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Bridging language barriers: Language skills in information-rich societies

The ability of individuals, societies, and economies to fully leverage advances in information and communications technologies depends on their ability to communicate effectively with others. This, in turn, relies on individuals having the language skills needed to exchange information with relevant parties or on them using digital and human mediators. This chapter identifies the demand for language skills in labour markets; maps the distribution of language skills proficiency and language skills training; and considers the implications of recent advances in artificial intelligence for knowledge workers, focusing on possible complementarities and substitution between machine translation tools and language professionals.

Key messages

Communication is indispensable in today's interconnected world. In particular, language is an important facilitator and barrier to both trade and the efficient and accurate exchange of information. Being able to understand and use a language is also a precondition for being able to access labour market opportunities offered in that language.

Exchanges of information between agents who primarily communicate in different languages can occur through either mediators or when some of these agents are bilingual. Mediators include language professionals such as translators, interpreters and linguists, as well as machine translation (MT) technologies.

This chapter illustrates the importance of language skills in today's labour markets. It maps self-reported levels of language proficiency of adult populations in European countries and details the provision of language learning in school systems. It also identifies the need for individuals and organisations to evaluate the capabilities and limitations of MT technologies in order to make informed decisions about when and how these can be used in different circumstances. Finally, the chapter discusses the implications of recent advances in artificial intelligence (AI) for knowledge workers.

Key empirical findings include:

- English is the most sought-after language in online job postings in selected European countries, with French, German, and Spanish following behind.
- On average, across OECD countries excluding countries in which English is an official language, one in two vacancies advertising managerial or professional occupations either explicitly or implicitly require applicants to have at least some knowledge of English.
- Whether or not adults can use a language other than their mother tongue varies across the 29 countries with available data. On average, 23% of respondents in 2016 reported that they could not use any language other than their mother tongue, compared to 29% in 2007.
- The share of adults who indicate not being able to use a language other than their mother tongue differs depending on educational attainment. On average, across countries in the sample, 10% of respondents with a tertiary degree reported that they could not use a language other than their mother tongue. However, this figure was 23% among individuals with an upper secondary degree and 41% among those with, at most, lower secondary qualifications.
- Proficiency levels vary among adults who know at least a language other than their mother tongue. In 2016, 32% of individuals indicated being able to master almost completely the non-mother-tongue language in which they felt most proficient.
- Schools are crucial to building language skills within populations. In virtually all education systems in Europe, learning at least one modern language in addition to the language of instruction is compulsory. In most education systems, learning a first modern language is compulsory for between 11 and 13 years of schooling. Depending on the evolution of generative AI systems' capabilities, language teaching and learning may change in the future.
- In the majority of countries, English is the modern language taught most in schools.
- Few individuals worldwide work as language professionals, such as interpreters and translators. However, evidence from the United States indicates that over the past 20 years, the employment of language professionals has almost tripled.
- Between 2015 and 2019, advances in MT technologies did not replace the work of language professionals, but there are increasing concerns over the shift in the tasks performed in language professions (such as the increase in post-editing tasks of translation work performed by MT technologies) may result in lower wages for language professionals.

- Post-editing, digital skills and communication skills are highly sought after skills in online vacancies for language professionals in selected English-speaking and European countries.

7.1. Introduction

Communication is indispensable in today's interconnected world. Being able to accurately exchange information with others is key to being able to make the most of digital information ecosystems. Of the estimated 8 billion people in the world at the end of 2022, about 5 billion were connected to the Internet. But whether on or offline, people's ability to access information and communicate with others depends on the language/s they understand and can use. Making the most of online information and advances in communications technologies requires individuals to be able to comprehend the text and speech in which information is delivered. Transaction costs associated with trade are rapidly decreasing due to the wide availability of affordable information and communications technology (ICT) and the speed of transportation (Hummels, 2007^[1]). However, language – the medium through which trade between different agents occurs – remains an important facilitator and barrier to both trade and to the efficient exchange of information. Individuals, firms and organisations still rely on language to communicate with one another to exchange information, goods and services. Being able to understand and use a language is also a precondition for being able to access labour market opportunities offered in that language: labour market mobility depends on individuals having relevant language skills.

Technological advances increase the returns to communication and information exchange. At the same time, they change the set of skills individuals need to make the most of information rich societies and labour markets. This chapter considers three ways in which individuals can communicate, access, and exchange information across language groups and the sets of skills that underpin these three ways of accessing and exchanging information. The first way is for individuals to exchange information directly. The set of skills needed in this situation are 'internal to the communication partners': language skills enable individuals to communicate with each other in the language of their interlocutor. The second way is for individuals to rely on machine translation (MT) technologies. Communication is made possible by digital mediators when individuals choose to rely on such tools rather than their own language skills or the skills of human professionals. Using machine translation technologies requires individuals to possess a set of skills that are also 'internal to communication partners'. These comprise the knowledge to adequately use machine translation technologies, the awareness of their limitations and the quality of the translated output, and the skill to choose between alternative mediation opportunities. The third way is for individuals to rely on the work of language professionals. In this case communication is made possible by skills that are 'external to the communication partners' and comprise the skills human mediators possess – i.e. language professionals. Language professionals need skills to convey meaning on behalf of their clients, which comprise subject matter skills, language skills, communication skills to work alongside their clients, and skills to make the most of communication with their clients.

Effective communication across language groups has important benefits for individuals but also for societies more widely. At the individual level, the ability to communicate with others is associated with better labour market prospects, especially in occupations that strongly rely on communication exchange. An extensive review of the literature on the benefits of language learning, as well as estimates of the changing skill sets of language professionals, and the description of the approach to estimating the demand for language skills in European labour markets are available in the following technical working paper, which was developed to support the preparation of this chapter: Marconi, Vergolini and Borgonovi (2023^[2]). Individuals who can communicate in more than one language are more likely to display a heightened intercultural understanding and actively participate in global issues than monolingual individuals. These are crucial skills that promote social cohesion in today's diverse societies. Multilingualism is also associated with positive economic outcomes, such as increased employability and higher wages. Such

returns could stem from the increased productivity of workers who possess such skills or because employers use language proficiency to identify characteristics such as adaptability and openness to other cultures, which are valuable but difficult to evaluate in hiring processes. Multilingual individuals also appear to exhibit higher linguistic capacity, superior divergent thinking skills – a facet of creativity – and enhanced attentional control, working memory, metalinguistic awareness, and abstract and symbolic representation skills, which are growing in importance with digital innovations and AI.

At the societal level, the benefits of interlanguage communication include increased economic growth and tax base arising from international trade as well as the availability of a larger amount of information from communities that are exposed to different challenges and opportunities. For example, language skills allow the scientific community to become aware of effective approaches to promote biodiversity that are common among indigenous communities and indigenous communities can become aware of effective approaches to promote biodiversity implemented in other parts of the world (Borgonovi, Hervé and Seitz, 2023^[3]). Moreover, whenever mistranslated content is made available on line, whenever individuals misinterpret information made available on line because of their poor language skills, or whenever information is made available on line in low quality translations, communication is distorted, with potentially far reaching implications for social cohesion and economic efficiency (see Chapter 5 on skills to navigate online information exchanges).

Language proficiency is a form of human capital. The returns to language proficiency increase with the number of speakers and vary depending on contextual factors, other forms of human capital that individuals possess, and the unique combination of individual and contextual circumstances. A key contextual factor is the development of machine translation technologies.

Over the past years, the landscape of digital mediators used to communicate, access, and exchange information across languages such as MT tools has undergone a remarkable transformation thanks to advances in natural language processing. On the one hand, the number of unique translatable language pairs increased from around 16 000 in 2019 to around 150 000 in 2022 (intento, 2022^[4]). On the other hand, MT technologies today can translate some texts with a high level of accuracy. The quality of translations varies depending on the algorithms used by language models, as well as the quantity, quality, and variety of translations used to train the machine-learning algorithms that power AI MT tools. The complexity of the text being translated also plays a role. Variability in the output of machine translations and persistent problems associated with the fact that MT technologies are not able to take into account cultural subtleties and context means that the proliferation of automated translations on line can deteriorate the quality of the information landscape. As AI MT technologies are not completely accurate, information made available on line via text or speech and translated using these tools may contain inaccuracies or mistakes. An extensive review of the literature on artificial intelligence machine translation systems are available in the following technical working paper, which was developed to support the preparation of this chapter: Borgonovi, Hervé and Seitz (2023^[3]).

Technological advances shift the boundaries of what digital mediators can do. By doing so, they change the opportunity cost for individuals to invest in language learning, to use digital rather than human mediators to access and exchange information but also change the set of skills individuals have to possess since interlinguistic communication mediated through technology requires a unique set of cognitive and metacognitive skills. Like for other emerging technologies, the use of machine translation technologies in fact requires knowledge and awareness about their capabilities and limitations for their use to be beneficial at the individual and societal levels and do not substitute but rather change the way in which skills are used.

At a minimum, individuals using online content should be able to determine whether the information they access is machine translated or not; if so, using which tools; and should develop an awareness of the continuously evolving capabilities, biases and limitations of AI MT technologies. Technological advances can bring benefits and create new problems, depending on individuals' abilities to understand how

technologies operate and the willingness of decision makers to regulate the use and applications of new technologies. This is particularly relevant given the results discussed in Chapter 5 on the increased complexity of the information landscape and the new challenges it poses for individuals in accessing, using, and exchanging information.

The chapter first illustrates the importance of language skills in today's labour markets by detailing the demand for language skills in vacancies posted on line by prospective employers. Second, the chapter maps self-reported levels of language proficiency of adult populations in European countries and details the provision of language learning in school systems. Third, the chapter identifies the need for individuals and organisations to evaluate the capabilities and limitations of MT technologies in order to make informed decisions about when and how these can be used in different circumstances. Finally, the chapter discusses the implications of recent advances in AI for knowledge workers, focusing on possible complementarities and substitution between MT tools and language professionals. It does so by identifying recent trends in demand for language professionals and by considering how technological advances in AI might impact the demand for skills.

7.2. Language skills are crucial for communication and information exchange

Language skills are highly sought after in labour markets, a reflection of the importance of information exchanges and inter-linguistic communication for service-oriented economies in which exchange of data and information is at the basis of innovation and growth. However, whether or not adults are able to speak another language besides the official language/s in their respective country of residence depends to a certain degree on whether school systems provide children and adolescents the necessary learning opportunities.

7.2.1. Language requirements in labour markets

Language requirements are key in labour markets, this includes not only the ability to speaking the official language/s of the country but also language skills beyond the official language/s. Previous work examining the demand for language skills in labour markets revealed that a knowledge of English was the sixth most-required skill in online job vacancies in European countries in 2021, making English one of the most widely requested transversal skills. The five skills that were mentioned more frequently than English in online job vacancies in 2021 were: the capacity to adapt to change; work in teams; use a computer; teamwork principles; and use Microsoft office (Marconi, Vergolini and Borgonovi, 2023^[2]).

English language skills are often required in non-English speaking countries

Table 7.1 shows the percentage of vacancies posted in 2022 for each country that required at least some knowledge of one of the four languages that appear to be most in demand in the combined sample of online vacancies posted in selected European countries: English, French, German and Spanish. This percentage combines vacancies that explicitly required at least some knowledge of English, French, German or Spanish in the vacancy text and vacancies written in one of these languages (with language skills implicitly assumed). For example, a vacancy posted in Austria would be classified as requiring at least some knowledge of English if the vacancy was written in German but specified that applicants would need to be able to communicate in English to be considered. In addition, it would be classified as requiring some knowledge of English if it did not explicitly specify any language knowledge but was written in English. It is reasonable to expect that ads written in English refer to jobs where this language is to some extent used, even though they may not mention English as a specific requirement. Finally, the last column of Table 7.1 shows the percentage of vacancies that explicitly mentioned some knowledge of at least one language in the vacancy text (including languages other than English, French, German or Spanish) without considering the language in which the vacancy text was written.

When excluding countries in which English is an official language (Ireland and United Kingdom), knowledge of English was requested in 33% or more of online vacancies posted in 2022 in Austria, Hungary, Belgium, Denmark, Switzerland, Bulgaria, Greece, Romania, Portugal, Luxembourg. By contrast, knowledge of English was requested in 15% or less of online vacancies posted in 2022 in Croatia, Latvia and Finland.

Table 7.1. Explicit and implicit language requirements in online job vacancies in European countries, 2022

Percentage of online vacancies in which the vacancy was either written in a language (implicit requirement) or a knowledge of such language was required in the vacancy text (explicit requirement)

	Explicit or implicit requirement (English)	Explicit or implicit requirement (French)	Explicit or implicit requirement (German)	Explicit or implicit requirement (Spanish)	Explicit requirement (Any language)
Austria	34	1	92	2	48
Belgium	35	19	3	1	50
Bulgaria	44	2	11	5	47
Croatia	15	2	2	10	31
Czech Republic	26	1	4	1	40
Denmark	38	1	1	0	51
Estonia	18	0	6	0	21
EU average	31	5	4	3	37
Finland	13	0	1	0	19
France	32	98	1	1	56
Germany	33	1	96	1	49
Greece*	44	2	3	2	19
Hungary	34	2	6	2	36
Ireland	99	3	3	2	15
Italy	26	4	2	1	36
Latvia	15	0	2	0	34
Lithuania	24	1	5	1	35
Luxembourg	59	63	15	5	89
Netherlands	27	1	2	1	28
Poland	30	2	5	2	29
Portugal	54	6	7	19	51
Romania	46	3	5	3	36
Slovak Republic	23	1	3	1	25
Slovenia	21	0	1	0	25
Spain	30	3	3	76	26
Sweden	28	1	1	0	36
Switzerland	42	9	76	3	56
United Kingdom	99	3	2	1	15

Note: Countries are sorted alphabetically. The EU average includes countries that are members of the European Union in the sample. The EU average excludes for each column, countries with values higher than 80% in the respective language requirement (i.e. Ireland and the United Kingdom are excluded for English; Austria, Switzerland and Germany are excluded for German; Spain is excluded for Spanish; and France is excluded for French). The “English”, “French”, “German” and “Spanish” columns include both ads explicitly requiring this language and implicitly requiring it (because they are written in that language). The column “Any language” includes only vacancies that explicitly require at least one language in the vacancy text.

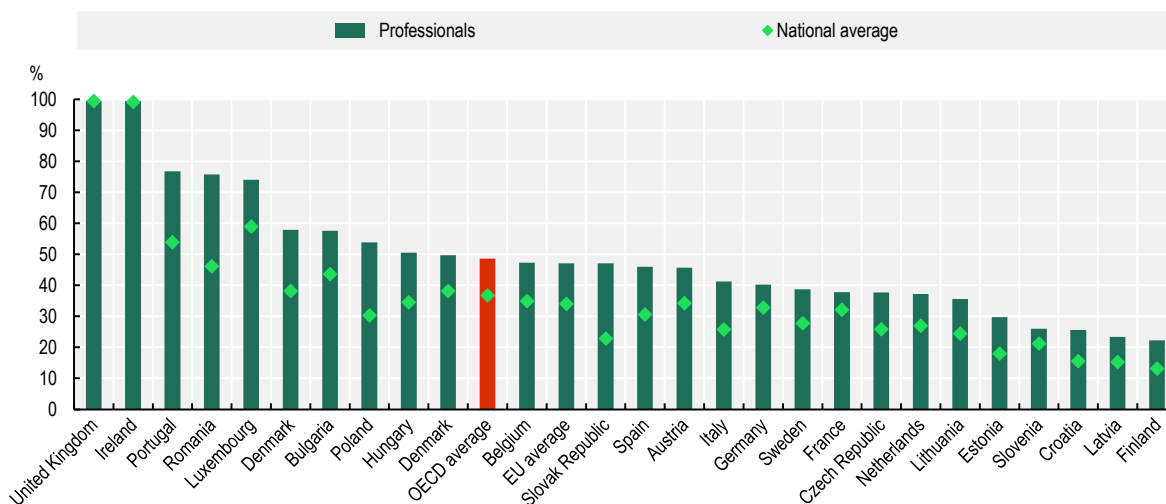
*It is possible that the language model used to extract vacancies misclassifies non-roman alphabets such as Greek and Cyrillic.

Source: Calculations based on Lightcast, (2023^[5]), Lightcast™, <https://lightcast.io>, (accessed April 2023), according to the methodology described in Marconi, Vergolini and Borgonovi, (2023^[2]), “The demand for language skills in the European labour market: Evidence from online job vacancies”, <https://doi.org/10.1787/e1a5abe0-en>.

Figure 7.1 shows the percentage of online vacancies implicitly or explicitly requiring English language skills in professional occupations relative to the percentage of online vacancies implicitly or explicitly requiring English in all vacancies advertised on line. Workers in professional occupations often completed tertiary or upper secondary degrees and have high levels of foundational skills, technical skills and transversal skills to be able to complete challenging cognitive tasks (ILO, 2012^[6]). On average, across OECD and European countries, almost one in two vacancies advertising professional occupations either explicitly or implicitly required applicants to have at least some knowledge of English. In Portugal, Romania and Luxembourg, over seven in ten online vacancies advertised for professional jobs explicitly or implicitly demanded at least some knowledge of English. English was also required in around one in two vacancies for professional occupations posted on line in Austria, Spain, the Slovak Republic, Belgium, Denmark, Hungary, Poland, Bulgaria, Denmark. By contrast, in Latvia and Finland, only around two in five vacancies posted on line for professionals explicitly or implicitly required at least some knowledge of English. In countries with compulsory English language learning in upper secondary education, like Sweden, employers may expect candidates to possess a good working knowledge of English and therefore not explicitly or implicitly require it in the job description.

Figure 7.1. The demand for English skills among professionals in European countries, 2022

Percentage of online vacancies implicitly or explicitly requiring at least some knowledge of English among professionals, and in all vacancies posted on line



Note: Countries are sorted in descending order of the number of vacancies explicitly or implicitly requiring English among professionals. These are vacancies either specifying English as a required skill in the vacancy text or vacancies that were written in English. “National average” refers to the average in a specific country across all occupational groups.

Source: Calculations based on Lightcast, (2023^[5]), Lightcast™, (accessed April 2023), <https://lightcast.io>, according to the methodology described in Marconi, Vergolini and Borgonovi, (2023^[2]), “The demand for language skills in the European labour market: Evidence from online job vacancies”, <https://doi.org/10.1787/e1a5abe0-en>

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Official languages remain critical for individuals to integrate in local labour markets

Countries around the world acknowledge the importance of language for exchange, cultural integration and labour market opportunities. Although language skills are important for effective information exchange across linguistic communities, and English language skills are critical in this respect, mastering the official

language/s of a country remains crucial for labour market and social integration. Proficiency in the official language/s of a country remains crucial if individuals are to be able to access labour market opportunities available in a country and, by extension, labour markets remain closed off to individuals who lack such language proficiency. Although in many countries, employers lament a lack of qualified workers to fill available positions, and, by contrast, many workers lament a lack of opportunities to use their skills effectively in the labour market, language remains an important barrier to tackle skill mismatch and skill shortages.

The importance of mastering the official language/s of a country has been extensively studied in the context of labour market and social integration of migrant communities. The literature has identified large returns for immigrant communities associated with acquiring the language spoken in the host country (Bleakley and Chin, 2004^[7]; Chiswick and Miller, 1995^[8]; Dustmann and Fabbri, 2003^[9]; Dustmann and Soest, 2001^[10]). This is especially the case in Europe, a large, linguistically diverse community of more than 500 million people and 24 official languages in which, thanks to the European Common market, the free movement of goods, capital, services, and people is guaranteed. According to the Council of the European Union “language competences contribute to the mobility, employability and personal development of European citizens, in particular young people, in line with the objectives of the Europe 2020 strategy for growth and jobs” (Council of the European Union, 2014, p. 2^[11]).

Table 7.2 shows the percentage of job vacancies posted on line in 2022 that were written in the official language/s of the country as well as the percentage of vacancies that were written in English, German, Spanish or French. Results reflect language requirements in job offers posted on line and may, therefore, not fully represent labour market opportunities. In particular, it is possible that online vacancies may tailor employment profiles that are more likely to require basic levels of digital skills and greater language competencies. Whereas French, German and Spanish are little used as the language in which vacancies are written outside of the countries in which they are official languages, vacancies written in English make up around 5-10% of vacancies in many countries.

Table 7.2. Implicit language requirements in European countries, 2022

	Official language/s	English	German	French	Spanish
Austria	92.00	6.76	91.84	0.06	0.01
Belgium	90.58	8.98	0.53	14.93	0.01
Bulgaria	52.50	22.43	4.93	0.15	0.60
Croatia	87.84	6.05	0.22	0.35	0.06
Czech Republic	88.52	4.55	0.53	0.00	0.00
Denmark	80.57	18.64	0.17	0.01	0.00
Estonia	82.91	8.14	6.40	0.10	0.02
EU average	82.00	13.85	13.85	3.43	0.40
Finland	93.84	5.38	0.06	0.01	0.00
France	97.75	1.66	0.18	97.75	0.10
Germany	96.10	3.38	96.10	0.04	0.01
Greece*	53.31	34.86	1.71	1.33	0.89
Hungary	71.21	21.12	1.36	0.48	0.66
Ireland	98.94	98.94	0.27	0.14	0.06
Italy	89.81	7.56	0.64	0.91	0.16
Latvia	93.93	3.78	1.13	0.00	0.02
Lithuania	87.97	8.35	1.68	0.00	0.52
Luxembourg	61.22	38.25	3.90	57.32	0.02
Netherlands	90.74	8.07	0.71	0.08	0.01
Poland	82.20	17.49	0.08	0.00	0.00
Portugal	46.71	39.72	2.71	1.35	4.95
Romania	61.94	29.86	1.09	0.56	1.15

	Official language/s	English	German	French	Spanish
Slovak Republic	82.33	10.32	0.86	0.69	0.02
Slovenia	94.92	1.82	0.70	0.02	0.00
Spain	81.63	16.19	0.97	0.42	77.44
Sweden	90.54	9.15	0.04	0.01	0.01
Switzerland	82.58	15.98	74.41	7.34	0.02
United Kingdom	99.32	99.32	0.17	0.06	0.01

Notes: Countries are sorted alphabetically. The EU average includes countries that are members of the European Union in the sample. The EU average excludes for each column, countries with values higher than 80% in the respective language requirement (i.e. Ireland and the United Kingdom are excluded for English; Austria and Germany are excluded for German; Spain is excluded for Spanish; and France is excluded for French). *It is possible that the language model used to extract vacancies misclassifies non-roman alphabets such as Greek and Cyrillic.

Source: Calculations based on Lightcast, (2023^[5]), Lightcast™, (accessed April 2023), <https://lightcast.io>, according to the methodology described in Marconi, Vergolini and Borgonovi, (2023^[2]), “The demand for language skills in the European labour market: Evidence from online job vacancies”, <https://doi.org/10.1787/e1a5abe0-en>.

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Many countries beyond Europe recognise the importance of knowing and understanding the local language in order to more successfully enter the labour market. For example, in Australia, it is crucial for prospective employees to speak English. A study found that an individual’s English language skills influences their prospects of employment and contributes to their possibility of getting more “secure” and “better” jobs (Roshid and Chowdhury, 2013^[12]). Meanwhile, in Canada to apply for a work permit, an individual must demonstrate that they have the minimum French and English language ability required for their job category (Government of Canada, 2014^[13]; Government of Canada, 2023^[14]). More generally, proficiency in one of the official languages (French or English) is an important factor for issuance of Canadian work, because a person’s ability to communicate with other employers, customers, clients and emergency services is a basic requirement for most jobs (Karas, 2020^[15]).

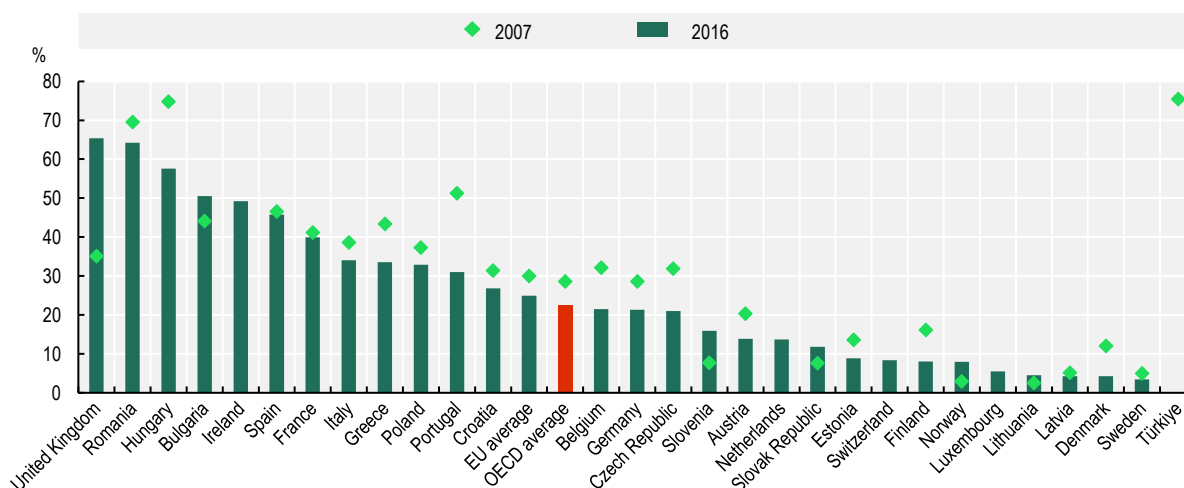
Japan also has a language requirement test – known as the Japanese Language Proficiency Test (JLPT) – that foreigners need to have completed in order to be eligible to work in the country. The level required to achieve depends on the company and the positions one applies for but conventionally it is considered that a JLPT level 2 is the minimum requirement for working in a company (with level 1 being the highest level) (CCI France Japon, n.d.^[16]). Similarly, Korea requires foreigners to take the Test of Proficiency in Korean (TOPIK) language exam – a test to measure the Korean language proficiency of non-native speakers in South Korea (TOPIK Guide, n.d.^[17]).

7.2.2. Adults’ language skills proficiency varies across countries and by level of education

Whether or not adults can use a language other than their mother tongue varies across countries and the share of adults who cannot use a language other than their mother tongue has decreased over time. Figure 7.2 shows the share of the adult population in European countries who reported not being able to use any language that was not their mother tongue in 2007 and 2016 (the year with the latest available data). On average, across OECD countries in the sample, 23% of respondents in 2016 reported that they could not use any language other than their mother tongue, compared to 29% in 2007. The percentage of adults who could not use any language other than their mother tongue in 2016 was highest in the United Kingdom (65%) and lowest in Sweden (3%). Figure 7.2 further reveals that in Denmark, Estonia, Finland, Latvia, Lithuania, Luxembourg, Norway, Sweden and Switzerland in 2016, less than 10% of adults indicated being unable to use any language other than their mother tongue language/s. In most countries with available data in both 2007 and 2016, the share of adults who reported not being able to use any language that was not their mother tongue decreased. However, this share increased by over 30 percentage points in the United Kingdom, from 35% in 2007 to 65% in 2016.

Figure 7.2. Share of adults who do not know a language other than their mother tongue, 2007 and 2016

Percentage of 25 to 64 year-olds who reported that they could not use any non-mother-tongue language



Note: Countries are ranked in descending order of the share of 25 to 64 year-olds who reported that they could not use any non-mother-tongue language in 2016. In 2007, estimates for the following countries were not available: Ireland, Luxembourg, the Netherlands and Switzerland. In 2016, estimates were not available for the Republic of Türkiye.

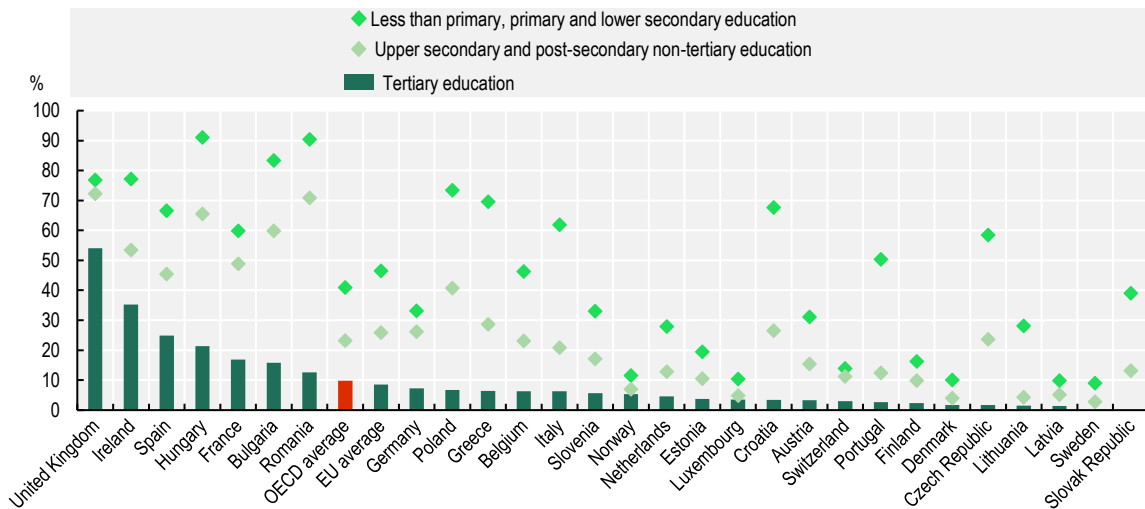
Source: Eurostat (2007^[18]), *Adult Education Survey 2007*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>; Eurostat (2016^[19]), *Adult Education Survey 2016*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>.

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The share of adults not able to use a language other than their mother tongue varies not only across countries but also across educational attainment, with higher educational levels decreasing the likelihood of not being able to use another language (other than one's mother tongue). Figure 7.3 illustrates that on average, across countries in the sample, 10% of respondents who indicated having obtained a tertiary degree reported that they could not use a language other than their mother tongue. This figure was 23% among individuals with an upper secondary degree and 41% among those with, at most, lower secondary qualifications. In all countries, individuals with tertiary qualifications were less likely to report being unable to use a language other than their mother tongue than those without tertiary qualifications. In the Netherlands, Estonia, Luxembourg, Croatia, Austria, Switzerland, Portugal, Finland, Denmark, the Czech Republic, Lithuania and Latvia, less than 5% of adults with a tertiary level qualification reported not being able to use any language other than their mother tongue, while in no country did less than 5% of individuals with less than an upper secondary degree report the same. Differences between tertiary-educated adults and adults who obtained at most a lower secondary degree were most pronounced in Romania, with 90% of individuals with less than an upper secondary degree not being able to use a language other than their mother tongue and 13% of individuals with a tertiary level qualification reporting the same.

Figure 7.3. Share of adults who do not know a language other than their mother tongue, by educational attainment, 2016

Percentage of 25 to 64 year-olds who reported that they could not use any non-mother-tongue language



Note: Countries are ranked in descending order of the share of 25 to 64 year-olds with a tertiary level qualification who reported that they could not use any non-mother-tongue language. Data are not reported for Sweden and the Slovak Republic due to the low reliability of estimates. No information was available for the Republic of Türkiye.

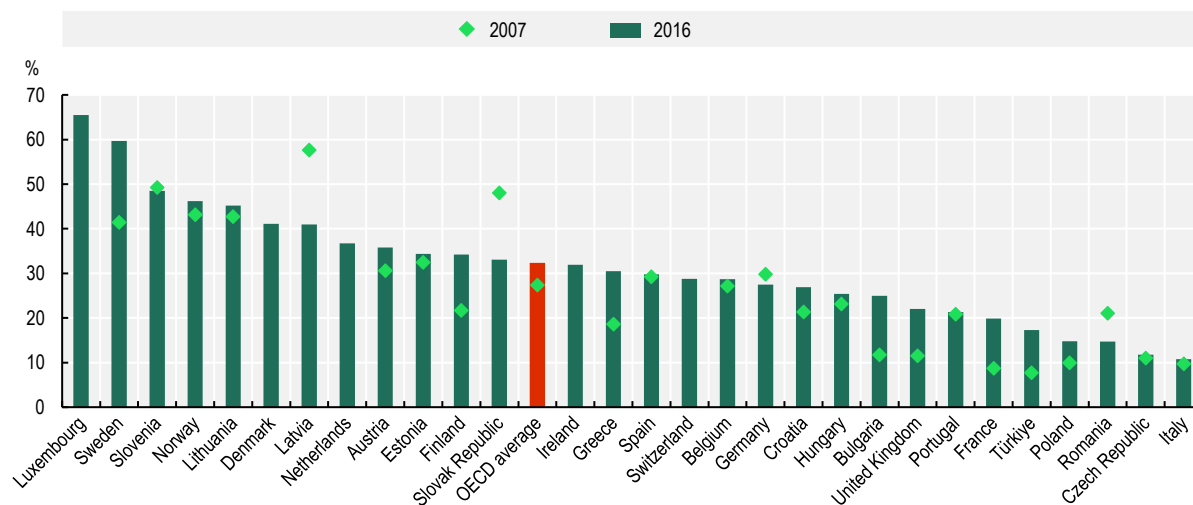
Source: Eurostat (2016_[19]), *Adult Education Survey 2016*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>.

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Proficiency levels vary among adults who know another language other than their mother tongue. Figure 7.4 reveals the share of individuals who indicated being proficient (can understand a wide range of demanding texts and use the language flexibly) instead of having good (can understand the essentials of clear language and produce simple text) or basic (can understand and use the most common everyday expressions) levels of proficiency among individuals who indicated being able to use at least one non-mother-tongue language. On average, across countries with available data, in 2016, 32% of individuals indicated being able to master almost completely the non-mother-tongue language in which they felt most proficient, whereas, in 2007, 27% of individuals reported the same. In Luxembourg, Sweden, Slovenia, Norway, Lithuania, Latvia and Denmark, over 40% of adults who could use at least one non-mother-tongue language indicated being proficient users of such language in 2016. By contrast, in Poland, Romania, the Czech Republic and Italy, less than 15% of adults who could use at least one non-mother-tongue language indicated being proficient users of such language in 2016. These data could reflect differences in self-perceived ability rather than actual proficiency levels. In addition, the figure reveals that the share of proficient users has increased over time. Only in Latvia, the Slovak Republic, Germany and Romania did the share of proficient users decrease between 2007 and 2016. Box 7.1 illustrates efforts undertaken by the OECD's Programme for International Student Assessment (PISA) to assess English language proficiency in the context of its international benchmarking efforts.

Figure 7.4. Share of adults who are proficient in their best-known language after their mother tongue, 2007 and 2016

Percentage of 25 to 64 year-olds who reported being proficient in the non-mother-tongue language that they indicated knowing the best



Note: Countries are ranked in descending order of the share of 25 to 64 year-olds who indicated, “I can understand a wide range of demanding texts and use the language flexibly. I master the language almost completely” regarding the non-mother-tongue language that they considered to know the best in 2016. In 2007, estimates for the following countries were not available: Denmark, Ireland, Luxembourg, the Netherlands and Switzerland.

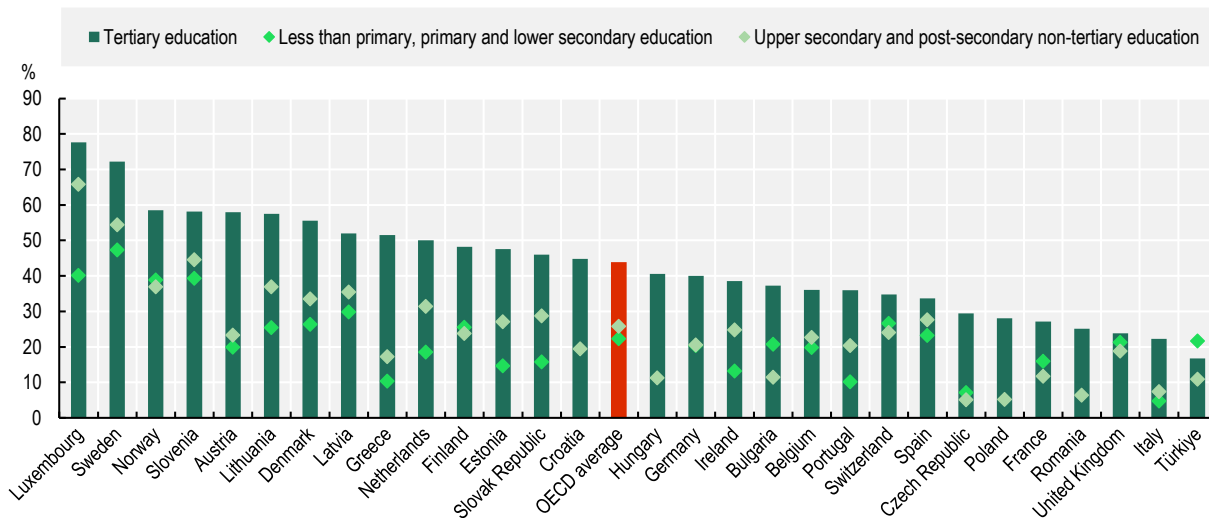
Source: Eurostat (2007^[18]), *Adult Education Survey 2007*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>; Eurostat (2016^[19]), *Adult Education Survey 2016*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>.

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Language proficiency also varies by educational attainment, with higher educational attainment levels being associated with a higher likelihood of being a proficient language user. Figure 7.5 illustrates differences in self-reported language skills proficiency among individuals with different levels of education. On average, across countries with available data, in 2016, 44% of 25-64 year-olds with a tertiary degree indicated being able to master almost completely the non-mother-tongue language in which they felt most proficient. Among 25-64 year-olds with an upper secondary degree, this figure was 26%, and among those with, at most, a lower-secondary degree, it was 24%. In Luxembourg and Sweden, over 70% of 25-64 year-olds with a tertiary degree indicated being able to master almost completely the non-mother-tongue language in which they felt most proficient, whereas in Italy and the Republic of Türkiye (hereafter ‘Türkiye’), this share was 22% and 17%, respectively. Luxembourg and Sweden were the countries with the largest share of individuals with at most a lower secondary degree who indicated being able to master almost completely the non-mother-tongue language in which they felt most proficient: in Luxembourg, 40%, and in Sweden, 47% so reported. Differences related to educational attainment in self-reported language skills proficiency were largest in Greece, where 41% reported being proficient among those with a tertiary degree and 10% reported being proficient with, at most, a lower secondary degree.


Figure 7.5. Level of proficiency in the best-known non-mother-tongue language among adults in European countries, by educational attainment, 2016

Percentage of 25 to 64 year-olds reporting being proficient in the best-known non-mother-tongue language by educational level



Note: Countries are ranked in descending order of the share of 25 to 64 year-olds with a tertiary degree who indicated, “I can understand a wide range of demanding texts and use the language flexibly. I master the language almost completely” regarding the non-mother-tongue language that they considered to know best in 2016. Data for “Less than primary, primary and lower-secondary education” are not available for the following countries: Croatia, Hungary, Poland and Romania.

Source: Eurostat (2016_[19]), *Adult Education Survey 2016*, <https://ec.europa.eu/eurostat/web/microdata/adult-education-survey>.

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Box 7.1. The PISA 2025 Assessment of Foreign Language Skills

For the first time, the PISA 2025 cycle will include an optional foreign language assessment, which will assess the main foreign language competences needed to study and work in a globalised world. The assessment will be implemented every two PISA cycles, allowing for trend analyses. The assessment, which will first be implemented in PISA 2025, will provide policy makers and educators with comparable results of their students’ foreign language competence and allow them to gain insights into the best practices and policies for teaching and learning a foreign language. Twenty-two countries and economies have signed up for this option in 2025, allowing for a diversity of contexts and richness in the analyses of best practices.

The first cycle will assess English as a foreign language and hence be referred to as the PISA 2025 Foreign Language Assessment-English. It will focus on the three skills of reading, listening and speaking (more specifically, on reading comprehension, listening comprehension and spoken production). The intention is to add other languages and skills in future cycles, subject to interest and technical feasibility.

The assessment will describe students’ reading, speaking and listening proficiency in English as a foreign language, inter-correlations of these three skills, and correlations between reading in the language of instruction and reading in English as a foreign language.

The framework builds on other international experiences of assessing foreign languages, in particular, the Common European Framework of Reference for Languages (CEFR) descriptive scheme and a socio-cognitive model of language use. The results will be reported on the CEFR level descriptors, which correspond to a progression in language competence; for each level, a series of “can-do” statements indicate what language learners whose competence falls within that level are typically able to do. The levels covered in PISA 2025 will be from Pre-A1 to C1. The use of these globally recognised scales will facilitate easy and appropriate interpretation of PISA results by educators and policy makers.

In addition to the cognitive assessment, this option will collect data on the background factors related to foreign language teaching and learning.

Note: For more information on the cognitive framework, see the *PISA 2025 Foreign Language Assessment Framework* at www.oecd.org/pisa/foreign-language/PISA-2025-FLA-Framework.pdf and the Framework brochure at www.oecd.org/pisa/foreign-language/PISA-2025-FLA-Framework-Learning-Another-Language.pdf.

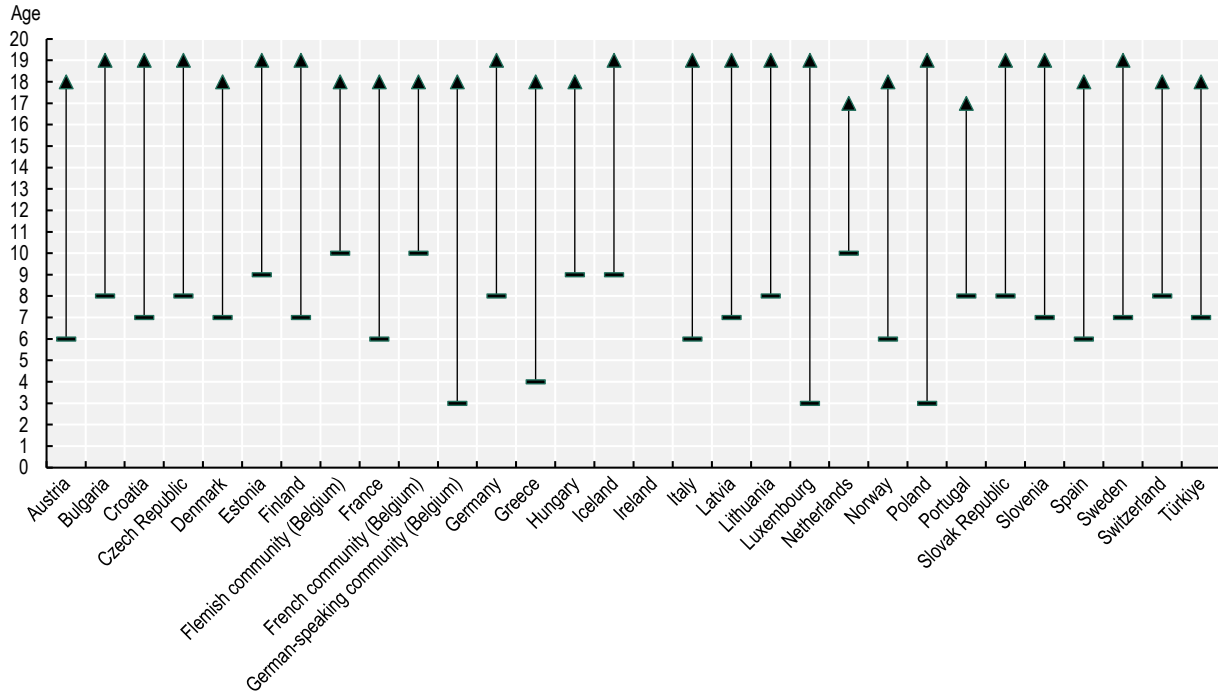
7.2.3. In most school systems in Europe, children learn at least one modern language at school

The use of language has complex implications for identity, social integration, education and development. Therefore, whether languages are preserved or not has important geopolitical implications in multicultural and globally connected societies. Estimates suggest that every two weeks, a language becomes extinct, often leaving little written record of the cultural and intellectual heritage accumulated with its use. Around 40% of the languages that remain in use are endangered, with only a few hundred languages being used in public education systems (UNESCO, 2010^[20]). International efforts, such as the celebration of the International Year of Indigenous Languages in 2019, the International Decade of Indigenous Languages (2022-32) and the UNESCO Recommendation concerning the Promotion and Use of Multilingualism and Access to Cyberspace (UNESCO, 2003^[21]) represent important attempts to preserve, revitalise and promote languages that are at risk of going extinct.

The period when young people learn a first language or an additional language in pre-primary, primary and general secondary education differs across European countries (Box 7.2 sheds light on language learning in selected countries outside Europe in particular in the United States, Japan and Colombia). Figure 7.6 shows that in virtually all education systems (excluding Ireland), learning at least one modern language in addition to the language of instruction is compulsory in school. In this chapter, the term modern language is used instead of the term foreign language since for some children this language may be their native language or one of their native languages. Moreover, the term foreign language would be incorrect in countries in which regional and/or minority languages are not treated separately from “foreign” languages. The duration of compulsory learning of a first modern language varies between 7 years in the Netherlands and 16 years in Luxembourg and Poland. In most education systems, learning a first modern language is compulsory for between 11 and 13 years of schooling.

Figure 7.6. Period during which learning a modern language other than the main language of instruction was compulsory in pre-primary, primary and/or general secondary education in 2021/22 in European countries

Starting age and finishing age during which learning a modern language was compulsory in pre-primary, primary and/or general secondary education.



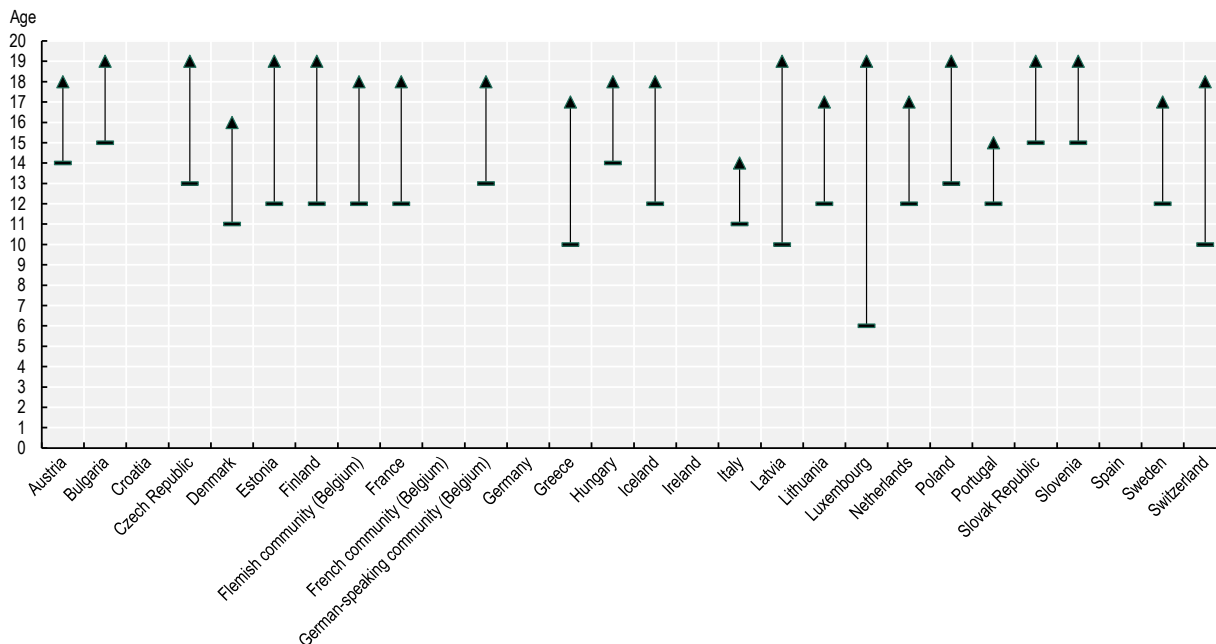
Note: Regional and/or minority languages and classical languages are included only when the curriculum designates them as alternatives to modern languages. Information is based on the curriculum or other steering documents issued by top-level education authorities. In Ireland, no compulsory modern/ language training exists.

Source: European Commission/EACEA/Eurydice (2023^[22]), Key data on teaching languages at school in Europe – 2023 edition, <https://eurydice.eacea.ec.europa.eu/publications/key-data-teaching-languages-school-europe-2023-edition>.

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Figure 7.7. Period during which the learning of two modern languages was compulsory in pre-primary, primary and/or general secondary education in 2021/22 in European countries

Starting age and finishing age during which learning two modern languages was compulsory in primary and/or general secondary education



Note: Regional and/or minority languages and classical languages are included only when the curriculum designates them as alternatives to modern languages. Information is based on the curriculum or other steering documents issued by top-level education authorities. In Ireland, no compulsory modern language training exists. "Second language" means a language students learn in addition to a first modern language, resulting in students learning two modern languages simultaneously. In Belgium (French Community), Croatia, Germany, Ireland and Spain, a second modern language is not compulsory. Information on Sweden is based on Skollag (2010:800) 10 kap §4; Skolförordning (2011:185), 15 kap, § 3; Gymnasieförordningen (2010:2039).

Source: European Commission/EACEA/Eurydice (2023^[22]), *Key data on teaching languages at school in Europe – 2023 edition*, <https://euridice.eacea.ec.europa.eu/publications/key-data-teaching-languages-school-europe-2023-edition>.

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Children as young as three are expected to start learning a modern language in the German-speaking community of Belgium, Luxembourg and Poland. In contrast, language learning is not compulsory until the age of ten in the Netherlands. In many education systems, compulsory language learning starts at the beginning of primary education. In Austria, France, Italy, Norway and Spain, children start learning a modern language in addition to the language of instruction at the age of six, whereas, in Croatia, Denmark, Finland, Latvia, Slovenia, Sweden and Türkiye, children start at the age of seven.

There is less variation in the age until which learning a first modern language in addition to the language of instruction is compulsory. In all countries, students are required to learn a second language until between the age of 17 and 19. Figure 7.7 suggests that in many education systems, a second compulsory modern language is part of the curriculum and that such a second language is typically studied for between five and nine years of schooling. In many countries, studying a second modern language becomes compulsory only in secondary school; except for Luxembourg (where learning a second modern language is compulsory from age six), in all other education systems, learning a second modern language starts at age 12 or above.

Box 7.2. Language learning in the United States, Japan and Colombia

United States

In contrast to the majority of European countries in which learning modern languages is compulsory in pre-primary, primary and/or general secondary education (Figure 7.6), no such national standard exists in the United States. Instead, whether or not language learning requirements exist are determined at the school district or state level. Only 11 states have clear modern language graduation requirements (American Councils for International Education, 2017^[23]). Therefore, enrolment in modern language education highly differs across states varying between 9.09% (Arkansas) and 51.18% (New Jersey) of the total school age population, with the majority of students being enrolled in Spanish language courses, followed by French and German.

Japan

Over the past years, the importance of international education in the school education curriculum in Japan has grown and the teaching and learning of modern languages expanded. The *English Education Reform Plan Corresponding to Globalization* by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) (MEXT: Ministry of Education, Culture, Sports, Science and Technology, 2014^[24]) was released in 2013 and is to be implemented gradually until 2020. Following the reform, English language instruction begins in elementary school with English language activity classes 1-2 times per week in the third and fourth grades, English language classes 3 times per week in the fifth and sixth grades, and continue throughout lower and upper secondary school.

Colombia

Colombia is consistently updating its educational policies to promote language instruction in the country. While the introduction of English language instruction in the school curriculum dates back to 1979, several changes in the last two decades mark Colombia's path toward developing bilingual language skills among students (Cifuentes, Mejía and Nates, 2018^[25]). In 2004, the National Bilingual Program NBP (Programa Nacional de Bilingüismo) was introduced, which among interventions, promoted the introduction of measures to evaluate student performance, defined English proficiency standards (e.g. B1 level for high school graduates by 2019) and developed projects for school teachers. In 2010, the NBP was updated through the Foreign Languages Competencies Development Program (PFDCLE) to further promote English language learning in Colombia, for example by setting specific English proficiency targets, such as the percentage of high school graduates achieving at least B1 and university graduates achieving B2 (Cifuentes, Mejía and Nates, 2018^[25]; Universidad de Antioquia, n.d.^[26]). The Bilingualism Law (Ley de Bilingüismo) was issued to adapt the General Education Law which regulates the supply of education to for example specify the goal of English language instruction (Universidad de Antioquia, 2013^[27]). In 2015, the National Plan of English (Programa Nacional de Inglés) was launched. The Plan enhances English language learning in Colombia through three key components: 1) teacher training strategies and pedagogical materials for basic and secondary education (e.g. extension of hours of English lessons, provision of English lessons outside the classroom); 2) quality, support and financing of English learning in higher education (e.g. facilitate free access to a free virtual platform); 3) English learning outside school (e.g. communication campaign to promote English language training for businesses and individuals in the workforce) (Gómez Sará, 2017^[28]; Universidad de Antioquia, n.d.^[26]; Ministerio de Educación Nacional, n.d.^[29]).

7.2.4. Adolescents enrolled in vocational education and training programmes are less likely to study modern languages

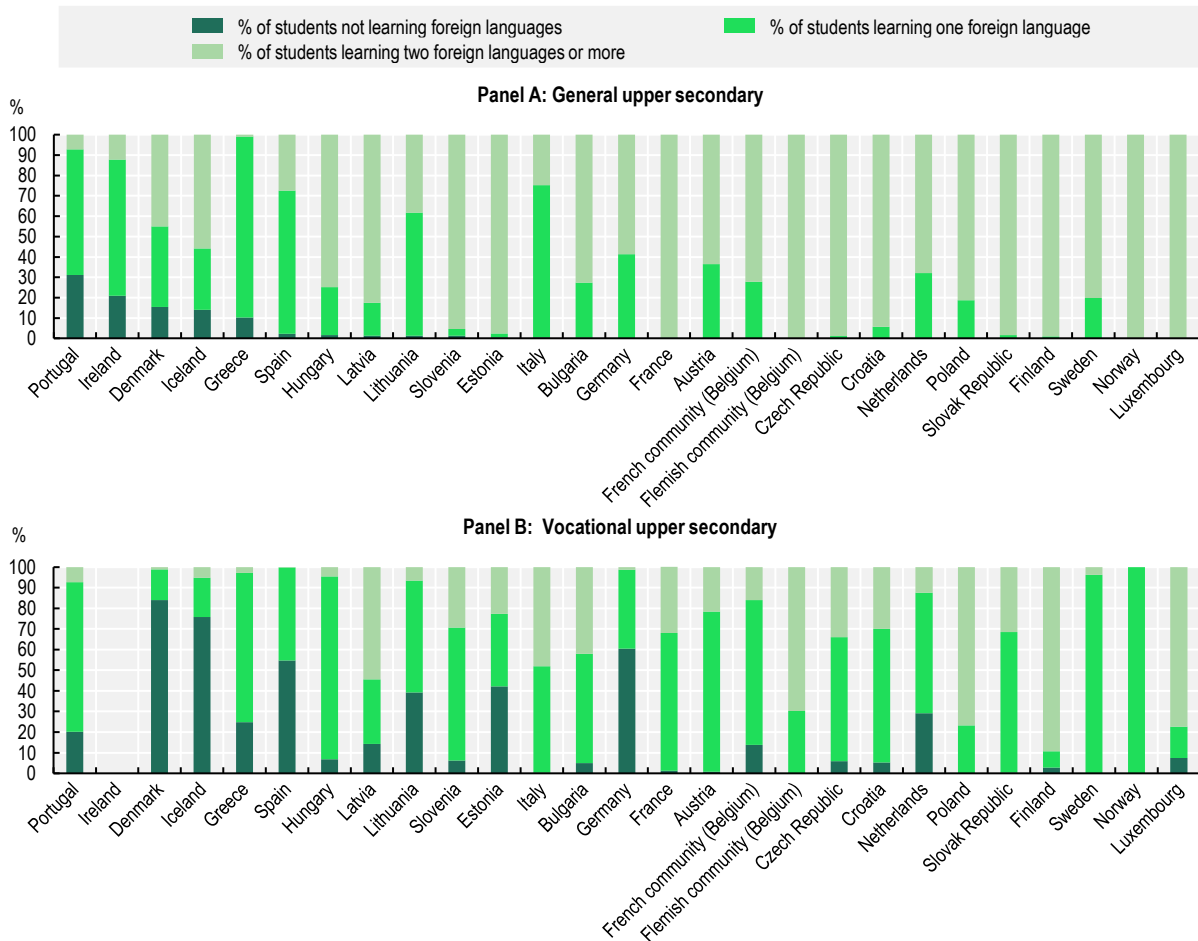
The opportunity to learn modern languages differs depending on whether students enrol in general upper secondary education or vocational upper secondary education programmes. Figure 7.8 suggests that in all education systems, except for Portugal, Ireland, Denmark, Iceland and Greece, over 95% of students enrolled in general upper secondary education programmes undertake a modern language course. On the other hand, in most education systems in the same countries, students in vocational education and training programmes are much less likely to attend modern language courses.

In Denmark, Iceland, Spain and Germany, over 50% of students enrolled in vocational upper secondary programmes do not attend any modern language courses in their programme. By contrast, in many education systems, a large share of students enrolled in general upper secondary programmes learn two modern languages or more: in Slovenia, Estonia, France, Belgium (Flemish Community), the Czech Republic, Croatia, Finland, Norway and Luxembourg, 90% or more of students enrolled in general upper secondary programmes learn two modern languages or more. By contrast, very few students enrolled in vocational upper secondary programmes learn two modern languages or more.

In the majority of countries including Japan (Box 7.2), English is the modern language that is taught the most in school. Figure 7.9 reveals that in Norway, Spain, Austria, Poland, Greece, Latvia, France, Italy, Sweden and Croatia, over 90% of children in primary school learn English in class. By contrast, English was not part of the primary school curriculum in Luxembourg or Belgium (Flemish Community). These are countries with several official languages and where young children are expected to first gain mastery of such languages. In lower secondary schools, participation in English language classes remains high in countries with nearly universal provision at the primary level. It increases markedly in the remaining countries: at the lower secondary level, over 90% of students attend English language classes in all countries except Hungary, Belgium (French Community), Belgium (Flemish Community) and Luxembourg. In several countries, the percentage of students who learn English in upper secondary schools decreases: in Norway, it drops from 95% at the lower secondary level to 43% at the upper secondary level. Similarly, in Denmark, it drops from 100% at the lower secondary level to 54% at the upper secondary level. By contrast, in Belgium (French Community), Belgium (Flemish Community) and Luxembourg, the percentage of students learning English at the upper secondary level increases to 77%, 89% and 84%, respectively.

Figure 7.8. Number of modern languages learnt by students in upper secondary education in European countries, 2020

Percentage of students learning modern languages in general and vocational upper secondary education, by number of languages

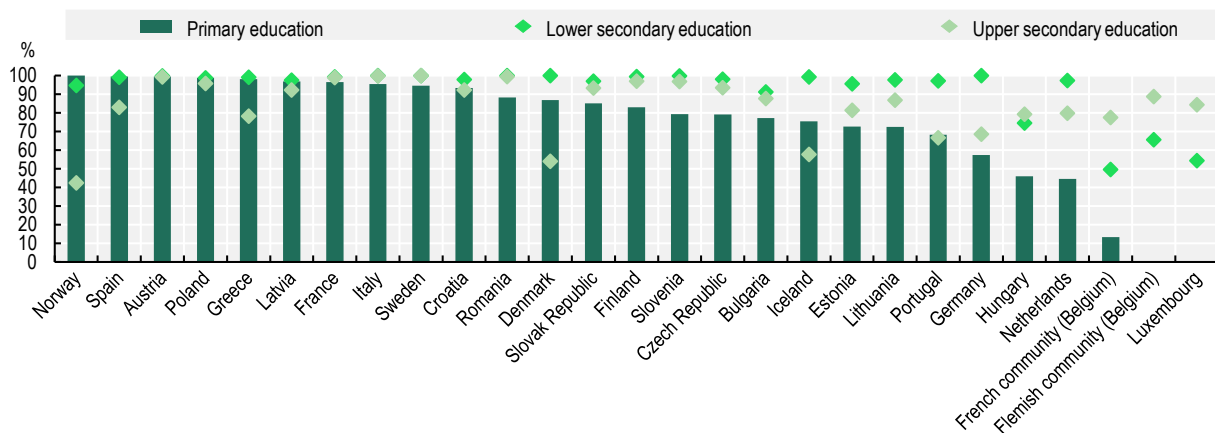


Note: The figure shows the percentage of students learning zero, one or two (or more) modern languages, with percentages being calculated with regard to all students in all years of general International Standard Classification of Education (ISCED) 3 or vocational ISCED 3, even where the language learning does not continue until the end of the level. More concretely, the number of students learning zero, one or two (or more) modern languages is divided by the sum of students learning zero, one or two (or more) modern languages in all years of general ISCED 3 or vocational ISCED 3. Data from Iceland are from 2019 instead of 2020. See Table C5 in European Commission/EACEA/Eurydice (2023^[22]). Source: European Commission/EACEA/Eurydice (2023^[22]), Key data on teaching languages at school in Europe – 2023 edition, <https://eurydice.eacea.ec.europa.eu/publications/key-data-teaching-languages-school-europe-2023-edition>.

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Figure 7.9. Learning English at school in European countries, by educational level, 2020

Percentage of students learning English in primary, lower secondary and upper secondary education



Note: The figure shows the percentage of students learning English in primary, lower and upper secondary education. Belgium (German-speaking Community), Switzerland and the Republic of Türkiye did not participate in data collection. For Ireland, no data are available. For Belgium (Flemish Community), the reference year for ISCED 1 data is 2019 (2020 data on ISCED 1 are not available). For Iceland, the reference year for general and vocational ISCED 3 data is 2019. See Table C9 in European Commission/EACEA/Eurydice (2023^[22]).

Source: European Commission/EACEA/Eurydice (2023^[22]), *Key data on teaching languages at school in Europe – 2023 edition*, <https://eurydice.eacea.ec.europa.eu/publications/key-data-teaching-languages-school-europe-2023-edition>.

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7.3. Making the most of artificial machine translation technologies requires the development of new skills

Language skills are the foundational element of inter language communication. Digital mediators such as MT technologies are one of the means individuals have to enhance their communication potential whenever they are not proficient in a language. But in order to effectively use MT technologies, individuals should develop a good knowledge of these tools, their strengths and limitations in different contexts, as well as the ability to use them effectively to achieve their goals. Existing machine translation tools in fact suffer from a number of limitations that make them unsuitable to substitute language skills in many settings. Rather they are useful aids to be used by individuals who are fully aware of their potentials and limitations. Yet, despite the fact that machine translation systems are being used by individuals worldwide to engage in inter linguistic communication, existing language learning courses – whether tailored to young people in school or adults – do not equip learners with such knowledge and ability making language learning incomplete given the existing technological landscape. This section details key features of existing machine translation systems as well as their potentials and limitations to highlight the need for education and training systems to evolve in response to this important technological development.

7.3.1. What are machine translation systems and on what data are they trained on?

Machine translation is the process of automatically translating content from one language (the source) to another (the target). Translation was one of the first applications of computing power, starting in the 1930s. Since the 1980s, machine translation tools have undergone a remarkable transformation with large improvements in quality over time.

A key problem of many existing MT tools is that the quality of translated output differs markedly across languages because of differences in the amount of resources available to train AI systems and the fact that linguistic minorities are rarely represented among AI developers (Fan et al., 2022^[30]; Haddow et al., 2022^[31]; Lewis, 2020^[32]; Time, 2023^[33]). Diversity in the quality of the translations produced by MT tools for high-resource and low-resource languages is likely to become more pronounced since recent models used in MT tools such as neural network models produce translations of a higher quality but only when they can rely on large training datasets. Compiling large and diverse datasets for low-resource languages is expensive, logistically challenging or both (Kuwanto et al., 2021^[34]; Nekoto et al., 2020^[35]; Orife et al., 2020^[36]). At the moment, high-resource languages, i.e. languages for which large quantities of training data are available in digital form and for which MT tools work best, are the same languages dominating scientific and social exchanges. Unless this changes, for example, because more digital examples of text become available, improvements in AI technologies could further exacerbate the concentration of prominence to a restricted set of languages rather than reduce existing disparities.

7.3.2. Environmental and social costs, caveats and challenges of machine translation systems

MT development and use have significant technological, cultural, environmental and societal impacts, and individuals and communities should therefore consider these alongside benefits when considering their use and when using them. AI systems, particularly systems that rely on extremely large data inputs, can have major negative environmental impacts (Costa-jussà et al., 2022^[37]). MT systems also continue to suffer from linguistic limitations. In particular, MT systems generate low quality output whenever ‘untranslatable words’ are present and when text reflects a specific cultural context and cultural expectations. Additionally, MT technologies have difficulties evaluating or recognising metaphorical meanings, interpreting and translating hidden or subtle messages, or identifying contextual meanings that are not literal, such as humour, irony or sarcasm (Ducar and Schocket, 2018^[38]; Wallace and Kertz, 2014^[39]). MT tools are limited in their ability to adjust translations to the cultural context or meet cultural expectations (Ducar and Schocket, 2018^[38]).

The development of MT technology is based on language models that require large amounts of data created by humans. Biases in data stemming from existing power structures are among the major issues of concern in AI and machine-learning models (Anaconda, 2020^[40]). These biases in AI systems consequently result in incorrect output and discriminatory output and predictions for certain populations (Smith and Ishita, 2020^[41]). One of the most prevalent biases is related to gender (Savoldi et al., 2021^[42]). MT technology performs less accurately when words or texts translated from a rather gender-neutral text are translated into a language that is not. For example, this could lead to MT technology only providing a single-gendered translation or using a masculine translation by default in male-dominated fields. AI systems are created by humans. Hence, they may integrate and mirror the perspective and knowledge of society of those who develop AI systems (Smith and Ishita, 2020^[41]) and women, linguistic and ethnic minorities are severely under-represented among AI developers (Smith and Ishita, 2020^[41]).

A final set of limitations pertains to ethical and legal implications. Users should carefully consider issues related to ownership and privacy of the content inputted in MT systems data and the legal responsibility for the consequences associated with potential mistakes in translated documents remain key challenges for the use of machine translations in high-stakes settings.

Should MT technologies improve to the extent that their output will be on a par with the output of proficient language users or the output of language professionals, education systems will face important dilemma over the relevance of their current approaches to teaching and learning and how best they could support students. As technologies evolve, it is crucial for policy makers and educators to continually monitor the evolving capabilities of AI systems, identify the set of skills that will enable individuals to work and live alongside AI, and develop programmes to effectively support the acquisition of such skills.

7.4. The skills of language professionals

Relying on language professionals and their skills is a third way to enable communication, access and exchange information across language groups. Just as machine translation technologies change the set of skills individuals directly engaged in information exchange require, they also change the set of skills human mediators should possess to facilitate the communication of others. Language professionals have a crucial societal role as facilitators of communication across language boundaries as they facilitate trade across economic agents in different countries and language communities. Furthermore, the work of translators entails many of the non-routine tasks that previous waves of technological development did not expose to the threat of automation but which may be exposed due to AI's emerging capabilities related to language.

Worldwide, only few individuals work as language professionals. However, in line with the growing importance of information exchange across language boundaries, evidence from the United States indicates that over the past 20 years, the employment of interpreters and translators has almost tripled. While employment in 2001 amounted to around 20 000, in 2021, more than 50 000 people were employed as interpreters or translators. Furthermore, the employment of interpreters and translators is expected to grow by around 20% between 2021 and 2031, an increase of 15 percentage points above the average growth rate for all occupations (Bureau of Labor Statistics, US Department of Labor, 2022^[43]). Similarly, evidence from online vacancies in selected English-speaking and European countries indicates that between 2015 and 2019 the demand for language professionals was relatively constant (Borgonovi, Hervé and Seitz, 2023^[3]). At the same time, changes in the way workers carry out their jobs as a result of AI adoption might change the skills individuals need to master since the tasks they are engaged with will differ and, consequently, require workers to reskill or upskill (Lane and Saint-Martin, 2021^[44]; Nedelkoska and Quintini, 2018^[45]).

From an employer perspective, deploying MT technology is associated with beneficial effects. However, such beneficial effects are not necessarily shared by language professionals [see (Borgonovi, Hervé and Seitz, 2023^[3]) for the view of language professionals on the adoption of MT technology in their work]. In particular, language professionals see their profession as being under pressure for three reasons: 1) individuals and institutions commissioning translations generally overestimate the quality of the output generated by AI MT tools and underestimate the amount of time and skills needed to ensure accuracy and quality through post-editing; 2) high levels of skills are needed to be able to work alongside machines – for example to rapidly post-edit text translators need to possess significant knowledge of subject areas the text deals with as well as detailed knowledge of how a particular MT tool operates – and acquiring high levels of skills in post-editing may not be possible without the extensive and direct experience of engaging in the original translation; and 3) some aspects of language proficiency may be lost without the daily use of such skills.

Post-editing skills are among the extended set of linguistic skills needed when MT tools are integrated into the workflow of language professionals (European Commission, 2022^[46]; Koponen, Salmi and Nikulin, 2019^[47]; Pym, 2014^[48]; Rico and Torrejón, 2012^[49]). Post-editing means that once MT output is generated, human translators conduct an editing, amending and correction process to achieve high-quality translations (Garcia, 2011^[50]; O'Brien, 2002^[51]). Because post-editing needs to be done by someone proficient in the target language, post-editing is mostly carried out by professional translators (Vieira, Alonso and Bywood, 2019^[52]). With the increased need for post-editing MT output, attempts have been made to harmonise and standardise this process. In 2017, the International Organization of Standards (ISO) developed a standard for post-editing (ISO 18587:2017), which provides the requirements for the process of full human post-editing and post-editors' competences and qualifications (International Organization of Standards, 2017^[53]).

Learning to post-edit machine-translated content is also finding its way into the education of language professionals, either as part of the formal education programme or non-formal training and education

(Guerberof Arenas and Moorkens, 2019^[54]). Post-editing training, for example, includes knowledge of various kinds of MT systems or MT error analysis (Guerberof Arenas and Moorkens, 2019^[54]). This is important since MT accuracy has, despite strong advances over past years, not been able to reach a human level of language proficiency due to limitations related to linguistics and biases.

Another set of skills comprises **instrumental competences** related to technology skills (Rico and Torrejón, 2012^[49]). This involves, for example, raising awareness in the profession on the range of available technology that can be used in the translation process (Alcina, Soler and Granell, 2007^[55]). Instrumental competences include understanding MT output and their integration into the workflow and knowledge about MT systems and their capabilities (European Commission, 2022^[46]; Rico and Torrejón, 2012^[49]).

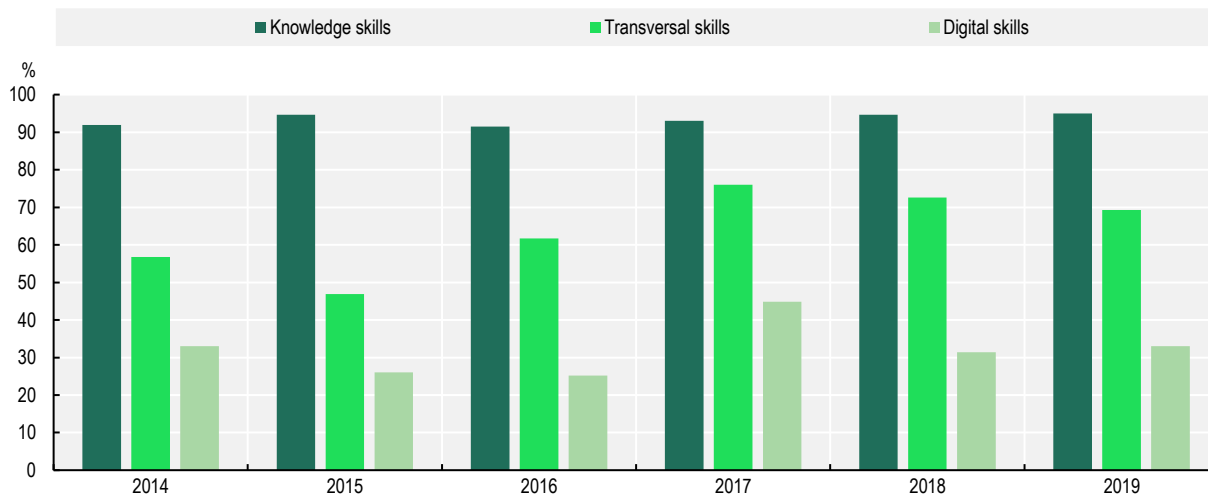
Finally, communication and other socio-emotional skills are key skills for language professionals. A key shortcoming of existing MT tools is that they do not engage in communication. Although adaptive systems can incorporate “feedback” on the quality of their output in new translations, such adaptation is reactive and initiated by users rather than the system itself. MT systems do not have the capacity to express doubt and feel self-doubt, perceive uncertainty about their translation predictions or ask for help. Because existing MT tools cannot understand if, when, and what they do not understand, they do not engage in a process of co-creation with the aim of satisfying the needs and intentions of those who seek their service. Delivering meaningful translations requires mediators to assign meaning to language and adjust translations in response to verbal and non-verbal cues. When human mediators are involved, the language mediation process can become a collaborative effort between the mediator and the individual requesting the mediation. By proposing and weeding out alternatives and understanding context – whether technical and subject-specific circumstances or cultural factors – human mediators can improve quality and generate meaningful content adapted to individual situations. Digital mediators, so far, do not engage in extensive communication with clients. Transversal skills, such as the capacity to work with others, communicate and have cultural and situational awareness, are therefore crucial aspects of the skillset of human language mediators.

7.4.1. Evidence on the skills required of language professionals from online job vacancies

Figure 7.10 illustrates the percentage of online job postings for language professionals mentioning any of the broader skill groups of “knowledge”, “transversal” and “digital”. **Knowledge skills** represent theoretical and factual knowledge acquired as the outcome of assimilating information through learning (European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2017^[56]). Knowledge-related skills keywords are mentioned most frequently in online job postings of language professionals. Between 2014 and 2019, the share of job postings mentioning knowledge skills was relatively stable: around 95% of job postings mentioned knowledge skills. **Transversal skills**, relevant to a broad range of occupations and economic sectors (European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2017^[56]), are the second-most commonly mentioned skills group among language professionals. In 2015, 47% of postings mentioned transversal skills, while this share increased to around 70% in 2019, an increase of more than 20 percentage points. Finally, the share of **digital skills** remained relatively stable despite small fluctuations between 2015 and 2019. Between 2015 and 2019, the share of postings mentioning digital skills varied between 26% in 2015 and 33% in 2019.

These analyses show that while the demand for digital and knowledge skills remained stable over the study period, there was a slight increase in the demand for transversal skills. This suggests that the increase in the demand for transversal skills did not come at the expense of other skills but rather, that the range of skills required of individual professionals broadened over time.

Figure 7.10. Percentage of online job postings for language professionals mentioning knowledge, transversal and digital skills in English-speaking countries, 2015-19



Note: The figure indicates the share of online job postings by language professionals mentioning knowledge, transversal and digital skills for English speaking countries (Australia, Canada, New Zealand, Singapore, United Kingdom, United States). Shares do not add up to 100% since several skills can be mentioned in one posting.

Source: Calculations based on Lightcast (2022^[57]), Lightcast™, <https://lightcast.io>, (accessed December 2022), in Borgonovi, Hervé and Seitz, (2023^[3]), “Not lost in translation: The implications of machine translation technologies for language professionals and for broader society”, <https://doi.org/10.1787/e1d1d170-en>.


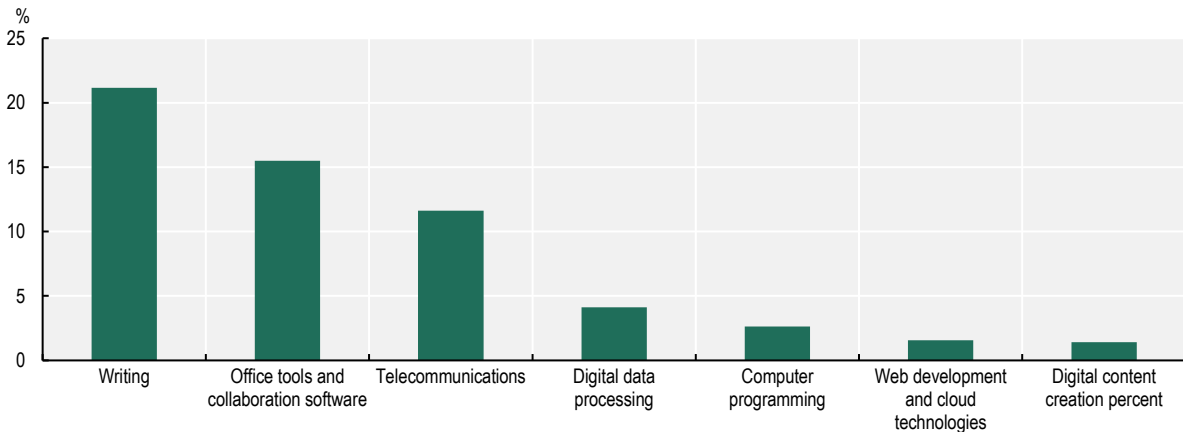
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Figure 7.11 provides a more granular picture of specific skills categories, in particular the digital skills group, given this chapter’s focus on the impact of technology on skills. Even though Figure 7.10 did not show an increasing trend in the demand for digital skills, changes could occur within skills subgroups. Figure 7.11 provides an overview of seven skills groups reflecting digital skills: computer programming; digital data processing; digital content creation; office tools and collaboration software; telecommunications; web development; and writing. Digital skills are required in around one-fifth of online vacancies advertising positions for language professionals. For example, on average, 21% of online job postings requested writing skills; 15% requested skills related to office tools and collaboration software; and 12% requested telecommunication skills. For the remaining skills, they were requested in 10% or less of online vacancies although on average, around one in ten postings for language professionals in English speaking countries requested at least one of the very specific digital skills that are related to the development and use of AI applications (Borgonovi, Hervé and Seitz, 2023^[3]).

Examples of highly demanded writing skills include: editing and post-editing; computational linguistics; MT; computer-assisted translation (CAT); and consecutive translation. Examples of highly demanded digital data processing skills include: machine learning; big data; metadata; ArcGIS; and data science. Examples of highly demanded computer programming skills include: AI, C++, Linux, Java and JavaScript.

Figure 7.11. Digital skills groups required in online job postings for language professionals in English-speaking countries, 2015-19

Percentage of online job postings containing at least one skill that belongs to each of the categories



Note: The figure presents the average percentage of online job postings containing at least one skill in each category. For each country – Australia, Canada, New Zealand, the United Kingdom and the United States – the average over the 2015-19 period was calculated, and then the average over the five countries was calculated.

Source: Calculations based on Lightcast (2022^[57]), Lightcast™, <https://lightcast.io>, (accessed December 2022), in Borgonovi, Hervé and Seitz, (2023^[3]), “Not lost in translation: The implications of machine translation technologies for language professionals and for broader society”, <https://doi.org/10.1787/e1d1d170-en>.


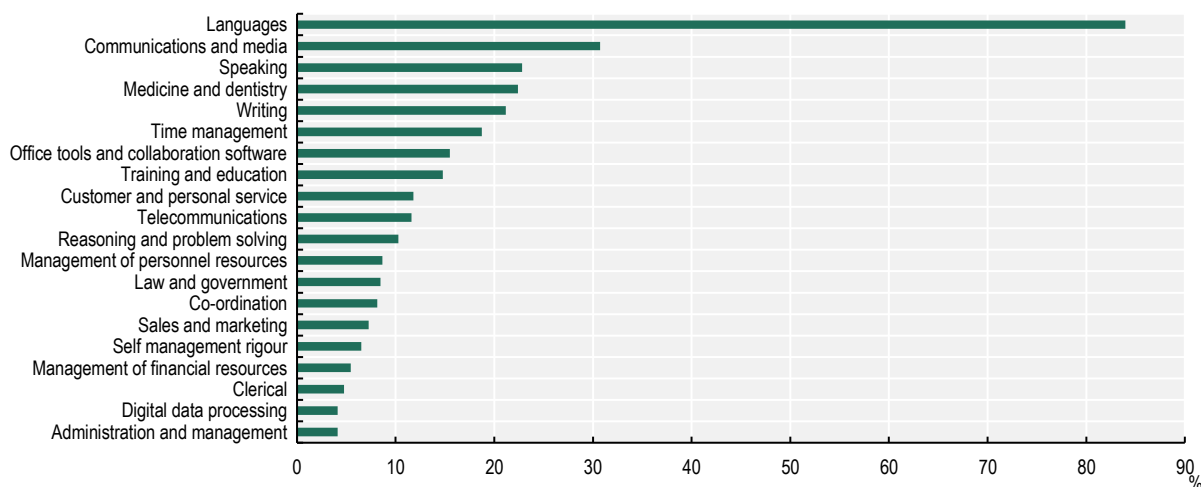
StatLink  <https://stat.link/ft02ep>

Figure 7.12 shows the top 20 out of 60 most frequently mentioned skills groups in online job postings of language professionals between 2015 and 2019. Among the top 20 skills groups, 45% represent transversal skills; 40% represent knowledge skills; and 15% represent digital skills. Among the 20 most frequently mentioned skills groups in postings of language professionals, the top 5 skills groups mentioned in more than 1 out of 5 vacancies were: language skills (84%); communications and media (31%); speaking (23%); medicine and dentistry (22%); and writing (21%). Writing is grouped into the digital skills group because many of the detailed skills in that group have technology aspects. For instance, skills keywords such as computational linguistics, MT and CAT all belong to the writing skills category.


Figure 7.12. The top 20 skills groups demanded of language professionals by employers in English-speaking countries, 2015-19

Percentage of online job postings mentioning one of the top 20 skill groups, by skills group



Note: The figure shows the percentage of online job postings mentioning one of the top 20 skills groups. The skill groups are ordered in descending order of the average percentage of online job postings mentioning that skill group between 2015 and 2019. The figure presents the average percentages averaging data from each country – Australia, Canada, New Zealand, the United Kingdom and the United States – over the 2015-19 period.

Source: Calculations based on Lightcast (2022^[57]), Lightcast™, <https://lightcast.io>, (accessed December 2022), in Borgonovi, Hervé and Seitz, (2023^[3]), “Not lost in translation: The implications of machine translation technologies for language professionals and for broader society”, <https://doi.org/10.1787/e1d1d170-en>.

StatLink  <https://stat.link/y4qb6f>

7.5. Conclusions

At both the individual and societal levels, making the most of the opportunities available due to global interconnectedness remains dependent on different economic and social agents being able to understand and communicate with each other. Linguistic diversity is key to the sustainability of communities worldwide, and inter-language communication can favour mutual understanding, global awareness and respect. This chapter has considered the role of developing language skills proficiency and language mediation in societies and labour markets and their implications for education and training systems.

Promoting language acquisition among young people in schools and among adults through participation in language learning brings benefits to individual learners, to labour markets, as well as to broader society. Language is key to intercultural understanding and to being able to access information in different languages. Language also remains an important “intangible” barrier to the movement and allocation of workers. Due to language barriers, some economic sectors may suffer from an oversupply of qualified workers to perform specific tasks. At the same time, other areas may face an undersupply of such workers because workers lack the specific language skills needed to be integrated into another linguistic context.

Across European countries, significant efforts have been made to ensure that individuals will master two other languages in addition to their mother tongue. Most young people start learning a language in either pre-primary or primary school; in many cases, this language is English. A second modern language is introduced for most learners in secondary school, although large differences exist between students who attend general secondary programmes and those who attend vocationally oriented programmes. Students

who take part in vocationally oriented programmes are considerably less likely than other students to attend language learning classes at school. Results indicate that English is the most demanded (and taught) modern language in Europe and the most demanded in labour markets. Although the demand for English language skills is most pronounced in managerial and professional occupations, employers seeking workers in many other sectors also require knowledge of English.

This chapter also considered the role of technological developments in shaping inter-language communication. The introduction of MT tools is reshaping the labour market opportunities of language professionals and the opportunities businesses and individuals have to engage in inter-language communication. There are concerns over the extent to which the introduction of MT technologies and improvements in the capabilities of AI systems may lead to devaluing and deskilling of professionals and lead to lower wages and employment conditions. Many language professionals work as freelancers and initial evidence on the employment outcomes of freelancers on a large online platform following the introduction of the large language model ChatGPT indicates that freelancers experienced reductions in both employment and earnings (Hui, Reshef and Zhou, 2023^[58]). The collective agreement reached in Finland in April 2023 establishing minimum rates for self-employed audiovisual (AV) translators represents one effort to reduce the devaluation of the work of language professionals (slator, 2023^[59]). Today, language mediation systems are available at one's fingertips: one can request the translation of a text on a smartphone screen and receive immediate and free mediation. An expanded choice set can yield significant societal benefits by broadening access to information produced in multiple languages. At the same time, unless potential users of language mediation systems are educated about the opportunities and limitations of alternative language mediation providers, it is possible that digital mediators will create harm as well as enhance opportunities. In particular, as societies struggle to limit the spread and the deleterious effects of misinformation, disinformation and malinformation, the use of MT technologies could have the unintended effect of making such problems more acute (Caramancion, 2022^[60]; Muda et al., 2021^[61]). To the extent that un-checked translations of varying levels of accuracy and quality are made available to a larger number of individuals and are accessed by individuals without a critical understanding of the nature of the translation process, MT tools could exacerbate existing problems associated with online content.

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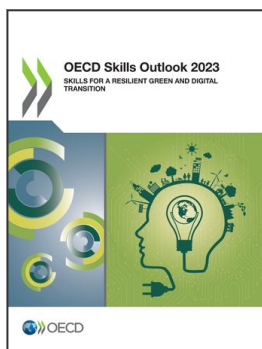
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