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Ways of defining digital competences and their components in the EU, EC and UNESCO recommendations

Introduction

The rapid development of technology has transformed our way of life, work, and education. In this digital age, digital competence has become a crucial skill for individuals to succeed. However, there is no clear consensus on the definitions of 'competence' (or competences) and 'literacy' in the literature (see, for example, Kačinová 2015; Kačinová 2019). Many experts in the field use the terms digital competence (or digital competences) and digital literacy as synonyms. Søby (2015) introduces the term 'digital skills' as a third term, indicating ongoing debates and differing interpretations among experts. He notes that 'digital competence' has become an umbrella term for understanding the complex relationships between individuals, organizations, ICTs, and society. This perspective is shared by Ilomäki et al. (2011). The authors describe various terms used to refer to skills and competences in the use of digital technologies, including ICT skills, technology skills, information technology skills, 21st century skills, information literacy, digital literacy, and digital skills. These terms are sometimes used interchangeably, but in other cases, they have narrow definitions. For example, internet skills refer only to digital technologies, while media skills and digital literacy encompass a broader range of topics. Ilomäki et al. (2011) explain that the wide range of terms used to describe digital competence reflects the rapid development of technology, the different areas of interest of scientific researchers, and the changes in society and culture that result from new technologies. In this study, we will use the term 'digital competence' to refer to this concept. It is worth noting that

the term 'digital competence' itself is relatively new one. Ilomäki et al. (2016) argue that digital competence is a political concept that reflects beliefs and desires about the future skills necessary for capable citizens. The concept is rooted in competition, an area where new technologies and knowledge-intensive work are expected to play a significant role in the future. Therefore, it can be stated that the concept of digital competence is not precisely defined, is still evolving, and its meanings vary according to different approaches. The European Union (EU), the European Commission (EC), and the United Nations Educational, Scientific and Cultural Organization (UNESCO) have also issued recommendations on digital competences.

Methodology

The aim of the study is to describe the understanding of digital competences and their components in the recommendations of the EU, the EC and UNESCO, and to find out what these recommendations have in common and how they differ. To achieve this, we analyze the key documents of each institution, namely the *DigComp 2.2: The digital competence framework for citizens with new examples of knowledge, skills and attitudes* (EU), the *Digital Education Action Plan (2021–2027)* (EC), and the *Global Media and Information Assessment Framework: Country Readiness and Competencies* (UNESCO).

Content analysis is used to investigate these, which Sedláková (2014) refers to as a traditional method for examining large amounts of text. Comparative analysis is then employed to describe the congruent and divergent elements of the different EU, EC and UNESCO approaches and recommendations. This allows for a systematic comparison of two or more documents in order to identify their similarities and differences (Sedláková 2014).

EU, EC and UNESCO Recommendations

A literature review on digital competence (digital literacy) reveals different perspectives on its definition and components. Some authors emphasise the technical skills required to use digital tools (e.g. Bawden 2001; Virkus 2003; Buckingham 2010), while others focus on the cognitive and social skills that enable individuals to use technology effectively in different contexts (e.g. Ala-Mutka 2011; Ng 2012; Lankshear, Knobel 2015).

The evolution of digital competence frameworks has been fundamentally shaped by the increasing ubiquity of technology in all aspects of life, underscoring the growing demand for widespread digital literacy. Initially, in the late 1990s and early 2000s, the focus was primarily on basic computer literacy – skills that enabled individuals to operate computers and use applications such as word processors and spreadsheets. One of the earliest documents to highlight the significance of digital competencies was the 1996 *Delors Report*. This document, published by UNESCO, addressed the educational challenges of the 21st century and emphasised the necessity to adapt educational systems in order to support the acquisition of new technological and information competencies (Delors 1996). In 1998, the first version of the National

Educational Technology Standards (NETS) was introduced in the United States, which later transformed into the ISTE Standards. These standards served as the foundation for the development of digital competencies in education and established benchmarks for the effective use of technology in schools (Wheeler 2000). As the Internet and digital technologies began to transform economies and societies, a broader definition of digital competence emerged, encompassing not only technical skills but also critical thinking and the ethical use of digital information. This expanded understanding led to the formalisation of digital competence frameworks. A pivotal moment occurred in 2006 when the European Commission recognised digital competence as one of the eight key competencies essential for lifelong learning. These competences include literacy competence; multilingual competence; mathematical competence and competence in science, technology and engineering; digital competence; personal, social and learning to learn competence; citizenship competence; entrepreneurship competence; cultural awareness and expression competence. The document states that digital competence involves confidently and critically using information society technologies (IST) for various purposes. It requires basic ICT skills such as using a computer to find, evaluate, store, create, present and share information, and to communicate and collaborate online. To acquire digital competences, individuals must comprehend the nature, role, and potential of IST in personal, social, and work contexts. This includes knowledge of the main computer applications and an understanding of the risks and opportunities associated with the Internet and electronic communications. They should be able to create and understand complex information using digital tools, access Internet services and develop critical thinking, creativity and innovation. According to the *Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning* (2006), it is important to have a critical and reflective attitude towards information and to use interactive media responsibly. This document has been studied by several theorists, including Ala-Mutka (2011), Janssen, Stoyanov (2012), and Punie, Ferrari, Brečko (2013). They have expanded the concept of digital competence beyond basic tools and computer applications to encompass more advanced knowledge, skills, and attitudes. They also emphasise the significance of reflecting on and integrating these competences to evaluate one's own abilities and environment. The authors stress the importance of responsibility and safety in the use of digital technologies. This was given less attention in the 2006 document. We believe that the influence of these studies, the evolution of the technology itself and the increasing demands for competences, the Council of the European Union in 2018 updated the definition of digital competence to its current form:

> Digital competence involves the confident, critical and responsive use of, and engagement with digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, digital content creation (including programming), safety, (including digital well-being and competences relating to cyber security), and problem solving (*Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning*, 2018).

The European Union's revised European Digital Competence Framework for Citizens (DigComp) also refers to this understanding of digital competence. DigComp is one of the most up-to-date and comprehensive frameworks currently developed on digital competences. It was launched by a group from the European Commission's Research Centre (JRC) and the Institute for Prospective Technological Studies (IPTS). The project aimed to identify definitions of digital competences and build a consensus at the European level on the components of digital competence (Punie, Ferrari, Brečko 2013). The European Commission first published the European Framework of Digital Competences for Citizens in 2013 under the name DigComp (Punie, Ferrari, Brečko 2013), later referred to as DigComp 1.0. In 2016, the European Union published a revised version of DigComp, called DigComp 2.0 (Vuorikari et al. 2016). A year later, version 2.1 was released (Carretero et al. 2017), and the most recent version, DigComp 2.2, was published in 2022 (Vuorikari et al. 2022). DigComp provides a comprehensive framework for describing digital literacy today. It defines digital competence as the set of knowledge, skills, and attitudes needed to use digital technologies effectively, critically, and safely (Vuorikari et al. 2022). DigComp serves as a basis for national learning frameworks, assists in the development of professional courses and provides a 'guide' for the assessment and recognition of digital competences. Its detailed structure allows organisations and individuals to identify specific areas for development or improvement.
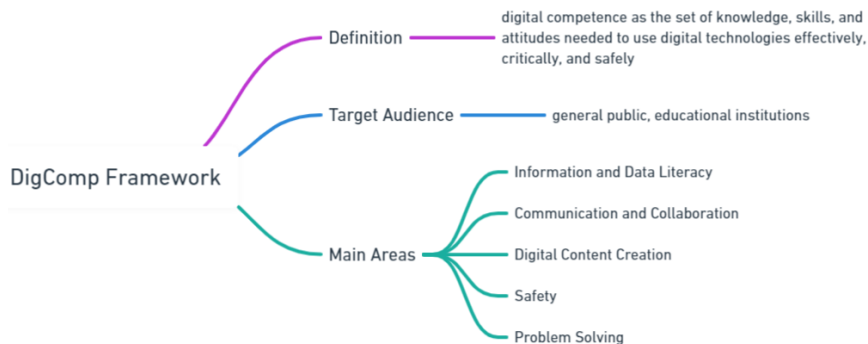

Figure 1. Main aspects of EU framework
Source: own processing (2024), according to Vuorikari et al. 2022.

DigComp serves as a basis for national learning frameworks, helps in the development of professional courses and provides a guideline for the assessment and recognition of digital competences. Its detailed structure allows organisations and individuals to identify specific areas for development or improvement.

In its Digital Agenda, the European Commission emphasises the need to develop digital skills across all age groups and sectors. The previous Digital Education Action Plan (2018–2020) established the framework for integrating digital technologies into education. However, the onset of the COVID-19 pandemic and the subsequent rapid shift to online learning has made it evident that European education systems

require greater resources and a more robust preparedness for the digital era. The necessity for an updated and comprehensive approach has also been prompted by the rapid changes occurring in the work environment, where digital skills are becoming increasingly important. The Digital Education Action Plan (2021–2027) focuses on harnessing the potential of digital technologies to benefit EU citizens, businesses and governments, improving digital literacy, increasing access to digital content and services, and stimulating innovation and investment in ICT.
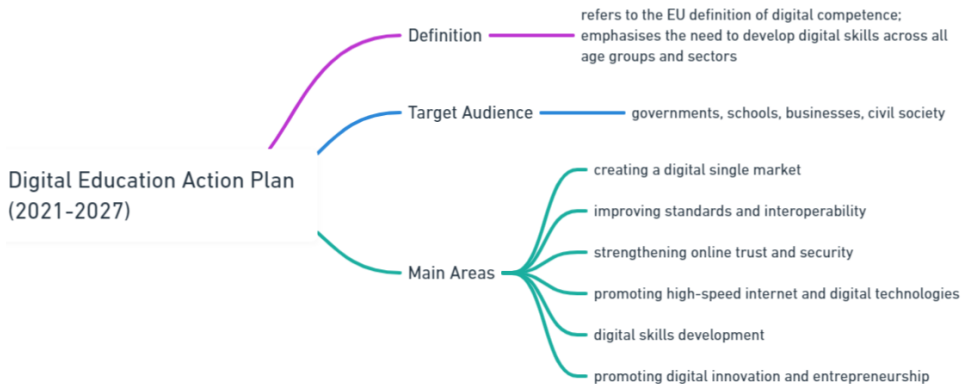

Figure 2. Main aspects of EC framework

Source: own processing (2024), according to European Commission, n.d.

The European Commission supports initiatives such as Erasmus+, which provides funding for projects to develop digital skills. The EC also supports the development of digital learning tools and platforms such as eTwinning, which allows schools to collaborate on international projects.

Initially, UNESCO's focus was on information literacy, primarily concerned with the skills needed to navigate and use information effectively. Over time, UNESCO merged its approach to include media literacy, recognising the convergence of technologies and the overlapping skills required to navigate the internet, social media, and other digital platforms. In 2011, this organisation formally introduced the Media and Information Literacy framework. The framework approaches the definition of digital competences in terms of inclusion and access to information. Its framework emphasises the need to combine information, media and digital literacy. The MIL framework promotes critical thinking, creative and ethical use of technology and media, thereby contributing to the empowerment of individuals and communities.

The impact of the MIL initiative is wide-ranging and includes improving people's ability to critically analyse information, better protecting them from misinformation and hoaxes, and promoting inclusive and democratic dialogue. UNESCO points out that the development of information and media literacy is an ongoing process that requires adaptation to changing technologies and media ecosystems.
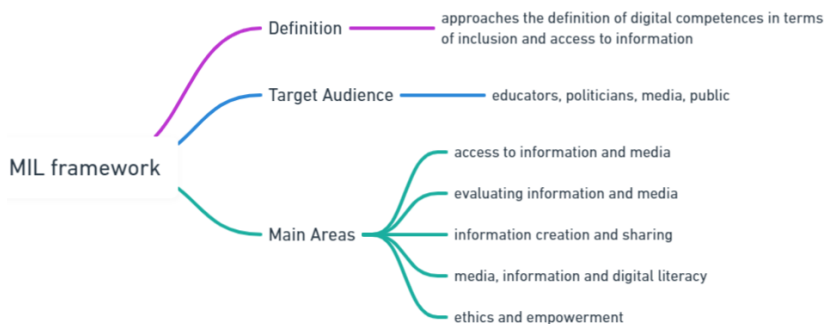
Figure 3. Main aspects of UNESCO framework

Source: own processing (2024), according to UNESCO, 2013.

From the above, we can conclude that these frameworks and recommendations point to a comprehensive and multidimensional approach to the definition of digital competences, taking into account the diversity of the digital world and the need for individuals to adapt to its challenges.

Comparison of Approaches

Comparing these three approaches, it is clear that each organisation approaches digital competences from a different perspective, reflecting its specific goals and mission. The EU focuses on detailing the individual digital skills needed in the digital world, while the EC puts more emphasis on systemic changes in education to promote digital literacy. UNESCO, on the other hand, takes a broader view, emphasising the importance of information and media literacy in the context of ethics, critical thinking and social responsibility.

The common thread is that all three organisations emphasise the importance of digital skills and literacy as key components for success in today's global and digitally connected world. They recognise that digital skills are essential for employment, active citizenship and personal development. They also aim to widen access to digital learning and resources for all groups in society to ensure inclusive learning and reduce digital divides. Their approaches to digital competence and information literacy also emphasise issues related to security, privacy, ethics and the responsible use of technology.

At the same time, it should be noted that when examining the above frameworks, we found further differences that can be grouped into several areas.

Table 1. Differences between the EU, EC and UNESCO approaches – Scope and Focus

Aspect	European Union	European Commission	UNESCO
Scope and Focus	Broad digital competencies for citizens needed for work, education, and life	Integration of digital technologies in education	Broadest approach including media, information and digital literacy

Source: own processing, 2024.

In the context of scope and focus, DigComp (EU) provides a detailed and structured framework of digital competences that focuses primarily on individual skills, divided into five main areas. The approach is more focused on the specific digital skills needed for work, education and everyday life in a digital society. The Digital Education Action Plan (EC), on the other hand, focuses on a broader strategy for the digital agenda and the promotion of systemic change in education and training, with the aim of integrating digital skills and competences across the whole spectrum of education and training programmes. UNESCO's framework zeroes in on media and information literacy, essential for critical engagement with media and information sources. It emphasises the ethical aspects and the importance of media literacy in promoting democracy and sustainable development, going beyond the technical aspects of digital literacy.

Table 2. Differences between the EU, EC and UNESCO approaches – Geographical and Political Reach

Aspect	European Union	European Commission	UNESCO
Geographical and Political Reach	Targets EU Member States to harmonize educational standards and promote digital integration within the internal market	Coordinates cross-national initiatives and supports projects at the European level to achieve objectives of the Digital Agenda and related strategies	Global strategy aiming to promote information and media literacy worldwide, with a special focus on developing countries to support global education goals like sustainable development

Source: own processing, 2024.

In terms of geographical and political reach, the activities and policies of the EU framework are primarily aimed at the Member States of the Union, with the aim of harmonising educational standards and promoting digital integration within the internal market. Similarly, the European Commission, as the executive arm of the EU, implements policies at the European level, coordinates cross-national initiatives and supports projects aimed at achieving the objectives of the Digital Agenda and other related strategies. UNESCO's strategy is global and aims to promote information and media literacy worldwide, especially in developing countries. Its initiatives are designed to support global education goals such as sustainable development and to address global challenges such as misinformation, media polarisation and democracy promotion.

Table 3. Differences between the EU, EC and UNESCO approaches – Target Audience and Application

Aspect	European Union	European Commission	UNESCO
Target Audience and Application	Individuals, educators	Educational institutions, policymakers, businesses and civil society	Policymakers, educational institutions, media, and the general public globally
	To improve digital literacy for education, work, and personal development	To support the EU's digital transformation	To raise awareness and skills in information and media literacy

Source: own processing, 2024.

The EU's main focus is on the citizens of the EU countries and their digital literacy, with applications in education, work and personal development. DigComp focuses broadly on digital competencies necessary for all citizens, emphasizing a comprehensive range of digital skills. For its part, the EC aims to reach out to a wide range of stakeholders, including governments, educational institutions, businesses and civil society. The Digital Education Action Plan is more specific, targeting the educational ecosystem and aiming to integrate digital technologies and competencies into learning and teaching to support the EU's digital transformation. UNESCO's initiatives are more targeted at educators, policy-makers, the media and the general public, with the aim of raising awareness and skills in information and media literacy at a global level. Its approach tends to be interdisciplinary, using culture, education, scientific knowledge and communication as means to achieve its objectives.

Table 4. Differences between the EU, EC and UNESCO approaches – Implementation and Monitoring

Aspect	European Union	European Commission	UNESCO
Implementation and Monitoring	Financial instruments like Erasmus+ and Horizon 2020 Efforts to monitor progress and share best practices among Member States	Implements policies through various programs like the Digital Education Action Plan or eTwinning Monitors through mechanisms like the European Semester	Works with partners including governments and NGOs Monitors impact through regular reports and studies

Source: own processing, 2024.

The EU uses various financial instruments and programmes, such as Erasmus+ and Horizon 2020, to implement the DigComp framework and related initiatives. Efforts are also being made to monitor Member States' progress on digital literacy and to share best practices. The EC implements policies through various programmes and initiatives, such as the Digital Education Action Plan, and monitors them through mechanisms such as the European Semester, which provides a framework for the coordination of economic policies in the EU. UNESCO, for its part, works with various partners, including governments, international organisations and non-profit organisations, to implement its programmes. The results and impact of its initiatives are monitored through regular reports and studies, which provide assessments and recommendations for future action.

Table 5. Differences between the EU, EC and UNESCO approaches – Adaptability to Technological Changes

Aspect	European Union	European Commission	UNESCO
Adaptability to Technological Changes	Requires regular updates to remain relevant	Promotes innovative teaching methods; inherently adaptable	Focus on critical evaluation makes it relevant across changing technologies

Source: own processing, 2024.

In terms of adaptability to technological changes EU' DigComp is somewhat flexible, designed to be updated as digital technologies evolve. However, its effectiveness depends on regular revisions to address emerging digital trends and challenges, such as cybersecurity threats and the ethical use of AI. The Digital Education Action Plan emphasises the use of digital technologies in education, promoting innovative and digital learning and teaching methods. It supports adaptability by encouraging the integration of the latest digital tools and resources in educational settings.

Table 6. Differences between the EU, EC and UNESCO approaches – Ethical Considerations and Digital Citizenship

Aspect	European Union	European Commission	UNESCO
Ethical Considerations and Digital Citizenship	Includes safety and problem solving; could emphasize ethical behaviour more	Highlights inclusive, equitable education and digital citizenship	Strongly incorporates ethical considerations through critical evaluation and dialogue

Source: own processing, 2024.

DigComp includes safety and problem solving among its key competencies, which include aspects of digital ethics and citizenship. However, there is potential for a broader focus on ethical digital behaviour, privacy and the social impact of digital technologies. The Digital Education Action Plan indirectly addresses ethical considerations through its emphasis on inclusive and equitable digital education. It highlights the importance of digital citizenship, including understanding digital rights and responsibilities, although it could further emphasise ethical digital engagement. The UNESCO framework strongly incorporates ethical considerations by emphasising the critical evaluation of information and the promotion of intercultural dialogue and understanding. It directly addresses the need for responsible use of media and information, making it a strong advocate for ethical behaviour in the digital domain.

Table 7. Differences between the EU, EC and UNESCO approaches – Stakeholder Engagement and Collaboration

Aspect	European Union	European Commission	UNESCO
Stakeholder Engagement and Collaboration	Collaboration among educators, policymakers, private sector	Collaborative approach with educators, students, parents, tech industry	Involves governments, educational institutions, NGOs, media for global cooperation

Source: own processing, 2024.

The EU framework encourages cooperation between educators, policy makers and the private sector to improve digital literacy across the European Union. Its implementation would be more effective if all stakeholders were actively involved in updating and applying the framework. The EC Action Plan explicitly calls for a collaborative

approach involving educators, students, parents and the technology industry to create a cohesive digital education ecosystem. The plan recognises the need for partnerships to achieve its ambitious goals. The UNESCO framework has a global perspective and encourages international cooperation in the promotion of media and information literacy. It seeks to involve a wide range of stakeholders, including governments, educational institutions, NGOs and the media, to promote a universal understanding and appreciation of media, information and digital literacy.

In summary, while the EU and the EC focus more on digital inclusion and skills within Europe, with an emphasis on the labour market and education, UNESCO approaches the issue from a more global perspective, with an emphasis on the social, cultural and democratic aspects of information and media literacy. Each of these approaches contributes in a unique way to the global understanding and development of digital competences and information and media literacy. Together, they provide a comprehensive framework for the development of policies, programmes and initiatives that seek to address different aspects of the digital transformation of society.

Conclusion

The European Union (EU), the European Commission (EC) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) have a major influence on the definition and development of digital competence and information and media literacy. DigComp, an EU initiative, provides a structured framework to improve the individual digital skills of EU citizens. The European Commission, through the Digital Education Action Plan, focuses on the wider implementation of policies aimed at integrating digital literacy into education systems and supporting the digital transformation of society. UNESCO, on the other hand, approaches information and media literacy from a global perspective, emphasising the importance of critical thinking, ethics and active citizenship in a media-saturated society. Although these organisations have different approaches and objectives, they all stress the importance of digital competences as essential for personal development, employment and active citizenship in today's digital age. However, the challenge for all three organisations remains to keep pace with the rapidly changing digital environment and to ensure that digital competences and information literacy are relevant and accessible to all groups in society. For educators, the frameworks emphasise the necessity of curriculum integration, professional development, and the creation of collaborative learning environments. Policymakers are urged to focus on comprehensive policy formulation, adequate funding, and robust monitoring mechanisms. Other stakeholders, including the private sector, community organisations, and international partners, are encouraged to collaborate and contribute to the global effort to enhance digital literacy. Together, these efforts can ensure that digital competences are relevant, accessible, and effective in addressing the challenges of the digital age. This includes continuously updating training materials, methodologies and policies, as well as ensuring equal access to technology and learning resources. This in turn creates an opportunity to use digital technologies to promote learning and information exchange between these

organisations and their target groups. Online platforms, digital learning tools and virtual communities can facilitate global collaboration and knowledge sharing, thereby increasing the reach and impact of their initiatives. Working together and integrating their strategies could provide a comprehensive framework for improving digital literacy at the global level, while addressing global challenges such as misinformation and the digital divide.

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Acknowledgement

Abstract

The aim of this article is to comprehensively examine the ways in which digital competences and their components are defined in the recommendations of the European Union (EU), the European Commission (EC) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The study delves into the evolving landscape of digital competences and highlights commonalities and differences in the frameworks proposed by these influential bodies.

Through a comparative analysis, the paper seeks to contribute to a deeper understanding of conceptualisations of digital competences, which may facilitate the development of a unified framework that can guide educational policies and practices.

Słowa kluczowe: kompetencje cyfrowe; zalecenia UE; zalecenia KE; zalecenia UNESCO

Keywords: digital competence; EU recommendations; EC recommendations; UNESCO recommendations

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