

Exploring Digital Competence: key concepts, evolving terminologies and core competencies

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Annotation *In the digital age, the concept of digital competence has gained critical significance, prompting a diverse range of academic and institutional definitions. This article provides a comprehensive review of related terms and conceptual frameworks, including computer literacy, information literacy, media literacy, e-literacy, digital literacy, and e-competence. It traces the historical development of these concepts and highlights their evolution in response to technological advances and societal needs. By examining key definitions and models proposed by UNESCO, the European Commission, and scholars such as Gilster, Eshet-Alkalai, and Ferrari, the review identifies both overlaps and distinctions among the terms. The analysis reveals two primary perspectives: one that treats digital competence as a convergence of multiple literacies, and another that positions it as a distinct and holistic literacy. Ultimately, this synthesis contributes to a clearer understanding of digital competence as a multifaceted and dynamic construct essential for effective functioning in digital environments across educational, professional, and personal contexts.*

Keywords *Digital competence, digital literacy, information literacy, media literacy, ICT skills e-Literacy, 21st-century skills, lifelong learning, digital environment*

Исследование цифровой компетентности: ключевые понятия, изменяющаяся терминология и основные компетенции

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Аннотация *В цифровую эпоху концепция цифровой компетентности приобрела особую значимость, что вызвало множество академических и институциональных определений. В данной статье представлен всесторонний обзор связанных терминов и концептуальных основ, включая компьютерную грамотность, информационную грамотность, медиаграмотность, электронную грамотность, цифровую грамотность и э-компетентность. Рассматривается историческое развитие этих понятий и подчеркивается их эволюция в ответ на технологические изменения и социальные потребности. На основе анализа ключевых определений и моделей, предложенных ЮНЕСКО, Европейской комиссией и учеными, такими как Гилстер, Эшет-Алкалай и Феррари, выделяются как общие черты, так и различия между понятиями. Анализ выявляет два основных подхода: первый рассматривает цифровую компетентность как слияние множества грамотностей, а второй – как самостоятельную и целостную*

грамотность. Таким образом, цифровая компетентность предстает как многогранная и динамичная конструкция, необходимая для эффективного функционирования в цифровой среде в образовательном, профессиональном и личном контексте.

Ключевые слова Цифровая компетентность, цифровая грамотность, информационная грамотность, медиаграмотность, навыки ИКТ, электронная грамотность, навыки XXI века, непрерывное обучение, цифровая среда

Raqamli kompetensiya: asosiy tushunchalar, o'zgarib borayotgan atamalar va asosiy kompetensiyalar

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Annotatsiya *Raqamli davrda raqamli kompetentlik tushunchasi muhim ahamiyat kasb etib, unga oid turli xil akademik va institutsional ta'riflarning paydo bo'lishiga sabab bo'ldi. Ushbu maqolada kompyuter savodxonligi, axborot savodxonligi, media savodxonligi, elektron savodxonlik, raqamli savodxonlik va e-kompetensiya kabi bog'liq atamalar va tushunchaviy asoslarning har tomonlama sharhi keltiriladi. Bu tushunchalarning tarixiy rivojlanishi va ular texnologik o'zgarishlar hamda ijtimoiy ehtiyojlarga javoban qanday rivojlanganligi ko'rib chiqiladi. UNESCO, Yevropa Komissiyasi hamda Gilster, Eshet-Alkalai va Ferrari kabi olimlar tomonidan taklif etilgan asosiy ta'riflar va modellar tahlili orqali atamalar o'rtasidagi o'xshashliklar va farqlar aniqlanadi. Tahlil ikki asosiy yondashuvni ko'rsatadi: biri raqamli kompetentlikni ko'p savodxonliklar birikmasi sifatida, ikkinchisi esa uni mustaqil va yaxlit savodxonlik sifatida ko'radi. Yakunida, raqamli kompetentlik – ta'lim, kasbiy faoliyat va shaxsiy hayotda samarali ishtirok etish uchun zarur bo'lgan ko'p qirrali va dinamik tushuncha sifatida namoyon bo'ladi.*

Kalit so'zlar *Raqamli kompetentlik, raqamli savodxonlik, axborot savodxonligi, media savodxonligi, AKT ko'nikmalar, e-savodxonlik, 21-asr ko'nikmalari, umrbod ta'lim, raqamli muhit*

Introduction

Digital competence is a multifaceted and evolving construct that incorporates various literacies and skill sets. It demands not only technical proficiency but also critical, ethical, and collaborative engagement with digital tools. As technology continues to advance, the integration of multiple frameworks and definitions remains essential to understanding

and developing digital competence across educational, social, and professional contexts. Initially, terms like "computer literacy" and "ICT literacy" were used interchangeably, with variations such as "IT literacy" and "technology literacy" also appearing. Scholars argue that ICT literacy extends beyond basic technical proficiency and encompasses the capacity to access, evaluate, and create information

through digital tools in a critical and purposeful manner. According to D Bawden, (2008), ICT literacy, particularly prominent at the end of 20th century, typically referred to the ability to effectively use digital technology, communication tools, and networks to access, manage, integrate, evaluate, and create information. According to the International ICT Literacy Panel (ETS, 2002), ICT literacy involves the effective use of digital technology and communication networks to support problem-solving and knowledge construction in contemporary knowledge societies. Collectively, these perspectives underline the evolving and holistic nature of ICT literacy as a foundational skill set for individuals navigating digital environments. In response to the National Academy of Sciences, the NRC (1999) developed the concept of "fluency" with information technology, which extends beyond basic computer literacy. They argued that the term "literacy" became too skill-focused and quickly outdated due to rapid technological changes. Therefore, "fluency" was adopted to suggest a more adaptable and future-oriented competency.

The notion of information literacy was first introduced in 1974, gained prominence during the 1990s and has roots in library and information science (Jackman & Jones, 2002). As stated in D. Bawden (2008) it is essential for lifelong learning, civic participation, and employment, thereby reinforcing its significance in both formal education and broader societal development. It is now understood as encompassing critical educational and professional skills essential in a digital economy. In their 2002 work, Jackman and Jones define information literacy as a collection of essential skills for both educational and professional environments. This definition emphasizes a broader, more strategic understanding of information literacy. Rather than mere technical ability, Jackman and Jones frame it as foundational competencies necessary to thrive in a knowledge-based, digitally driven global economy (Jackman &

Jones, 2002). UNESCO (1999) described media education as a means for individuals to understand and utilize communication media in society, encompassing traditional and modern forms such as print, audio, and digital content. Hague and Williamson (2009) included devices and platforms like computers, mobile phones, video games, and artificial intelligence within the scope of digital technology and new media. They argue that ICT literacy should include critical thinking, ethical reasoning, and collaboration, highlighting its role in fostering responsible digital citizenship.

Media literacy has become a critical component of 21st-century competencies, particularly as individuals increasingly encounter diverse forms of media in digital environments. It was defined by Aufderheide and Firestone (1993) as a movement to include modern media in literacy discussions. It equips individuals to analyze, interpret, and create meaning through various media platforms. This definition reflects a comprehensive view of media literacy not only as a cognitive skill but also as an active process of interpretation and production. The Henry J. Kaiser Family Foundation (2003) emphasized the ability to critically engage with information across print, audio, and visual media. Their perspective positions media literacy as essential for fostering critical thinking, empowering individuals to navigate complex media landscapes, and encouraging informed engagement with media content. This framework continues to inform contemporary discussions about the role of media education in both formal and informal learning contexts. Pérez-Tornero (2004) emphasizes that media literacy is a vital element of digital literacy, as it equips individuals with the ability to critically interpret and actively engage with media messages in an increasingly complex digital environment. He argues that media literacy should not be limited to understanding the content of media but must also involve recognizing the social, political, and cultural influences that shape media production and

consumption. From this perspective, media literacy becomes a key civic competence, enabling citizens to participate more fully and responsibly in democratic processes.

Allan Martin introduced the term “e-literacy” in 2003, referring to the basic awareness and skills necessary to read, write, and communicate using electronic media, requiring a blend of traditional literacy skills and digital competencies for effective participation in digitally mediated environments (Martin & Grudziecki, 2006). E-literacy combines traditional literacy with the

competencies needed to operate in electronic contexts, including basic computer use, digital communication, and information retrieval. According to Lindsey Martin (2006), it is the ability to effectively use electronic technologies and digital platforms to access, evaluate, manage, and communicate information. It encompasses a set of cognitive and technical skills required to navigate digital environments for learning, work, and everyday life. According to these scholars, e-literacy for the individual can be described as a framework consisting of five main components (see Table 2).

Component		Description
1	Awareness of the ICT and information Environment	Understanding the digital landscape and the context in which information and communication technologies (ICT) operate.
2	Confidence in using generic ICT and information tools	Feeling competent and comfortable using basic digital tools (e.g., word processors, browsers, email).
3	Evaluation of information-handling operations and products	Ability to critically assess how information is collected, managed, and presented.
4	Reflection on one’s own e-Literacy development	Self-assessment and awareness of personal progress in developing digital literacy skills.
5	Adaptability and willingness to meet eLiteracy challenges	Openness to learning new technologies and responding to changes in the digital world.

Table 2. Components of e-literacy development

More recently, Martin (2008) positions e-literacy within the broader framework of digital literacy, emphasizing its role in enabling individuals to participate meaningfully in the digital information society. The European e-Skills Forum (2004) defined “e-skills” broadly to include ICT practitioner, user, and e-business skills. This term supports the European Commission’s goals of equipping all citizens with digital capabilities for lifelong learning (European Commission, 2007). Another relevant term e-competence encompasses not only the instrumental skills required to operate digital tools but also advanced capabilities in communication, collaboration, information

management, problem-solving, and purposeful engagement. The European Committee for Standardisation developed the eCompetence Framework (e-CF) to guide ICT practitioner standards, highlighting the importance of applying ICT meaningfully in education (Schneckenberg & Wildt, 2006). In her framework, digital competence is structured hierarchically: users first develop *instrumental knowledge* of hardware and software, which becomes the foundation for *advanced skills* that support meaningful interaction and cognitive tasks. Crucially, Ala-Mutka (2011) argues that effective digital competence is underpinned by *attitudes* – such as critical

reflection, creativity, intercultural awareness, responsibility, and autonomy – which she sees as essential motivators that shape how individuals strategically deploy their skills. She further emphasizes that this framework is intentionally generic and adaptable, recognizing that distinct user groups – such as students, educators, or ICT professionals – may require tailored competencies suited to their specific contexts.

In 2005, The New Media Consortium introduced the concept of 21st-century literacy, merging aural, visual, and digital literacies. It includes understanding and manipulating digital content, recognizing media power, and adapting materials across formats. Later, Wilson et al. (2011) conceptualize Media and Information Literacy (MIL) as an essential framework that merges competencies in both media and information domains, aiming to

empower individuals to think critically, communicate effectively, and engage responsibly in the digital age. They emphasize that MIL is not only about understanding how media and information are created and disseminated, but also about fostering the ability to evaluate content, identify bias, and make informed decisions. The authors argue that teachers play a central role in promoting these competencies, as they are instrumental in guiding learners to become reflective and ethical users and producers of information and media. By integrating MIL into teacher education, the curriculum seeks to prepare educators to help students navigate an increasingly mediated and information-rich environment, thereby supporting democratic participation and lifelong learning (see Figure 1).

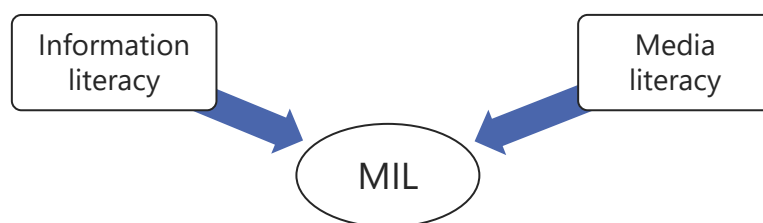


Figure 1. *MIL-media and information literacy*

Digital literacy, a precursor to digital competence, was introduced by Gilster (1997) and includes technical, cognitive, and social-emotional skills for navigating information presented via digital platforms. Jones-Kavalier and Flannigan (2006) defined it as the ability to work effectively in digital environments. They highlighted the centrality of reading and writing with new technologies that blend written and visual representations. This multidimensional nature of digital competence has been further emphasized by Eshet-Alkalai (2004), who conceptualizes it as a composite of multiple literacies – such as photo-visual, information, socio-emotional, and branching literacies – required to function effectively in

the digital era. He expanded the definition to include complex skills such as cognitive processing, motor skills, and emotional intelligence, later adding the notion of real-time digital thinking (Eshet-Alkalai, 2009). (see Figure 3).

The European Commission (2006) described digital competence as the confident and critical use of Information Society Technology (IST) for work, communication, and leisure. It includes foundational ICT skills like information retrieval, assessment, production, and collaboration via digital platforms.

Calvani et al. (2008) proposed a definition encompassing adaptability to new technologies, critical analysis, problem-solving,

collaboration, and ethical awareness. Ferrari et al.(2012) presented two interpretations of digital competence: one sees it as a convergence of various literacies, while the other views it as a new form of literacy that exceeds the sum of its parts. Ferrari (2012) synthesized various frameworks and identified key competences: managing information, collaboration, communication, content

creation, ethics, evaluation, and technical operations. In her comprehensive review of fifteen digital competence frameworks – from formal curricula and certification schemes to academic models – Ferrari (2012) articulates a multifaceted understanding of digital competence that extends far beyond mere technical aptitude. She further identifies seven core competence domains (see Figure 4).

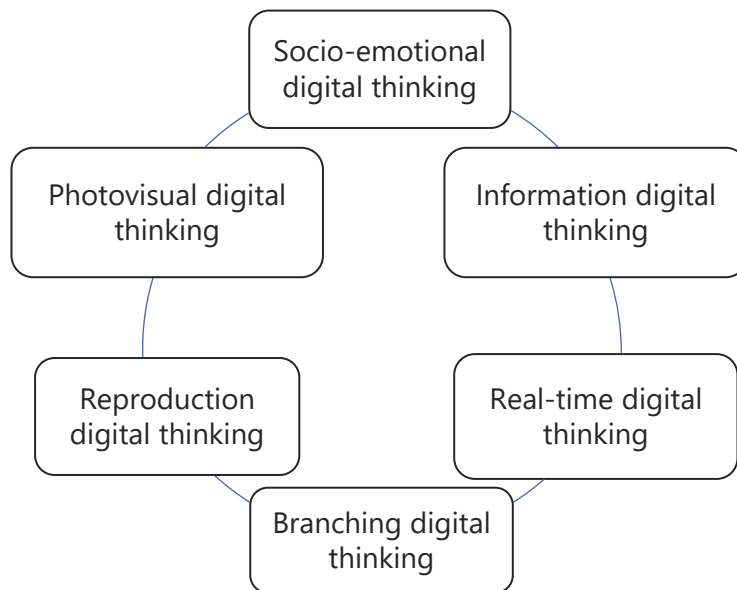


Figure 2. Six- skill holistic conceptual model

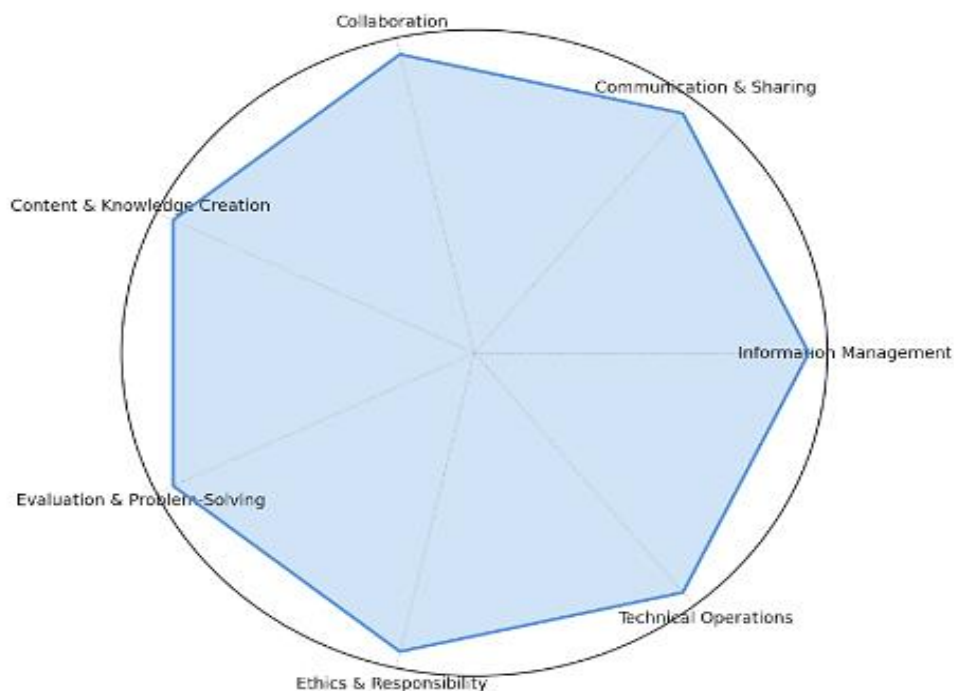


Figure 3. Seven core competence domains of digital competence

She cautions that while many frameworks emphasize operational ICT skills, the true breadth of digital competence also demands reflective, critical, and ethical dimensions. By integrating cognitive, attitudinal, and technical elements, Ferrari's model proposes a balanced and holistic structure aimed at preparing individuals for meaningful engagement in digital society. Larraz (2013) conceptualizes digital competence as the integrated and ethical mobilization of multiple literacies – specifically informational, technological, multimedia, and communicative literacies – to navigate the digital landscape effectively. This competency encompasses the

ability to locate, assess, organize, and transform information; manage hardware and software; interpret and create multimedia content; and engage in digital citizenship through effective communication. According to him, digital competence requires the presence of four literacies (see Figure 4). Importantly, Larraz argues that digital competence transcends these distinct literacies, constituting a broader capacity to employ digital media reflexively for communication, problem-solving, creation, and knowledge construction – not merely as technical tasks, but as thoughtful, purposeful practices.

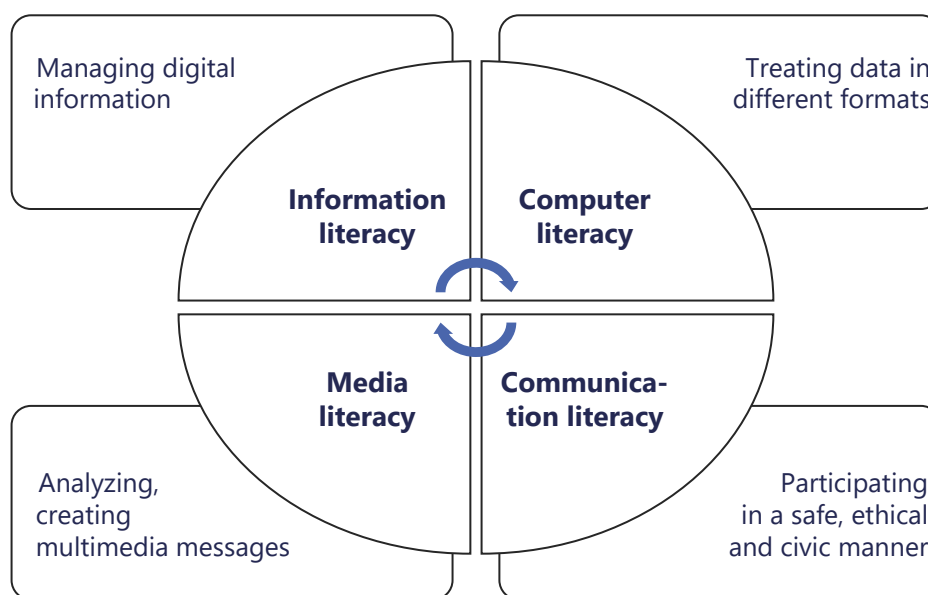


Figure 4. Main literacy components of digital competency

Conclusion

Digital competence represents a complex, evolving construct that draws from various literacies and skills. It requires individuals not only to possess technical knowledge but also to engage critically,

ethically, and collaboratively with digital tools. The integration of multiple frameworks reflects ongoing efforts to understand and articulate the competencies required for meaningful participation in a digital world.

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