations to bridge the digital divide.

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11 The Cedefop and PIAAC survey conclusions are somewhat different with regard to how digital skills are best used in the labour market in Greece. Further analysis of the results is necessary to explain the relevant findings. However, note that the results are not easily comparable due to the different methodologies used in the two surveys.

12 DESI 2020 (European Commission, 2020).

Table 3.1
Basic or above basic digital skills

	2015	2016	2017	2019
EU-27	54	54	55	56
Greece	44	46	46	51
EU-27, 55-64 years	35	37	38	40
Greece, 55-64 years	14	17	20	28
EU-27, 55-74 years	29	30	31	33
Greece, 55-74 years	9	12	14	19
EU-27, Women, 16-74 years	51	52	53	54
Greece, Women, 16-74 years	40	45	44	49
EU-27, Men, 16-74 years	57	57	58	58
Greece, Men, 16-74 years	48	47	49	52
EU-27, Women, 55-74 years	23	25	26	28
Greece, Women, 55-74 years	6	9	10	15
EU-27, Men, 55-74 years	35	35	37	38
Greece, Men, 55-74 years	12	15	19	23
EU, Women, low level of education	27	27	27	29
Greece, Women, low level of education	8	12	10	14
EU, Men, low level of education	35	35	35	36
Greece, Men, low level of education	16	14	15	15
EU, 55-74 years, low level of education	10	10	11	12
Greece, 55-74 years, low level of education	1	2	1	2

Source: Eurostat (ESS)

Different age groups: when digital inclusion is enhanced and the digital divide cemented

This section reviews the findings of two surveys to provide a more specific overview of the digital divide and the parameters linked to it[13]. The change over time in digital skills in Greece and the EU for various demographic groups is outlined in Table 3.1.

The key conclusions arising from the findings of this survey are:

- Greece is lagging behind the European average in digital skills.
- Greece is gradually converging towards the EU-27 in terms of digital skills.
- An age-based digital divided is observed in the EU-27 and in Greece.
- Convergence is observed between Greece and the EU-27 in the older ages.
- The combination of females and older individuals is linked to the lowest level of digital skills.
- Gender disparities in digital skills are greater in older age groups.
- The educational level is a significant correlation factor to the level of digital skills.
- Improvement in the digital skills of individuals with a low level of education is not observed in most cases over time.

The results of the PIACC-OECD survey are listed in Table 3.2[14].

The key conclusions arising from this survey are:

- Compared to other countries, Greece is marked by a low level of digital skills.
- The age-based digital divide is present in all countries (to the detriment of the elderly).
- The age-based digital divide appears smaller in Greece compared to the rest of the countries.

13 As the length of this article is quite limited, it allows only for an illustration of the findings, without the space for further analysis, so as to review the more specific relationships between the observed traits.

14 In Greece, it was jointly carried out by the following agencies: Ministry of Education, National Centre of Social Research (EKKE), Hellenic Statistical Authority (ELSTAT) and National Organisation for the Certification of Qualifications & Vocational Guidance (EOPPEP).

Table 3.2
Average proficiency in problem-solving in technology-rich environments per age, sample list of countries

	<=24 years	25-34 years	35-44 years	45-54 years	55+ years	Average score differences between older and younger individuals
Singapore	305	302	285	271	248	57
Slovenia	2	280	270	253	235	52
Finland	303	310	296	277	253	50
Korea	304	293	277	261	256	48
Chile	264	263	246	236	218	46
Estonia	293	289	275	259	249	44
Poland	287	280	271	258	244	43
Sweden	302	305	294	278	259	39
Netherlands	300	301	293	278	261	39
Denmark	294	303	291	275	254	38
Japan	300	310	302	282	262	36
Norway	296	302	293	277	259	36
Israel	279	285	275	267	243	36
Lithuania	272	270	256	244	236	35
Germany	295	296	285	273	260	35
OECD	290	290	280	268	255	35
Austria	294	296	285	274	260	34
Ireland	286	285	275	266	251	34
Czechia	297	297	277	270	263	33
Canada	294	292	288	274	261	30
N. Zealand	296	298	291	281	266	25
England (UK)	295	296	291	283	270	25
Russia	288	292	283	272	263	24
USA	285	283	279	271	267	18
Turkey	255	260	247	248	239	16
Slovakia	287	284	279	275	271	16
Greece	262	260	261	246	248	14

Source: PIAAC (2015), from: Chatzigiannis, et al. (pending publication

The conclusions of different surveys, like the ones presented in the tables above, demonstrate, on the one hand, that Greece is lagging behind in terms of social inclusion and, on the other, that an age-based digital divide exists. All surveys, irrespective of their methodology and other traits, agree on the two conclusions mentioned above. Another interesting conclusion is the interdependence of various traits at digital-skill level. It becomes evident that – apart from age – gender and level of education are significant factors that correlate with the level of digital skills. In addition, according to the PIAAC survey, the disparity in skills levels (including proficiency in problem-solving in technology-rich environments) within the country is comparatively smaller in other countries in relation to demographic and socio-economic variables. Other surveys have shown that significant geographic differences exist in Greece in terms of digital inclusion (Tsekeris, et al., 2020).

But the fact is, all surveys show that an age-based gender divide exists. Other surveys provide useful information on the progress of this phenomenon. For example, there is lower acceptance of technology among older individuals (Morris & Venkatesh, 2000), while stress, fear and even lack of self-esteem when it comes to learning new things are seen in older people (Jimoyiannis & Gravani, 2011).

Conclusions / Policy recommendations

When analysing the digital divide issue, it is important to review the comparative position of Greece, as well as the country's disparity based on demographic, geographic and socio-economic traits. The available surveys clearly demonstrate that, despite its convergence trend, Greece's level of digital skills remains low compared to other countries. It is also observed that the disparity in digital skills is quite high in Greece,

but relatively low compared to other countries when the digital skills are linked to demographic and socio-economic traits.

Note that apart from reviewing the averages per country, it is also important to review the skills levels. The averages may be the same between two countries, but may reflect entirely different situations. For example, while Greece has a low digital skills average, its lowest level of digital skills is higher than the OECD average (Chatzigiannis, et al.). The age factor is one of the most significant inequality factors in terms of digital inclusion. Clearly, there are other significant parameters as well, such as gender and, chiefly, level of education, which interact with age in shaping the relevant indexes. Highlighting this interaction is quite significant, both for contextual/interpretative purposes when discussing skills and for formulating suitable policies. It should also be noted that the various surveys demonstrate how digital skills complement other skills, at least when it comes to the employment environment (OECD, 2016, Cedefop, 2018)[15].

All of the above highlight the complexity of the concept of skills, which encompasses subjective and social dimensions, as well as the difficulties in measuring the skills and any of their shortages or mismatches[16]. They also demonstrate that the findings of the various surveys must be studied carefully, and the same applies to the conclusions drawn with regard to the interpretation of any shortages, as well as with regard to comparisons between countries and social groups (Lintzeris, 2020).

Clearly, the aim of any policies is to increase the digital skills of the entire population and mainly those of older individuals, so as to close the aged-based digital divide. The actions adopted should be adapted to the target group – after taking into account what the members of the specific group need to learn and which parameters affect the learning process – followed by proper planning and implementation and, lastly, scientific evaluation, which will provide useful feedback on the procedure. It is clear that individual groups with a low level of digital skills, even among older individuals, must be handled differently. Of course, a matter that keeps arising in social policy issues is whether priority should be given to those who are in the worst situation or those who will be able to escape from the worst situation more easily.

The answer will also depend on the significance attached to the issue of upgrading digital inclusion. However, the surveys have highlighted the significance of enhancing digital skills, not just for employment purposes, but also to ensure more comprehensive participation in society and to reinforce social cohesion (OECD, 2019). Any policy recommendations should also take into account both the place of older individuals in the social hierarchy and how the hierarchy in question is affecting the planning of actions and the response of participants to the relevant programmes.

In concluding this short article, it is important to highlight that the recent COVID-19 health crisis is creating the right conditions for reinforcing digital inclusion not only for the entire population, but also for those who are most underprivileged in this sector. Naturally, it is necessary to design suitable policy programmes to bridge the digital divide. These policies will be based on reliable studies of the parameters that create the problems of the digital divide for the individual social groups, so that they are adequately adapted to the needs of each group.

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15 Meaning that people with advanced digital skills are more likely to work in jobs that demand advanced skills in various fields.

16 For different perspectives on understanding the skills, mainly in terms of professions, see Efstratoglou, Kyrou & Marsellou (2011), pp. 39-54.

4. DIGITAL SKILLS AND PROFESSIONS

DR ANGELOS EFSTRATOGLOU

An investigation of the relationship between digital skills[17] and professions raises two key questions. The first concerns the type and quantity of digital skills required by the country's production system for each profession to efficiently carry out its productive activities; in other words, the types of digital skills employees should have in each profession so they can carry out their duties efficiently. The second concerns the extent to which the creation[18] – or production – mechanisms of professions provide the necessary skills to those employed in them, so they can carry out their duties efficiently. In addition, note that, as technology not only changes the structure of professions within an economy, by creating new ones and abolishing others, but also affects their content, differentiating skills and duties[19], digital skills must not be seen as a fixed quantity, but as a continuously evolving and dynamic one.

Initially, it could be claimed that the production system's requirements for digital skills in professions is horizontal in nature, meaning that it spans the entire range of professions. However, it stands to reason that the requirements among professions are different, both as to the type and also as to their quantity[20]. On a global level, based on the data from the adult skills survey (PIACC), 23.0% of employees in professions that require secondary education skills use computers, 98.0% in professions that require a tertiary education degree and 100.0% in professions that require a postgraduate degree (Nedelkoska and Quindini, 2018). These differences seem reasonable even among different categories of professions. For example, individuals employed in senior management and executive positions, as well as those practising a scientific profession, use digital skills differently than farmers, livestock breeders or even unskilled workers. These conclusions seem to be verified in the study by Pouliakas (Pouliakas, 2020) regarding teleworking in Greece, providing an indirect estimate of the use of digital skills in basic professions (Table 4.1).

A much larger percentage of professionals and senior executives usually or occasionally work from home compared to office workers, service employees, farmers, livestock breeders and unskilled workers. Service employees and salespeople in particular – a large portion of whom work in the retail, hotel and restaurant sectors or in service provision – due to the nature of their work, are forced to come into physical contact with consumers, a fact that limits the use of digital media. This factor, in turn, creates a high risk of their losing their job due to the social distancing policies and measures (INE, 2020).

To analyse this further, according to estimates by the Hellenic Federation of Enterprises (SEV, 2020) – which are based on data from the National Institute of Labour and Human Resources (EIEAD) and Eurofound and concern the frequency with which employees in specific professions use basic Information and Communications Technology (ICT) tools or programming languages when carrying out their duties – 17 out of 42 professions (2-digit ISCO code) demonstrate heavy use of ICT greater than 50.0%. Among these, the top places are occupied by ICT professionals (25, 0.85), ICT technicians (35, 0.74), business and management professionals (24), and science professionals and engineers (21, 0.69)[21].

However, digital skills may not differ just among professions, but also within the profession itself, with the economic activity sector where the profession is practised shaping its own requirements. It is very likely that different digital skills, and to a different extent, may be required for an office employee in manufacturing compared to a colleague in commerce or in a bank, which demonstrates the special significance of a job's characteristics[22], with the skills the individual has coming second. Besides, Greece demonstrates high mismatch of skills among the countries participating in the PIAAC survey in the field of literacy (and potentially in the other skills categories as well), with 28.0% of individuals having higher skills than those required by the country's production system (OECD, 2016b).

In the field of production mechanisms of professions, and specifically the educational system and tertiary education, digital skills are provided directly and indirectly. Directly in the cases where digital skills are the object of individual educational programmes, and indirectly, via the use of e-learning educational methods and techniques, or via digitalisation of the educational material. University students in various disciplines (engineers, doctors, economists, etc.) are directly or indirectly led towards the acquisition of digital skills, by following individual educational programmes in the process of concluding their studies. Similar procedures, but at a lower level, exist in secondary technical and professional education, where the educational programmes for technical professions include individual activities for the acquisition of digital skills.

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17 ESCO (European Skills, Competences, Qualifications and Occupations) classifies digital skills into 5 basic categories: digital data processing, digital communication and collaboration digital content creation, safety and problem solving.

18 The creation – or production – mechanisms of professions naturally include the educational system, with tertiary education being the key mechanism for creating scientific professions, and secondary and vocational training being the mechanism for creating technical professions of various categories and levels. They also include the production system itself, which contributes to generating professions and specialisations by using non-standard and informal types of learning.

19 See: Efstratoglou (2018) for the Greek economy and Oesch (2013) for the European economy.

20 Recognising the various demands for digital skills in professions, Cedefop (2020) postulates the need to reinforce all the professions involved in tourism, focusing especially on business owners and managers of SME and family-owned tourism businesses.

21 To analyse this further (3-digit code), 55 out of 123 professions demonstrate ICT use higher than 50.0%. Among these, and based on the number of employees in them, there are general duty employees (411, 0.63), primary education teachers (234, 0.58), secondary education teachers (233, 0.58) and financial sector professionals (241, 0.69).

22 This is clearly highlighted by the OECD (OECD, 2016a), based on the findings of the PIACC surveys for all the countries that participated.

Table 4.1
Share of teleworking employees per profession (one-digit code), 2008-2018

Professions	Never	Occasionally	Usually
1 Senior managers & executives	92,86%	3,97%	3,17%
2 Professionals	86,08%	8,17%	5,75%
3 Technicians & related professions	97,62%	1,58%	0,81%
4 Office employees	98,78%	0,78%	0,64%
5 Service employees & salespeople	98,59%	0,78%	0,43%
6 Farmers, livestock breeders, forest workers, fishery workers	99,26%	0,58%	0,19%
7 Specialised technicians & related professions	99,18%	0,48%	0,33%
8 Industrial & heavy equipment operators	98,98%	0,64%	0,38%
9 Unskilled workers, craftsmen & small business professionals	98,49%	0,36%	1,15%

Source: Pouliakas, 2020

And while the production system, to the degree that it operates as a mechanism for the provision of digital skills, seems to produce – in terms of the type and up to a certain point – the digital skills necessary, meaning that the organisations and businesses involved in this procedure provide the digital skills necessary for production, the educational system, both in its formal and informal dimension, needs to better converse with and adapt to the production system, with the aim of providing the required digital skills and bridging the digital divide in economy and society.

5. DIGITAL INCLUSION OF SOCIALLY VULNERABLE GROUPS

DR ANNA TSIMPOUKLI

The digital divide and the differences in the frequency and the manner in which the internet is used highlight the inequalities between the general population and the groups vulnerable to social exclusion, which are now also facing the risk of digital exclusion, therefore, dual exclusion. These groups include individuals **aged over 55 years**, who may not still be active in the labour market, but lack digital skills, at an average rate of 69%, **people with disabilities**, of whom 54%, according to a European Disability Forum survey, have never used the internet, **children and young people**, who are at risk of social exclusion, the **unemployed**, and **migrants/refugees**.

Molnar's model (Molnar, 2003) – which claims that the faster and more accessible the internet is to people the higher the chance of bridging the gap of the digital divide – has received criticism from the Dystopia model. This model claims that a large portion of the population will remain on the margins of the knowledge society, as these persons do not fully comprehend the potential and benefits of a technologically advanced society, mainly perceiving the entertainment aspect of the internet (Cullen, Hadjivassiliou & Junge, 2007). Based on this approach, a case in point are the young NEETs[23], younger individuals with low educational level, individuals living in poverty, individuals facing mental health problems, individuals with criminal behaviour, substance abusers, pris-

23 Not in Education, Employment, or Training.

oners, former prisoners, individuals with various disabilities, migrants, older people and many other population groups at risk of dual exclusion (Cullen, et al., 2015. White, 2016).

Many efforts have been made in recent years to bridge the digital divide, as part of the European strategy for digital inclusion. However, the proposals for preventing the digital gap from widening, as well as early intervention actions, have not been fully developed, while there is inadequate evidence available to evaluate the effectiveness of such actions (Cullen, et al., 2015, p. 17. Cullen, et al., 2012, p. 18. Hache & Centento, 2011, p. 19).

Out of around 5,000 EU-funded projects carried out for the digital inclusion of socially vulnerable groups, no more than 200 fulfil the criteria of good practices according to the MEDICI project (www.medici-project.eu) in 27 EU Member States and the UK. These good practices are divided into three clusters, A, B and C, with C including the most advanced practices, based on specific criteria that involve: i. innovation, ii. effectiveness, iii. possibility of replicability to another context and iv. external assessment results.

Based on these, 21 good practices are included in Cluster C, 47 in Cluster B and the remaining 114 in Cluster A (Table 5.1). Among these, 6 good practices have been recorded in Greece, in the regions of Attica and Peloponnese, mainly relating to the development of digital skills in young people and children. Unfortunately, no good practices focusing on people with disabilities have been reported in Greece, despite the fact that this group represents around 10% of the population. As already highlighted in the relevant report by the National Confederation of Persons with Disabilities (ESAMEA) in 2014, this social group is being increasingly threatened by new forms of social exclusion as digital technology advances.

Table 5.1
Project distribution per population

Population	**Projects**
Mixed groups	90
Unemployed	36
Marginalised young people and children	28
Older individuals	12
Individuals with disabilities	10
Migrants/Refugees	6
Total	182

Source: European Commission (2020)

Individuals aged over 65 years are facing similar threats in Greece, given that, according to the findings of organisation 50plus Greece, around 78% have never used a computer and, as a result, depend on others for access to goods available via the internet. With regard to good practices that focus exclusively on marginalised young people and children, according to the findings, not enough actions addressing the needs of this population groups are recorded in Greece. The situation with the digital inclusion of migrants and refugees is similar in Greece. A portal was recently developed by the City of Athens, available in Greek and English, that is mainly addressed to agencies serving this population group. It is a fact that the majority of good practices in Europe mainly focus on the unemployed. However, even in this case, it is the countries of Northern Europe that dominate in good practices, with very few references in Greece. Prisoners are another socially excluded group that would be interesting to study in terms of social inclusion. As mentioned in a recent report, they are facing extreme obstacles to internet access for security reasons. However, according to an EU Council Resolution on Adult Learning, it is important for this group to participate in e-learning activities, which would contribute significantly to the rehabilitation of prisons (https://epale.ec.europa.eu/el/blog/6-ways-improve-prisoners-access-education-europe) (Downes, P., 2014).

However, some good practices under way in Greece are worth mentioning, as they could serve as an opportunity for further networking, learning and actions or similar initiatives. These good practices include:

Junior Coding Academy (JCA): A joint venture by the IT company InterMediaKT and the Educational Content, Methodology and Technology Laboratory of the Hellenic Open University. The project is designed for children and teenagers aged 10-16 who are at risk of social exclusion and aims to develop their coding and IT skills. A total of 600 children, mainly from rural areas of Western Greece, have been trained. https://digitalinclusion.eu/digital-map/963

Tech Talent School & Start Project: Socialinnov (Social Impact & Innovation) has developed a project to close the divide in digital skills and IT sciences. It is designed for teenagers, young adults, the unemployed and migrants/refugees (16-26 years) who are facing the risk of social exclusion. The project is supported by Microsoft and has already been implemented in six cities (Trikala, Ioannina, Veria, Heraklion, Tinos and Larissa). https://digitalinclusion.eu/digital-map/918

REvive Greece: The project was launched by REvive Greece and is addressed to the unemployed, migrants and young people faced with social marginalisation. It aims to enhance their digital skills so that they can look for new jobs, mainly as developers in IT companies. https://digitalinclusion.eu/digital-map/910

I CARE: A: A joint venture involving the National and Kapodistrian University of Athens, the Hellenic Open University and other organisations and universities from various European countries. The project is addressed to adult caregivers of senior citizens, aiming to help them acquire digital and social skills through a blended learning project. https://digitalinclusion.eu/digital-map/735

Sweet Country [Saldus Novads]: This e-twinning and e-education project among schools aims to upgrade the digital and other skills of primary school teachers in rural areas. The Primary School of Messinia is participating in the project. https://digitalinclusion.eu/digital-map/347

Hack the Future: Aiming to reduce unemployment and reinforce volunteerism and social entrepreneurship, the Social Hackers Academy, in partnership with the Solidarity Mission, have jointly developed a social incubator in Athens, aiming to train migrants/refugees and marginalised young people. https://digitalinclusion.eu/ digital-map/344

However, despite the efforts toward the digital inclusion of socially vulnerable groups, the digital divide continues to exist among different populations groups, as well as among Member States. As is clear from the data, the UK has the most best practices (65), followed by France (38), Spain (33) and Czechia (24). An additional obstacle to closing the digital divide and introducing good practices could also be the working language, which hinders the opportunities for project dissemination and/or networking on a European level.

The need for digital inclusion of the general population the socially vulnerable groups is still pressing. Many more steps are needed in this direction, at least in Greece, so as to bridge the digital divide compared to other European countries, as well as among different population groups within the country, mainly focusing on those under threat of dual exclusion.

6. ENHANCING THE DIGITAL SKILLS OF THE UNEMPLOYED – AN OPPORTUNITY AND A CHALLENGE FOR THE EU AND GREECE

NIKOLAS KOKKOSIS

Technological advancements are continuing to shape new ways to work. Businesses that monitor these advancements and changes will be the main point of attraction for fully trained human resources. These resources will work together with the businesses and, using new tools, will contribute in the production and provision of quality products and services. The European Union is constantly faced with an ever-changing world marked by increased digitisation and ever-greater needs for digital skills. The unemployed, as a population group, are a potential economic driving force for increasing the EU economic indicators; however, they are often at a disadvantage, unable to upgrade their skills. In this context, the European Commission ought to develop suitable programmes and tools that offer this population group the potential and the opportunity to acquire the right digital skills to be able, in turn, to contribute to the European GDP.

The Digital Skills and Jobs Coalition[24]

The European Commission looked into the need to upgrade the skills of European citizens in the modern era as part of the Europe 2020 strategy and the New Skills Agenda for Europe. The Digital Skills and Jobs Coalition was formed in 2016 to promote and facilitate collaboration among Member States, public- and private-law entities, various social partners, NGOs, educational and training institutes, and all public-sector organisations in general that are active in tackling the digital skills gap or digital gap in Europe.

As part of this initiative, and with the aim of forging and reinforcing partnerships between organisations in each Member State, national and regional coalitions have been formed in most EU countries to date. As a result, the National Digital Skills and Jobs Coalition was established in Greece in May 2018. Many social, educational, business and scientific organisations participated in this action.

All population groups, including the unemployed, fall within this strategy. Note that, to date, many tools have been developed through this strategy and used to train primary and high school students, public servants and entrepreneurs. Also note that these tools are industry-specific (e.g. tourism, medicine), meaning that an unemployed individual may choose specialised industry-based digital knowledge. Another important fact is that technology giants such as Google (National Coalition Greece, 2018) and Cisco (National Coalition Greece, 2019) actively participated in the project, offering the necessary technical know-how to develop tools for digital skills learning.

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24 The Digital Skills and Jobs Coalition – European Commission

Developing digital skills to combat unemployment

In the context of the 5th Delphi Economic Forum (SKAI, 2020), conducted in mid-2020, and the Digital Skills and Jobs Coalition, a new programme is being developed by the Greek Manpower Employment Organisation (OAED) in partnership with Google to develop digital skills and boost the employment prospects of the unemployed. In the first stage of the programme, more than 3,000 young unemployed individuals are expected to receive free training in digital skills, such as digital marketing, from Google. This action forms part of the Grow Greece with Google initiative, which aims to reinforce the country's recovery through technology. In the second stage, OAED will link the trained individuals with private-sector businesses so they can gain paid work experience in the area of digital marketing for 6 months. The wages and social insurance contributions will be covered by funds from the European Social Fund.

Challenges

The creation of programmes and tools to develop digital skills has to overcome multiple challenges to be deemed effective, given that the unemployed are a population group with specific needs and the central aim of finding a job.

1. Incentive – Added value

A very significant challenge is to provide incentives to the unemployed to develop their digital knowledge. It is absolutely necessary to have employers and social bodies involved in creating and implementing tools for digital skills learning, as the tools gain added value for the unemployed when they derive from the private economy.

2. Dropout

Planning and effectively promoting the tools will bridge the gap between the expectations of participants and the learning outcomes of the seminars. Furthermore, it is very important for the organisation providing the training to continuously engage with the participants to keep them alert. Online engagement of trainers with the participants reduces the chance of early dropout by the latter.

3. Levels of skills

As digital skills are uncountable and do not constitute academic knowledge, but a dynamic and ever-changing range of knowledge with various aspects (programming, computer skills, digital marketing), there is no specific foundation of skills and knowledge, especially among the unemployed. The best practice is to identify the existing knowledge through a short exploratory questionnaire, so participants can effectively improve their skills. Creating various levels for the educational tools would also be helpful (e.g. Programming I, Programming II).

4. Individualised results

The intervention of trainers, especially when a participant is seen as an individual and not part of a team, has a positive impact on the participant's performance. Continuous and consistent assessment is an effective method for ensuring that participants, and especially the unemployed, feel they are improving their skills.

5. Time frame

Given that the unemployed are not employees, who traditionally can only attend seminars in the evenings, a live streaming seminar would be a solution for this population group. The ability of the unemployed to shape their own schedule is a significant factor when planning a digital skills educational tool.

6.Gamification

A key trait of the game-design strategy is rewards. This approach is applied to gamified activities, through targets and rewards. Each time a user reaches a target, they win a badge (point, score, star). These types of rewards are illustrated with point tallies and progress charts, or even virtual coins. This technique greatly encourages user engagement, as it meets the inherent need for recognition of their efforts, increasing the degree of their commitment.

Policies to include the unemployed in the country's digital transformation

The last chapter will outline specific policies that could be implemented to successfully usher the unemployed into the digital era.

Equipment / Infrastructure	Services	Education	Entrepreneurship
Network upgrade (5G)	Digital upgrade of public services	Reinforcement of tele-education	Focus on digital entrepreneurship and innovative small and medium sized enterprises (SMEs)
System and computer upgrade in the public sector	Reinforcement of the significance of the digital signature	Inclusion of more areas of specialisations in education	Reinforcement of e-commerce
Greater access to public WiFi networks	Facilitation of online transactions	Development of open databases	Reinforcement of training for relevant jobs

PART TWO: DIGITAL SKILLS AND EDUCATION

7. USE OF DIGITAL MEDIA IN THE EDUCATIONAL PROCESS

KYRIAKOS FILINIS, ELEFTHERIA ROMA

The digital transformation of the economy does not depend only on the use of digital technologies in the public and private sector, but also on the skills and abilities for, and familiarisation of citizens with, the use of these technologies. Digital skills and familiarisation with the use of digital technologies must be developed during the stage of compulsory education, either through special classes or through the use of digital media in instruction (internet, interactive whiteboards, online learning platforms, etc.).

The benefits from the use of digital media/devices in instruction can be summed up as follows (OECD, 2016c):

- Developing the digital skills of students.
- Familiarising students with the use of digital technologies.
- Expanding the possibilities of the educational process. Using the internet in instruction, which provides students with access to a wide range of resources and shows them how to use them correctly (assessment of resources, distinguishing between facts and opinions, etc.). At the same time, it offers teachers the opportunity to use innovative learning and teaching methods, such as simulations and online workshops.
- Boosting active learning, as, apart from being recipients, students are potential content creators.
- Fostering a culture of extroversion and multicultural communication, offering students the chance to communicate and work with students from other countries online.

The recent health crisis has demonstrated that the use of digital media/devices in instruction can avert interruptions in the educational process during times when physical presence at school is not possible.

Where is Greece in terms of infrastructure and teaching skills in the use of digital media/devices in instruction?

The latest survey by the OECD Programme for International Student Assessment (PISA 2018)[25] includes questions posed to school principals of compulsory upper secondary levels as to the adequacy of infrastructure and the skills of teachers to integrate digital technologies into teaching.

According to the survey results (Table 7.1), Greece is lagging behind other countries in terms of adequacy of infrastructure. The most significant shortfalls are in the number of digital media/devices: just 32% of school principals in Greece believe that digital media/devices (computers, tablets, interactive whiteboards, online learning platforms, etc.) are sufficient, when, for example, the corresponding rate is 41% in Portugal, 46% in Spain and 61% in Italy. The percentage of principals who believe that the online learning platform is used effectively is just as low (33%), while it is 80% in Finland, 52% in Spain and 44% in Ireland.

Shortfalls are also identified, though to a smaller extent, in the computing capacity of digital devices and the availability of adequate software. Specifically, 46% of the principals who participated in the PISA 2018 survey believe that digital devices are not sufficiently powerful in terms of computing capacity, when the corresponding rate is between 52% and 77% in Finland, Germany, Spain, Ireland and Italy. In addition, 49% of principals believe that their school has adequate software available, while this rate exceeds 58% in the selected European countries, apart from Portugal.

On the other hand, Greece performed quite well in terms of internet bandwidth and speed. A total of 62% of the principals who responded believe that the internet speed and bandwidth were sufficient, when the same rate was between 34% and 58% in countries such as Germany, Spain and Italy.

As to the adequacy of the human resources to use digital media/devices in the educational process, the biggest shortages pertain to the training and incentives available to teachers to use digital media/devices, as well as the technical assistant staff. Specifically, just 12% of principals believe that the

25 The PISA survey is conducted every three years on students aged 15 who are concluding their compulsory education. The survey assesses the extent to which students have acquired basic knowledge and skills that are essential for participation in modern societies as active members. The survey also includes ad hoc questions on special topics.

Table 7.1
Results of the PISA 2018 survey on the use of digital devices in the educational process (% of responses by school principals)

	PISA 2018 Results	Finland (N= 213)	Germany (N=191)	Spain (N=1.064)	Ireland (N=156)	Italy (N=536)	Portugal (N=275)	Greece (N=242)
Infrastructure	The number of digital devices (desktop computers and laptops, tablets or interactive whiteboards) connected to the internet is sufficient	51%	45%	57%	56%	68%	50%	50%
	The school's internet bandwidth or speed is sufficient	73%	31%	58%	75%	55%	34%	62%
	The number of digital devices for instruction is sufficient	42%	33%	46%	45%	61%	41%	32%
	Digital devices at the school are sufficiently powerful in terms of computing capacity	77%	59%	52%	72%	67%	32%	46%
	The availability of adequate software is sufficient	75%	60%	58%	71%	68%	45%	49%
	An effective online learning support platform is available	80%	31%	52%	44%	43%	36%	33%
Human resources	Teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction	51%	57%	54%	48%	49%	62%	62%
	Teachers have sufficient time to prepare lessons integrating digital devices	44%	44%	35%	51%	61%	47%	58%
	Effective professional resources for teachers to learn how to use digital devices are available	62%	42%	58%	46%	69%	55%	43%
	Teachers are provided with incentives to integrate digital devices into their teaching	38%	44%	12%	36%	44%	43%	31%
	The school has sufficiently qualified technical assistant staff	64%	34%	43%	21%	45%	27%	12%

Source: PISA results: https://www.oecd.org/pisa/data/. Material edited by authors.
Note: The responses come from the questionnaire addressed to the school principals who participated in the PISA survey.

technical assistant staff are sufficiently qualified to support educational digital media, a rate that is significantly lower compared to the other European countries. Furthermore, just 31% of principals in Greece believe that incentives are provided to teachers to integrate digital media/devices into their teaching, when the corresponding rate is significantly higher in other countries, with the exception of Spain. Finally, 43% of principals in Greece believe that teachers have access to effective professional resources, while this rate exceeds 55% in Portugal, Italy, Spain and Finland.

On the other hand, 62% of principals believe that teachers have the necessary skills to integrate digital devices into instruction, a rate that is significantly higher than those recorded in other countries, such as Finland (51%), Germany (57%), Spain (54%) and Italy (49%). Lastly, 58% of principals believe that teachers have sufficient time to prepare lessons integrating digital devices, when the corresponding rate is significantly lower in other countries.

In short, using digital media/devices in instruction will contribute significantly towards ushering the economy into the new era of digital technology and information. However, significant shortfalls are identified in Greece in terms of infrastructure, such as adequacy and computing capability of digital devices (computers, tablets, interactive whiteboards, etc.), use of software and online learning platforms. Public investment in such infrastructure would significantly impact development. Other than that, priority should be given both to training teachers in the use of digital media/devices and to reinforcing the schools with qualified technical assistant staff. These conclusions are quite current, at a time when sectors are being sought for channelling significant public investment funds.

8. DIGITAL SKILLS IN PRIMARY AND SECONDARY EDUCATION

KONSTANTINOS KALTSAS

We are living in an ever-changing world. Concepts such as the Fourth Industrial Revolution, artificial intelligence, technology and IT have become a part of our everyday lives. Children are growing up in a technological world that is rapidly changing, and smart phones, smart TVs and easy internet access are part of their daily lives. There are unlimited possibilities available for the billions of people who go online from mobile devices. Actually, these possibilities are constantly being multiplied due to the progress of technology in areas such as biotechnology, artificial intelligence, robotics, internet of things, 3D printing, virtual reality, nanotechnology, GPS, drones, virtual assistants, etc.

21st-century society requires skills that enable people to respond with flexibility to complex problems, communicate efficiently, manage information, collaborate constructively in problem solving, use technology effectively and produce new knowledge. Children must acquire critical thinking to be able to solve a problem and, through collaboration, which is of pivotal importance, reach the solution to the problem together. They must also construct new knowledge. To do be able to construct new knowledge, children must create ideas and comprehend things that are new to them, and not just regurgitate information given to them. Learning information, which is huge in the modern era and poses major management issues, is no longer required; the main aim is to develop skills to use this information and transform it into knowledge. This may be done through interpretation, analysis, composition or evaluation.

The COVID-19 pandemic that has been afflicting our planet over the last few months has dramatically accelerated developments in these sectors, introducing new ways and methods to communicate and work. This situation demands the acceleration of the digital transformation of society and the economy, highlighting the need for much faster reforms and significant actions, so that human capital can acquire the right skills and be able to respond to the new state of affairs.

According to a survey matching digital skills to professions, carried out by the Hellenic Federation of Enterprises (SEV), the degree of digitalisation for 45% of professions is such that it renders digital skills absolutely necessary. According to the European Skills, Competences, Qualifications and Occupations (ESCO), a total of 137 digital skills have been identified, hard and soft skills, which are classified into 5 basic categories: digital data processing, digital communication and collaboration digital content creation, safety and problem solving.

On 1 July 2020, the European Commission presented the European Skills Agenda[26] for sustainable competitiveness, social fairness and resilience, which sets ambitious, quantitative objectives for upskilling (improving existing skills) and reskilling (training in new skills). The objectives, which are set for 2025 and relate to digital skills, include the percentage of adults aged 16-74 having at least basic digital skills rising from 56% in 2019 to 70%.

In this rapidly changing new environment, education is a sector that must not be left behind in the developments, but must play the leading role in educating the students who will become the citizens of tomorrow. For education to become the backbone of development and inclusiveness, it must first prepare the citizens properly, so they can make the most of opportunities and respond to the challenges posed by a rapidly evolving, globalised and interconnected world. It must prepare today's students to live as adults in a world very different from the one they are growing up in as students.

The current situation in Greece is starkly depicted in international and European surveys, some of which are presented below.

- Based on the **results of the PISA 2018 survey**, the performance of Greek students in the subjects of reading, mathematics and science was below the OECD average.
- According to the **Digital Economy and Society Index (DESI) 2020**[27] and the Human Capital chapter, Greece is in 25th place among the EU countries in digital skills, outperforming only the citizens of Bulgaria, Romania and Italy.
- Based on the **Programme for the International Assessment of Adult Competencies (PIAAC) by the OECD**, which assesses the skills and competencies of the adult population, Greece ranks 17th out of the 19 EU Members States that participated in the programme, with performances well below the OECD average.
- According to **Cedefop's European Skills Index**[28], Greece is in last place in terms of skills matching, with 17% as opposed to the EU average of 66%, is significantly lagging behind both in skills activation, with 45% as opposed to the EU average of 79%, and skills development, with 43% as opposed to the EU average of 76%, while it is second from last among the EU countries in the overall ranking.

Despite the reform efforts made over the last decade, there continues to be a divide between Greece and the rest of the EU countries, especially in terms of digital infrastructure and digital skills, a fact that hinders development without exclusions. Vulnerable groups are hit the hardest by this situation. This divide is due to the few and often fragmented steps taken to reform the educational system in that direction – steps that have not managed to give the necessary new knowledge to the students. It is necessary to promote serious and comprehensive reforms, both in primary and secondary

26 https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

27 https://ec.europa.eu/digital-single-market/en/desi

28 https://www.cedefop.europa.eu/en/events-and-projects/projects/european-skills-index-esi

education, for the young people of today to acquire the skills necessary for the 21st century.

Most horizontal skills are not included in the primary or secondary school curriculum. In the field of digital skills, Information and Communications Technology (ICT) is taught for only 1 hour per week in primary school. In junior high school, ICT is taught for 2 hours per week. Although ICT certification for junior high school students was announced as a measure about 10 years ago, it has not been implemented across all junior high school graduates to date. Although the State Accredited Certificate in Computer Science has been instituted with Law 4653/2020 (12/A), certification tests have yet to be carried out for students in the 3rd grade of Junior High School.

The integration of new technologies into teaching, both in primary and in secondary education, is at very low levels. The shortages in suitable equipment and insufficient training of teachers have not permitted the substantial operation of the digital school. Of course, teachers and schools have made considerable efforts to change this situation by participating in Erasmus and other European programmes. Furthermore, the volunteer operation of robotics workshops and other digital activities in many schools, aided by parent-guardian associations, have contributed significantly towards developing the digital skills of students.

The operation of activities clubs in model and experimental schools, instituted with Law 3966/2011, made an essential contribution in developing the horizontal and digital skills of students attending these schools. However, the good practices of model and experimental schools have not yet been integrated into all the primary, junior high and senior high schools.

During the 2016-2019 period, the thematic week was introduced into junior high schools, but it was limited to social and health education issues, and specifically to providing information and raising awareness about issues such as nutrition, substance addiction/abuse and gender identity. Horizontal and chiefly digital skills were not part of the philosophy or content of the thematic week.

By virtue of Article 1, Law 4692/2020 (111/A), a pilot action entitled "Skills Workshops" was introduced into primary and secondary education, consisting of the addition of new thematic cycles in kindergarten and in the mandatory curriculum of primary and junior high school on a trial basis, aiming to reinforce the cultivation of soft skills, life skills, and science and technology skills in students.

The following skills cycles will be introduced during this pilot action:

1. **Learning skills cycle** (Critical thinking, Communication, Collaboration, Creativity).
2. **Life skills cycle** (Self-care, Social skills, Citizenship, Compassion and empathy, Adaptability, Resilience, Responsibility, Initiative, Organisational skills, Planning, Productivity).
3. **Science and technology skills cycle** (Modelling and simulation skills, Computer literacy, Digital literacy, Technological literacy, Media literacy, E-governance competence, Digital Humanities, Safe internet navigation, Protection from technology addiction, Skills in creating and sharing digital artefacts, Combinational digital technology, communication and collaboration skills, Skills in analysis and production of content for print and digital media, Skills in interdisciplinary and cross-curricular use of new technologies).
4. **Mental skills cycle** (Strategic thinking, Problem solving, Case study, Crafts, Lateral thinking).

The Skills Workshops will operate on a pilot basis in 218 schools across Greece (kindergartens, primary schools and junior high schools) during the 2020-2021 school year.

This action is a step in the right direction, albeit a much delayed one. However, it is important that this pilot implementation is evaluated quickly, improved and then implemented in all of the country's kindergartens, primary schools and junior high schools.

The fact that Greece is lagging behind significantly in the area of digital skills necessitates the comprehensive reform of the educational content and teaching methods in primary and secondary education. Some key aspects of this reform could include:

- **Integrating digital technologies into teaching, learning and student assessment.** The European Commission has developed a tool for this, aiming to support schools and learning in the digital era. This tool is known as SELFIE[29], Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies.
- **Introducing subjects and actions that enhance digital skills in all primary and secondary education grades, and mainly in junior and senior high school.** These subjects could include programming, social media, internet safety, etc.
- **Introducing the STEM (Science, Technology, Engineering and Mathematics) methodology into instruction, and mainly in the subjects of mathematics, natural sciences and technology.** This methodology introduces problem solving of everyday issues into the educational process, not based on a teacher-centric learning approach, but on exploratory instruction, implementing suitable teaching techniques, such as group projects.
- **Boosting the school infrastructure with digital devices**, such as computers, tablets, interactive whiteboards, stylus pens, virtual reality headsets, augmented reality books and educational software. Connecting all schools to high-speed networks.
- **Teacher training is a key prerequisite**, since successful integration of ICT into teaching and learning requires

29 https://ec.europa.eu/education/schools-go-digital_el

revisiting the role of teachers in planning and implementing ICT to improve and convert learning. To this end, it is necessary to plan and implement a training system for the professional development of teachers, ensuring that teachers will be able to make the best use of technology in education. A key tool in planning this could be the UNESCO ICT Competency Framework for Teachers, which seeks to help countries develop comprehensive national teacher ICT competency policies and standards, and integrate these into general education policies for digital skills.

In conclusion, it must be noted that fragmented interventions, such as introduction of digital media as a separate subject (e.g. Computer Science), cannot achieve the main objective, which is to bridge the gap in the digital skills of students. Research findings demonstrate that the most creative digital literacy practices for children relate to extra-curricular activities (e.g. robotics), to school activities that are on the sidelines of school life (e.g. clubs), or to individual teacher initiatives, which, however, are not favoured by the educational system to the extent that they could become a school norm. Essentially, they are individual practices that further increase social inequalities. In contrast, a well-rounded reformative approach is necessary to flip the situation in today's schools and bridge the digital divide.

9. DIGITAL SKILLS AND THE TRANSITION FROM EDUCATION TO EMPLOYMENT. COORDINATION OF POLICIES AND INTERVENTIONS AT LOCAL/REGIONAL LEVEL

WALTER FISSABER

Transition from School to Employment

J. Habermas describes our current situation as "one we have never experienced before, namely having so much knowledge about our lack of knowledge and being forced to act and live under the uncertainty of not-knowing what we need to know."

Under these circumstances, and beyond them, transitioning from school to professional training and stable employment is proving to be harder than expected. With the penetration of digital technology into the professional world, the question raised is to what extent the transition from school to employment has become harder, causing a series of unpleasant personal situations, such as disappointment, discouragement and loss of incentive (see European Agency for Special Needs and Inclusive Education, 2020). "No one will be left behind" is the main aim and the most significant indicator for every effort on this issue to be successful.

The initiatives and responsibilities in managing this transition generally aim to avert the exclusion of teenagers and young adults from education, professional training and steady integration in jobs, through adopting coordinated measures at a local level and improving their prospects for a decent life. At the same time, by general admission, when young people transition to employment, problems and difficulties arise which are not due to the economic situation at a given time and which are not temporary, but structural in nature. Young people are faced with a series of difficulties when transitioning from school to employment. This is especially true for young people with vulnerable social traits (e.g. low educational level, early school dropout, migration background).

At the same time, the new digital technologies/applications have essentially taken over all professional activities and virtually no job can be filled by people who have no digital skills. The threat of automation in jobs held mainly by young people is higher compared to any other age group (see ILO, 2020). Many young people are having trouble successfully completing the step from professional training to employment.

The transition routes no longer follow the traditional paths of the past, but have increased in number; as a result, the transition from school to the sphere of employment is a challenge that is difficult to address in today's societies.

Furthermore, it is very important to attempt to change our way of thinking when it comes to the philosophy and content of the transition policies, leaving aside the view that we have a grave problem to tackle and adopting the view that young people who have not yet found their footing and are lost in a maze represent a rich, untapped source to a great extent.

Specifically, according to C. Gentner (2019), the right digital skills are considered, along with reading, writing and arithmetic, the fourth cultural technique for successful transition from professional training to employment. The fact that young people are growing up in a digital world does not automatically mean they have the knowledge to be able to manage new technologies and digital information. In addition, these problems are not just due to human resources' lack of skills and competencies compared to the demand in the modern labour market, but also stem significantly from structural problems within the educational/professional training/employment system in itself. Ultimately, a failed social inclusion of young people will mainly burden local societies in terms of social problems and social costs.

In addition, if we look at successful social inclusion from another perspective, it is a key factor that determines a city's quality of life. Lastly, at local level, it is necessary to overcome the issue of closed systems: schools and businesses belong to different worlds, use different work methods and a different language, and have different objectives. The one world has to get to know the other better, share their concerns, and respect and understand their differences by looking for a common objective, i.e. mutual benefit. It is evident from all this that it would be useful to devote an organised and coordinated effort at local level, aiming to facilitate the transition of young people from school to employment, with specific key goals.

The four goals of this effort would be:

- Creating a wide alliance of local bodies and social capital to coordinate the efforts in favour of the transition of young people from school to employment, at the initiative of the mayors.
- Top priority: giving a first job to young people. Making sure that no one is left behind.
- Targeting especially the acquisition of sufficient digital skills to integrate young people into the current 4.0 labour market

(Kruse, W., et al., 2017)

Good practices in the EU and Greece

In the EU, and especially the Members States of central and northern Europe, many cities and regions are coordinating and implementing transition policies, with the most characteristic example being the Weinheimer Initiative for Local Educational Coordination (Weinheimer Initiative zur lokalen Bildungskoordinierung, see Kruse, W., 2010). A total of 26 German cities and small regions are participating in this initiative, which have pledged to make the professional and social inclusion of young people their top priority, replacing the concept of duties in the internal operations of their administrative structures with the concept of joint responsibility.

In recent years in Greece (despite the degradation of career guidance counselling in secondary education), initiatives have been increasing, both at national level (e.g. Institute of Educational Policy, the former Pedagogical Institute) and at local level, in cities and municipalities. These initiatives aim to implement policies that contribute directly or indirectly to the transition from school to employment. Currently, some of the following departments operate in many Greek municipalities: Employment Offices, Counselling Offices, Career Guidance Offices, Lifelong Learning Offices, Psychosocial Support Offices, Education Offices, Municipal Education Committees, Social Tuition Schools, Integrated School Committees, Parent Academies, etc., as well as decentralised offices of national bodies, such as local Employment Promotion Centres of the Greek Manpower Employment Organisation (OAED). However, all these units operate independently to a great extent, without cohesive coordination that would enable them to forge synergies and partnerships.

As for including the upgrading of the digital skills of young people in local coordination policies and facilitating their transition from school to employment – not just in Greece, but also in the EU – a general and awkward gap can be seen (Kruse, W., et al., 2017).

The proposal

Planning and preparing the implementation of a comprehensive plan of policies and actions to improve the transition from school to employment locally and/or regionally works on two levels: the systemic/organisational and the business levels.

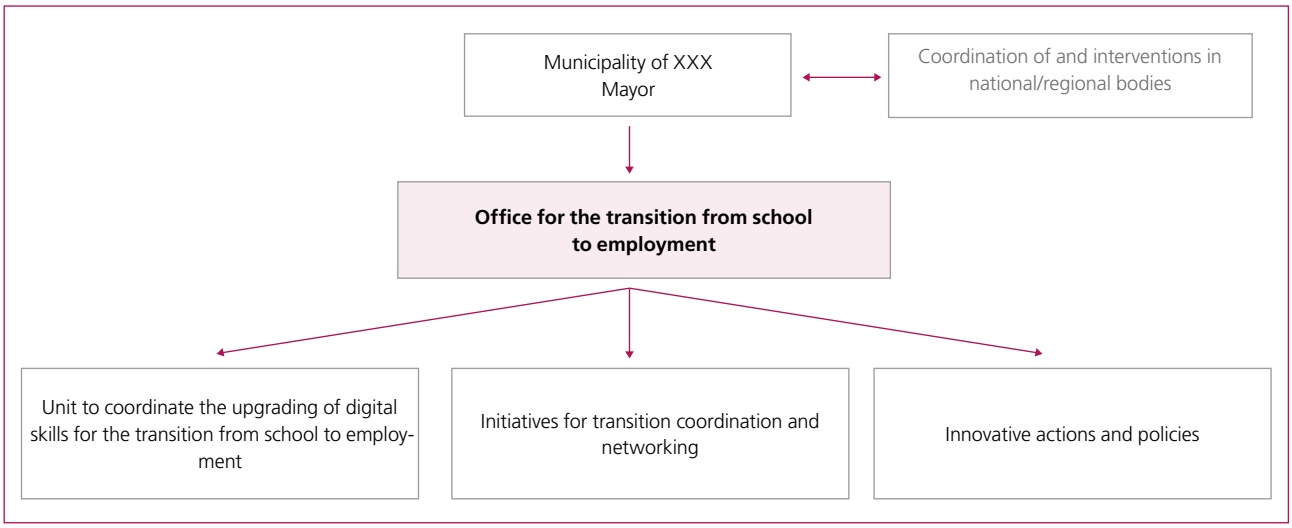
Proposed systemic/organisational level

The creation of a Coordination Office at municipal level is proposed to facilitate the transition from school to employment. This Office shall fall directly under the jurisdiction of the Mayor and will undertake to coordinate local bodies and local social capital, so they can jointly contribute to the transition of young people in the area from school to employment. It will also undertake to organise and monitor innovative local policies and actions for the benefit of this transition, as well as coordinate upgrading of the digital skills of young people

A series of duties and actions emerge from the experience of many European regions and cities that have been successfully implementing intervention coordination policies for decades to promote the transition of young people from school to employment. Generally speaking, coordination does not mean implementing actions, but encouraging synergies, promoting transparency, exchanging views and promoting the key objectives of the transition, in line with the goal: "Immediate priority: giving young people their first job." This means that existing responsibilities are not affected, but the distributed responsibilities are further reinforced.

Some of the proposed innovative actions and policies to coordinate the transition at local level include:

- Raising awareness and organising synergies among all the stakeholders and local individuals involved in the transition of young people from school to employment, at the initiative and under the auspices of the Mayor or Regional Governor. This creates a network for coordinat-



ing all local bodies involved in issues relating to the transition from school to employment.
- Preparing policy recommendations for the sustainability of current transition policies and consequent lobbying efforts against overlapping competent institutional players.
- Providing information and transferring know-how on good practices from other EU cities and regions.
- Formulating individual transition plans.
- Introducing actions that raise awareness, mobilise and promote cooperation with local – and other – employers, starting with a major campaign.
- Offering services to push people into the labour market, on top of and in partnership with existing organisations (e.g. Employment Promotion Centres of OAED).
- Introducing actions to foster cooperation with the parents of young people through seminars and through the operation of Parent Academies.
- Preparing and running short, practical seminars that target job search.
- At senior high schools or in partnership with them (as well as for unemployed young people): organising visits to businesses, working with parents, encouraging/supporting student businesses, holding career days, holding professional outreach meetings, etc.
- Adopting actions to reduce the waiting times in the transition of young people (transition management, cooperative management of key points).
- Attracting and coordinating volunteers (people with prestige) as lobbyists to find jobs, as well as volunteers to offer support to young people.
- Introducing actions to prevent young people from dropping out of school. Developing a system for monitoring and early detection of students at risk of dropping out, in partnership with local schools (see Institute of Educational Policy, 2019).
- Offering multiple support to the existing School Career Guidance human resources.
- Forming a local team of mentors (on a volunteer basis), which will offer mentoring to young people, depending on their needs.
- Providing individual counselling to unemployed young people and students with special inclusion difficulties.
- Providing individual career guidance services by analysing the profile of specific professional specialisations in practice.
- Identifying educational paths suited to specific young people and providing information on who they can contact and how.

Digital skills and coordination of the transition from education to employment

With regard to the acquisition of digital skills for successful transition to employment, it is important for young people to fully understand that networking and the constantly increasing complexity are salient traits of the multi-faceted digital penetration of the workplace. Education and professional training must make all young people capable of understanding and addressing the advancements in technology with confidence.

POLICY RECOMMENDATIONS

Although serving as an indication, the policy recommendations put forward by the authors of this publication highlight the crucial role of lifelong learning and training of human capital in digital skills, and underline the significance of raising awareness and providing information on digital inclusion issues.

However, note that many of the policy recommendations converge with those that have been adopted in recent years at national and European level to develop the potential of human capital and address the challenges posed by digital transformation.

- Initiatives by social partners, and especially bodies representing human capital, which boost digital skills in professions that require the use of ICT tools.
- Creating (or funding) digital skills training programmes addressed to individuals aged over 45.
- Creating (or funding) digital skills training programmes addressed to public-sector employees.
- Exploring the needs of specific groups (teachers, public servants, etc.) and designing suitable training programmes.
- Adopting legislative initiatives to increase the recruitment of female ICT personnel.

- Offering focused/dedicated programmes – and not horizontal ones – based on age or other traits, due to the large disparity in skills and the needs of certain demographic and other social groups.

- Providing information and raising awareness to prevent dual exclusion: digital and social.
- Using some of the European funds for the digital inclusion of socially vulnerable groups.
- Systematically collecting and disseminating information on the gender digital divide and promoting the gender dimensions of ICT policies and actions.

- Integrating digital technologies into teaching, learning and student assessment, combined with teacher training, so the integration is successful.
- Introducing subjects and actions that enhance digital skills in all primary and secondary education grades, and mainly in junior and senior high school.
- Introducing the STEM (Science, Technology, Engineering and Mathematics) methodology in instruction, and mainly in the subjects of mathematics, natural sciences and technology.
- Boosting school infrastructure with digital devices (computers, tablets, interactive whiteboards, stylus pens, virtual reality headsets), augmented reality books and educational software. Connecting all schools to high-speed networks.
- Undertaking actions at all levels of education, aiming to increase the number of women in STEM (Science, Technology, Engineering and Mathematics) disciplines.

- Setting up a special office in each municipality that falls directly under the municipal authority undertakes to activate and coordinate the competent institutional bodies and local social capital towards the transition of young people from school to employment, focusing on boosting and developing their digital skills based on demand in the local and broader labour market.
- Adapting the content and methodology of career guidance to the continuous digitalisation of the labour market.
- Choosing internship programmes with the right profile for establishing digital skills.
- Creating school robotics networks.
- Developing student alliances between local schools and universities (e.g. through a learning workshop).
- Upgrading the horizontal skills that are deemed useful today, in tandem with and in relation to digital skills (creativity, communication skills, understanding of procedure flow, abstractive reasoning and ability to work in a team).
- Integrating the necessary digital skills into the individualised transition plan.

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The Athens-based Friedrich-Ebert-Stiftung foundation's "Education & Employment" working group of experts was founded in 2013. It is made up of experts, scientific specialists and personnel from public organisations and social partners. Its aim is to develop a dialogue on and create proposals for bolstering employment and the digital transition of economic activities in Greece, while also engaging on issues of education and professional training. The project was produced and authored by Stavros Gavroglou, Angelos Efstratoglou, Kostas Kaltsas, Olympia Kaminioti, Nikolas Kokkosis, Chrysa Paidousi, Eleftheria Roma, Anna Tsimpoukli, Kyriakos Filinis and Walter Fissaber.

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DIGITAL INCLUSION AND HUMAN CAPITAL IN GREECE

The object of this collective publication is to address the challenges of digital transformation for human capital in Greece, and specifically, the issues that arise from the digital inclusion of various population groups.

Initially, it reviews issues that relate to the digital readiness of human capital in Greece, the relationship between digital skills and professions, and the way in which gender and age hinder access to the digital reality. It then delves into the threat of dual exclusion of various vulnerable population groups as a result of digital poverty, and looks into what needs to be considered when planning policies and actions to address this.

Lastly, it presents the educational reforms necessary for children and teenagers to acquire the necessary digital skills and transition smoothly from school to employment.

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