Chapter 3 - New Literacy Instruction Strategies in the Light of Higher Education Hybridization

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Chapter Highlights

- The development of e-learning and the massive introduction of distance learning technologies into the educational process are the main trends in the development of education throughout the world.
- The widespread utilization of digital tools tries to harmonize the educational process by improving the means of planning and organizing the educational process, extending the use of active learning methods and the transition to a personalized and a more effective organization of the educational process.
- Digitalization is an opportunity for all actors that are participating in the educational process to become co-creators of the educational content.
- Teachers in the new educational format should have (1) scientific and methodological knowledge to implement educational programs by using distance learning technologies; (2) practical skills to adapt the educational content to the distance teaching, and (3) organizational and technical abilities to connect and interact with students.
- The amount of content uploaded online every minute is immense, far exceeding the ability of a regular student to process it. The challenge is to practice one's literacy skills to help navigate through this great amount of informational content, to benefit from it and not to be overwhelmed. It is equally important to be able to prevent its dangerous and harmful effects.

Introduction

Higher education is evolving dynamically worldwide. Attitudes of teachers and students to distance learning and e-learning are changing as well, embracing the fact that technology revolutionized the way learning happens. Technologically-mediated learning and research represent the latest achievements of mankind. Despite this divergence of opinion, distance education is gaining momentum, not only in prestigious and world-wide recognized universities, that already for a few decades are posting high-quality courses online to the large audience, but in small universities as well. Today, due to strong digitized services, students can attend courses of well-known lecturers and one teacher can impact a very large audience of students. The development of engineering and technology has led to the expansion of the use of distance courses by universities around the world, to a change in both the learning process and the methods of assessing the acquired knowledge, and access to the necessary educational materials.

The chapter focuses on how digital literacy is modeled in higher education, how new literacy should help students navigate in the rapid-changing contexts such as medical crises, economic and social insecurity, fast-paced changing labor-work demands. All these factors push faculty and higher education to shift to a totally digital environment and create appropriate conditions to utilize digital technologies and strengthen students and teachers' digital literacy. The chapter discusses higher education pathways to incorporate open educational resources, to provide open access to educational and research content through electronic libraries and databases, and to ensure appropriate support in distance learning. Developing and expanding of the literacy concept have become crucial in the digital era at least from the perspective of gaining knowledge and skills that will allow students and teachers to navigate and use the great amount of existing information. Moreover, they are getting acquainted with the process of incorporating communication technologies and innovative pedagogical tools in their teaching activities and (re)viving education and improving the interactions between faculty, students, librarians and labor-market. The widespread utilization of digital tools tries to harmonize the educational process by improving the means of planning and organizing the educational process, extending the use of active learning methods and the transition to a personalized and a more effective organization of the educational process.

Thus, digitalization is an opportunity for all actors, participating in the educational process, to become co-creators of the educational content. Higher education must be considered from the perspective of the development of new and innovative technologies, the penetration in the academic life of the variety of possibilities of existing and prospective information and communication technologies (ICT), as well as innovative pedagogical methods based on the use of ICT. Therefore, the issue of the elaboration of effective systems of professional development and training of teachers based on competence models (Dumitru, 2019), as well as developing mechanisms for improving the interaction of teachers and librarians to meet the requirements of inclusive knowledge societies in the context of the widespread use of digital technology is an imperative step to be taken for the 21st century education.

The digital transformation of education requires re(thinking) and mapping out educational results, the content of education, methods and organizational forms of educational activities, as well as the assessment of the educational results achieved in a rapidly developing digital environment. However, attention to their use in education is dynamically evolving worldwide. Digital technologies are increasingly spreading and updating, opening unlimited opportunities for access to digital tools, information and services. Learners and educators gain unprecedented control over their information space and its sharing (Barrot et al., 2021). Their opportunities for self- and mutual education, for motivating learners and engaging in meaningful learning experiences are increasing. Virtual reality (VR) technologies are rapidly merging with artificial intelligence (AI) technologies, but methodological developments for their use in education are progressing slowly. It is necessary to develop a new class of methodological solutions that will use new pedagogical possibilities. In the environment of the digital learning the challenge is to harmonize the educational process by (1) mastery of pre-selected content by students; (2) achievement by students of educational goals and (3) support and development of students' ability to learn, creation of their educational independence and development of their personal identity in the process of mastering both socially assigned and self-selected content.

Massive digitalization and innovation in higher education has been the primary trend since the medical crises of Covid-19 (de Obesso et al., 2023). However, the process of digitization has been challenging for several small universities, steadily increasing inequalities in higher education across several countries (Clark, 2023). Studies report regional inequalities of higher education development across China (Han et al., 2023), Norway (Mustafa et al., 2022)

and even across European Union (Nikolaidis, 2021) where educational services despite the fact that are provided by the state, implies several costs with finances for accommodation, medical services, books and internet fees. The digitalization of education is recognized as essential and of massive economic value, according to the European Commission's Digital Education Action Plan 2021–2027 (European Commission 2021). Digitalization of education has its power to provide a formal educational reform and empower higher education institutions in this "unequal pedagogical reality" (Armila et al., 2022).

(Re)Framing Literacy Instruction

Technological development changed the way learning happens and education is delivered. Educational systems worldwide have been modernized through the introduction of innovative technological tools and advanced pedagogical technological-mediated strategies adopted to better respond to the requirements of the knowledge society. Digitalization leads to qualitative changes in the sphere of production and in global markets, affecting equally the education sector. The technological revolution not only poses new challenges for education, but also provides digital technology to help solve them. Digital technologies create the conditions to face the challenges by improving the means of planning and organizing the educational process, by using widely various active learning methods and by transitioning to a more personalized and inclusive educational process. The digital transformation of education cannot be done fast, it requires time. Mostly, because it affects all levels of education and it is impossible without the active participation of students, teachers and all stakeholders, including parents, employers, politicians and members of the society. This digitalization can be divided into three large interconnected groups of action:

- Development of digital education infrastructure;
- Development of digital teaching and learning materials, tools and services, including digital techniques for assessment and evaluation;
- Development and promotion of new formats and models of how to organize effectively and efficiently the educational process.

All this requires a qualitative update of the existing practices based on strong pedagogical research, turning all these practices and evidence-based decisions into a tool for scientific and methodological support for the digital transformation of education.

It is worldwide accepted that the core aim of education is to develop literacy and more precisely functional literacy (Kirsch & Guthrie, 1977). This term encompasses the quality of general educational competence, which is largely observed by taking into account Educational Standards of all levels of education. The definitions of literacy have evolved over time. The term "literacy" was introduced in 1956 by UNESCO (Simon, 1956), and first it comprised a set of skills, including reading and writing, that are needed to be applied for social integration and development. Generally speaking, literacy represents the ability to read and write fluently, and use it appropriately in social contexts (UNESCO, 2013). Literacy is the level of proficiency in reading and writing, dealing with the printed word. For providing a working definition for the Program for International Student Assessment (PISA), OECD defined literacy as "the ability to understand, use, and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate effectively in society" (OECD, 2001, p.21). Today the term expanded its meaning to „a means of identification, understanding, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich and fast-changing world" (UNESCO, 2018). The definition and the measurements of literacy changed over time, as the society and the environment are changing, and the level of literacy determines the full activity of a person in a social environment. Functional literacy focuses commonly on competences to solve everyday problems (Mukan & Fuchyla, 2016).

The development of functional literacy of students is influenced by several factors: (i) educational content (educational standards, curricula); (ii) educational forms and methods of teaching; (iii) a system for diagnosing and evaluating educational institutions; (iv) nonformal educational programs; (v) the presence of a friendly educational environment based on interests, achieved with all interested parties and (vi) the active role of parents in the process of education and upbringing of children (Ilomäki & Lakkala, 2018). (Re)framing literacy instruction is inextricably linked to:

- Clarification of learning objectives and learning outcomes (what to teach);
- Developing new pedagogical tools (pedagogical design, methods and techniques of pedagogical support and educational activities and tasks, improving the management of educational organizations, etc.);
- Updating pedagogical practices using digital technologies (how to teach).

"Literacy in higher education will require complex skills to understand and use the information in academic texts, to summarize, to understand abstract and complex concepts, to finish and hand in on time academic assignments, to be able to identify appropriate references, to navigate through the database of articles, etc." (Dumitru, 2022, p. 2). A wide use of the need to (re)think literacy, based on the globalization and informatization of the educational process and the use of ICT in professional training, was confirmed by several literature reviews (Pangrazio et al., 2020; Shi et al., 2021).

Living in an advanced digital culture means that this advanced digital environment will shape individuals to engage and work with different digital systems and tools, and work and study in different contexts. It implies the ability to work with information, use practical tools and technologies, including specialized ones that relate to individual subject areas, as well as general user ones that every literate person should own. Digital opportunities and digital experience are important for learners' development and formation as a full-fledged individual. It would help to expand their digital literacy by working on different operating systems, with different programs, software, platforms and devices.

Information Literacy in Digital Era

Digitalization is overtaking several sectors, education including. The digital economy requires that every student masters the competencies of the 21st century, such as critical thinking, learning to learn skills, digital skills, team-work, creativity and the ability to apply existing knowledge in a rapidly developing digital environment. In the light of the digital economy, higher education students should be able to manage their own learning (Koulianou & Samartzi, 2018; Syaharuddin et al., 2022). To better respond to these demands, universities should transform and (re)invent themselves (Mohamed Hashim et al., 2022). Digital transformation in the economy is proven to increase labor productivity, while the use of digital technologies in education is expected to enhance learning efficiency (Armila et al., 2022). The digital transformation of education is affecting the educational content, organization of instructional and research activities, as well as the assessment of the results achieved in this new digital environment.

The digital transformation of education is a challenging process. It affects all levels of education and it is impossible without the active participation of all the actors: students,

teachers, managers and all stakeholders, including parents and employers, politicians and members of the society. All this requires a qualitative update of the existing practice of pedagogical research, turning them into a tool for scientific and methodological support and sustenance for the processes of digital transformation of education.

Literacy Instruction Strategies

All spheres of life were transformed since the world wide web. Today, there is no need to buy expensive tablets, laptops or computers, sometimes all you need is a mobile phone. Blended learning develops rapidly, a variety of information educational systems and platforms (for example, LMS, edX, Coursera, Udacity, Moodle) are available already in many universities, providing access to digital learning resources (Figure 1), various educational formats, different types of tasks, and technologically mediated space for exchange and discussions (Marín & Castaneda, 2023). Teachers understand today that flexibility is a strong asset of online education. Therefore, a modular system of organizing educational content is very convenient and it is becoming a dominant way of organizing educational activity.

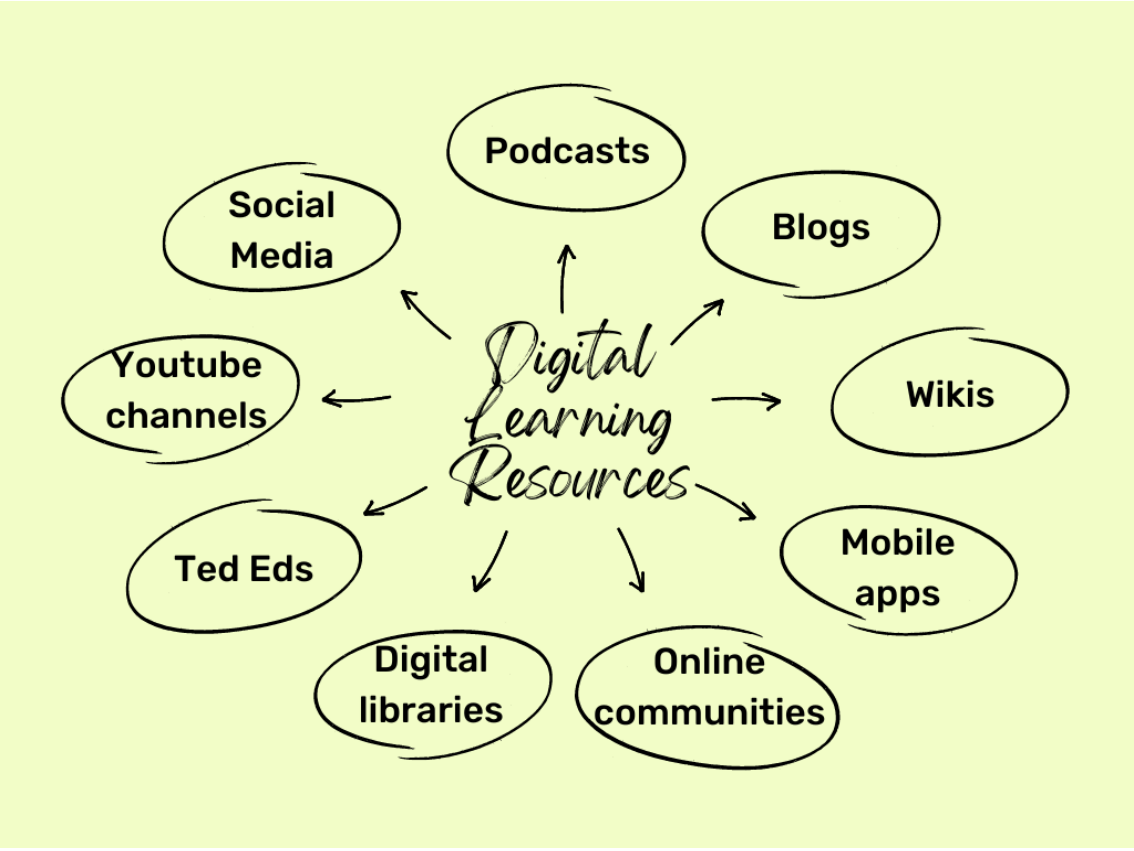

Figure 1. Digital Learning Resources

The new digital era renewed the principle of "knowledge for life" with the principle of "knowledge throughout life", which gave impetus to the development of various learning systems such as massive open online courses (MOOCs), that can support learners to improve their knowledge throughout life. MOOCs represent a promising direction in the development of information technology for distance learning of university students:

- Mass, that is the immense number of students worldwide, with different educational and professional backgrounds;
- Open, vast majority of the courses are free and have no prerequisite requirements;
- Online, the course can be followed outside the classroom, via online platforms (this requires a device);
- Course, with a curriculum, deadline for handing it the assignments, and evaluation criteria.

According to experts (Kennedy, 2014), the concept of MOOCs is based on connectivism as a learning principle (a variety of approaches, understanding of learning as a process of network formation and decision-making, learning and cognition as a dynamic process). MOOCs are courses provided online (based on pedagogical and methodological design), consisting of video lectures, handouts, homework assignments, tests and final exams to create a personal educational environment for each student. There are also such advantages of MOOCs as accessibility, a high level of self-organization, a multimedia form of presenting material (scripts for reading, video and online forums, webinars, interactive tasks in the form of puzzles, simulation laboratories and many others).

Digital learning, including open online learning materials, is changing the learning experience. Changes are outlined in the access to various learning experiences and opportunities, the widespread use of digital formats, online simulators, and digital laboratories.

Changing Access to Information

The library in an educational institution and the textbook have ceased to be the main source of knowledge. Search engines, Wikipedia, libraries of digital learning materials, specialized tools, abstract collections, professional community portals, digital books, and numerous

online publications, provide students and teachers with rapid and continuous access to any educational material.

Online Communities of Learners

Traditional pedagogy has viewed students as separate individuals who come together for study or for leisure. In the digital era, students and teachers often discuss issues of interest to them in online communities, at local level (during classes at university), and at global level. In the online settings, they build up learners' communities where they receive advice, they can exchange ideas, discuss assignments, engage in joint projects, and co-create educational materials. Their learning environment is qualitatively enriched.

Advantages of Digital Learning Environments

Digital learning environments offer flexible educational settings and increase academic independence, various training facilities, time and space flexibility. In order to increase the effectiveness of online learning, digital educational materials, tools and services should have several characteristics:

(i) adaptability (information is presented depending on the student's learning behaviors, knowledge and other characteristics);

(ii) feedback (the students receive instant feedback on the quality of their learning process about how it can be improved);

(iii) free choice (students have a choice of what and how to master, which allows them to regulate their learning);

(iv) non-linear access to information (in a random order, using hypertext, which is different from its traditional linear representation);

(v) interconnected presentation of information (for example, voice messages, printed texts, diagrams, videos and interactive models);

(vi) the use of various means of communication (for example, orally, written, drawing images, etc., which makes it possible to activate learning);

(vii) online networking (students can communicate both with teachers and peers and with various experts using e-mail, webinars, chats, multimedia communication tools for individualized and collaborative learning, tutoring, consultations and crowdsourcing) (Kuzminov & Frumin, 2019).

Distinctive features of the currently emerging new digital information tools were presented by Kerr (2005), and can be found in Figure 2.

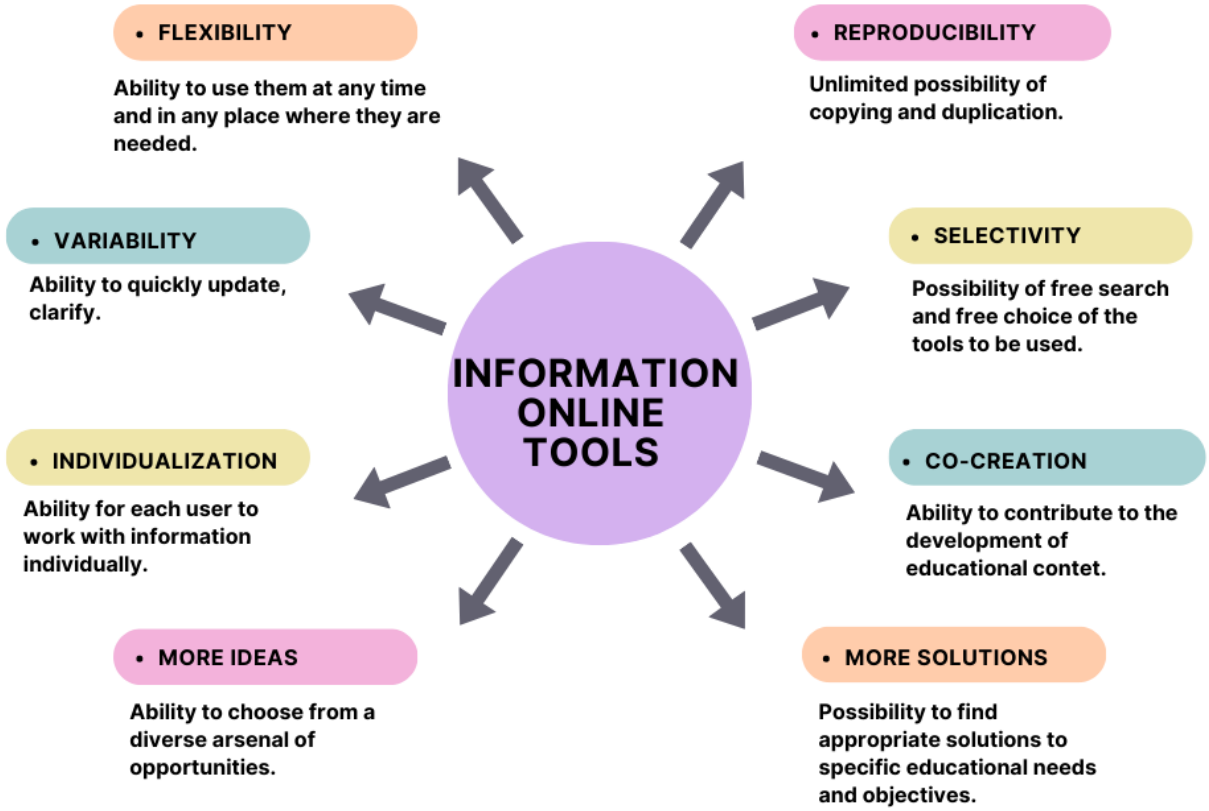

Figure 2. Characteristics of Online Tools (Kerr, 2005)

Information online tools should

(i) ensure confidentiality and flexible settings of accessing information;

(ii) create and update individual learners' profiles, regarding their actions with digital educational content, tools and services;

(iii) provide access to educational activities

(iv) cover all the necessary educational and methodological materials for lectures and laboratory activities, etc., and

(v) provide instant feedback.

A good educational tool provides students with information about the progress and results of their learning; provide teachers with information on the progress of students' educational outcomes for the purpose of guiding, monitoring and further planning. In designing appropriate educational digital tools, it is important first to become acquainted with learners' personal profile: (i) their learning behaviors and routines, (ii) their successes and difficulties

(to know students potential, resources, but also to identify knowledge gaps), (iii) what motivates the learners, their interests and aspirations, (iv) educational goals (and moreover to guide learners to identify and describe their educational goals, how to monitor their achievements and assist them in moving towards the intended goals) and (v) feedback (how often and how should the learners be informed about their progress). Digital tools assist learners and their teachers in measuring individual progress, in order to make it easier for the learner to move on to mastering new material. Personal learning path provides visibility and enhances the relevance of the educational process.

Digital Literacy Competence

What does digital literacy mean? We encountered this term lately, and we can easily presume its meaning. However, there is a lot of confusion around it. In fact, digital literacy comprises a set of skills to navigate in the digital space, but also to transfer them to the real life. Researchers (Kalantzis & Cope, 1997; Pangrazio et al., 2020) connect digital literacy with new literacies, considering it as a system of cognitive, social and technical skills essential to navigation in the information environment. However, digital literacy is today viewed as a more complex concept (Boronenko et al., 2019), which consists of several complex components, such as

(1) *computer literacy*, the ability to effectively use electronic devices and software;

(2) *information literacy*, the ability to independently search, analyze and critically understand information data;

(3) *technical skills*, competent use of social media and use of network technologies with an understanding of the basics of network security and ethical standards.

According to Van Deursen & Van Dijk (2014), digital literacy depends on the development of three types of skills:

- Ability to interact efficiently with an electronic device, go online and create digital artifacts;
- Ability to interact with the software, which implies the knowledge and skills to work with the content;
- Universal skills in working with digital technologies, including design, development of a digital online or offline environment.

Digital literacy competence is crucial in the new digital environment. Today, one is now not only a consumer, but also an author of content and can share their opinion worldwide. Studies (Leguina et al., 2021; Yin & Choi, 2022) shows that the informatization of education helps to reduce inequality in obtaining quality education due to the following conditions:

- Providing trainees with equal access to high-quality open digital educational resources and teaching materials, as well as to experts;
- Improvement of educational content and organization of distance learning due to distance learning technologies;
- Greater opportunities and dissemination of educational programs to continue education in online settings;
- Provision of more individualized and personalized learning paths more appropriate to individual educational needs of learners.

Digital competence consists of the structural aspect, which refers to the comprehension process of the availability and the utilization of digital tools and sources in order to create something new, something useful and necessary based on their potential and practicalities. Communicative aspect of digital competence is the comprehension of the purpose of digital networks and communications, and their role in the development of personal digital literacy. The knowledge of how communication is carried out between various digital devices (including mobile and stationary computing devices, as well as their peripheral equipment) is an essential element of digital competence. When developing digital competence, it is crucial to build up confidence in the use of digital equipment and tools. A confident user of digital technologies is capable of introspection, understands the difference between the analog and digital world (Kuzminov & Frumin, 2019). A learner with digital competence should be able to:

- Analyze and critically evaluate one's own digital competence;
- Benefit from the digital experience and continuously maintain one's digital environment;
- Actively participate (create, maintain, and use) in online communities that help the learner to develop, master, and use new digital tools and equipment;
- Understand the principles, processes, procedures and systems on which digital opportunities are built on;
- Master individual techniques of using software and hardware;

- Monitor the digital environment;
- Skillfully organize and control digital materials.

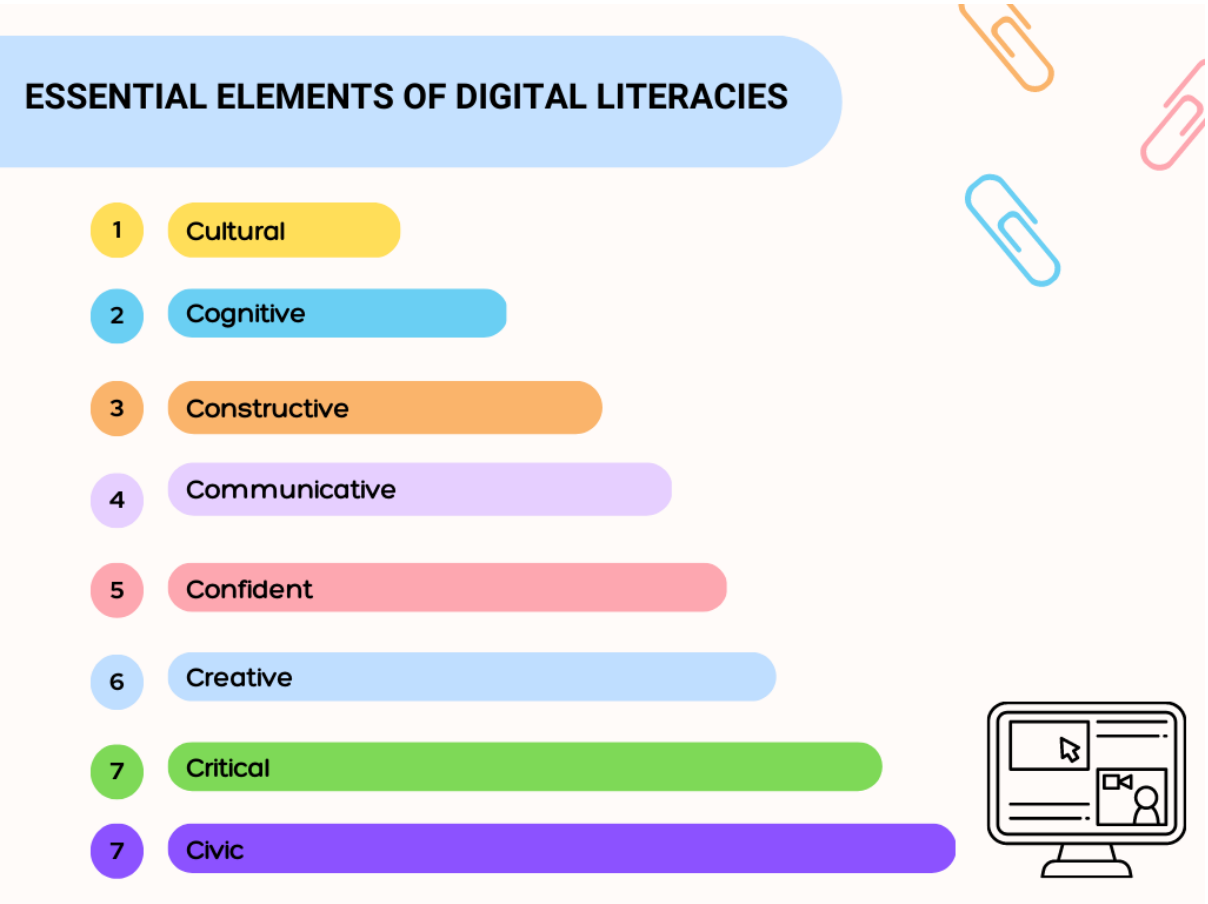

Figure3. Essential Elements of Digital Literacies (Belshaw, 2014)

According to According to Belshaw (2014), digital literacy is characterized by eight elements, as shown in Figure 3, that are described below.

1. *Cultural* element involves (i) the set of norms, rules and expected behaviors during online communication, (ii) the understanding of specific Internet artifacts (meme, emoji, animated gifs, etc.), (iii) the knowledge of the history, language, customs and values of digital environments, (iv) the respect of confidentiality and information protection etc.
2. *Cognitive* component refers to the understanding of key elements of computer literacy, the comprehension of several functions (navigation settings, menus, profiles, tags and hashtags), and the use of digital devices, software platforms and interfaces.
3. *Constructive* element refers to the knowledge of how the online content is created in the digital environment and the knowledge related to copyright.

4. *Communicative* component involves knowledge of the possibilities of communication in digital environments and understanding the specifics of the concepts of "identity", "trust", "exchange", and "influence" in the digital space.
5. *Confident* use, according to Belshaw (2014) refers to the feeling of being part of the online community, understanding and using the advantages of the online space compared to the offline world, and also reflects learning and academic communities in the digital environment.
6. *Creativity* as part of digital literacy indicates the value of creativity in the digital space, the development of new ways to use online tools and opportunities, and the creation of new knowledge through digital technologies.
7. *Critical* element of digital literacy applies to the use of analytical and critical reflective skills in the assessment of digital content, tools and platforms, and in the selection of reliable sources.
8. *Civic* component characterizes the ability of online users for self-organization, active participation in online social movements and events, as well as the knowledge of digital rights and obligations.

According to Belshaw (2011) digital competence refers to the creative aspect of competence building, the ability to use digital equipment and tools to create new and valuable digital information resources or products. Creativity and innovation are fundamental skills to be mastered and developed in the new digital era in order to participate fully in public life. Digital environment can facilitate the establishment and development of connections with local, regional, national and international communities. Today, digital literacy has become a mandatory component of the competencies of the 21st century, which all students should master.

Information Literacy

The goal of media and information literacy is to empower learners or users of a particular technology through continuous learning and acquiring knowledge about the functions of the media, about the mechanisms for creating and distributing informational content. With the immense amount of content uploaded online every minute far exceeding the ability of individuals to be able to navigate through it, highlight the importance of developing and practicing information literacy. Education is key to addressing this challenge. Teachers must

take on a new role, which is to help learners acquire the knowledge and the necessary skills to make full use of digital resources, while protecting them from false, harmful and inappropriate content.

Yet, the process of developing information literacy is gaining momentum and represents an important factor in supporting the learning process. Lack of information literacy skills makes the learner seen as a "naked learner" and not as a "tool-equipped learner" (Rosli et al., 2020). The challenge for practicing literacy skills in the online environment is to get acquainted with the digital tools that would help learners to regulate and self-direct their learning process (Mastrothanais et al., 2018) „in pursuit of academically relevant goals" (Bol & Garner, 2011, p.105).

Digital transformation of education begins with the transformation of its content. Information literacy has become a new element of such content. The concept of information literacy is defined by the *American Library Association* as „a set of abilities requiring individuals to „recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (2000, p.20).

Use of Artificial Intelligence in Education

Technology development is impacting education extensively. Examples of use of Artificial Intelligence (AI) have been reported relatively recently. Intelligent learning systems and chatbots have been already used in several universities where AI assists in personalizing learning, providing students with instant direct feedback throughout the whole learning process. AI is used also in the assessment process, tools and automatic assessment systems to ensure accurate evaluation of educational outcomes. AI is also used in customizing educational content and learning materials, in creating learners' own educational materials, reorganizing textbooks into manageable chunks of information, and generating summaries or other mnemonic helpers. In research, higher education institutions use AI methods for working with big data and preparing educational analytics in order to better understand and predict the curricula and educational outcomes, and increase its effectiveness. The development and the use of these technologies promise to significantly increase the visibility of educational activities and promote their incorporation in everyday teaching and studying processes.

Digital Literacy Strategies in Higher Education

Technology changed the educational landscape, and even the most conservative teachers accept the significant impact of technology on the teaching-learning process. Higher education institutions adopted ICT in their life: reorganized their libraries, creating well-supplied digital libraries, and equipped their research centers with highly sophisticated technologies, and cutting-edge technology infrastructure. At higher education level, learning is usually taken for granted, and assessing and practicing digital literacy does not always have enough emphasis. Yet, practicing digital literacy skills can help students navigate and interact with the great amount of information available today. University teachers most often forget to provide assistance in helping students explore and practice several strategies that will help them learn efficiently. Studies show the effectiveness of academic supervision, tutoring, peer mentoring and coaching, project learning and problem-based learning (Alt & Raichel, 2022; Arefian, 2022). A key task of higher education is to facilitate independent cognitive activity of its students. Strong metacognitive skills stimulate the process of learning and contribute to the desire for self-development (Koulianou & Samartzi, 2018; Alt & Raichel, 2020).

Higher education consists primarily of two main elements: sending and receiving information. Innovative methods in teaching include creative approaches to understanding the discipline, as well as the ability to find non-standard and creative solutions to various problems. Education should become an interesting and exciting process that contributes to the personal and professional growth of a person. In the context of "classical" education, the "chalk-and-talk" method, used in onsite education, is usually passive and students play a minor role in their learning process. The challenge in online education is to tackle the issue of the active engagement of the learner in the learning process.

The purpose of interactive methods in teaching is to create appropriate learning conditions, which makes the learning process effective. Universities today tend to return to providing „universal" knowledge to their students (Mayor, 1998), to enable students to shift to various professions in accordance with the labor demands. While additional knowledge will be needed, „universal" competences empower learners with necessary skills to perform and navigate through a diverse, flexible and uncertain environment, and way better as a „narrow" specialization, which in the case of a new environment will need a complete training and not an additional one. So, what are those „universal" knowledge and skills necessary to be

acquired by learners: creativity, effective communication, team work, problem-solving thinking, critical thinking and digital literacy. Digital literacy is required to empower students with tools to work efficiently with the data. Therefore, a number of digital literacy strategies are known and can be practiced by students to help them efficiently and effectively navigate in the digital world. Some techniques that can facilitate the learning process in the digital era are listed in the table below.

Table 1. Reading Techniques toward Improving Reading Comprehension

Learning and reading technique	Technique Characteristics
Skimming	It is a surface reading technique, crucially important in the age of abundant information and data. It provides learners with a fast-reading skill necessary to identify relevant content and get rid of unclear, confusing, irrelevant, and non-qualitative educational content (Van et al., 2022). Skimming is essential for learners to assess the available content online and on-print and identify the most appropriate one for the learning process.
SQ3R (Survey, Questions, Read, Recite and Review)	Developed by Robinson (1946) in his book *Effective Study*, refers to an active and profound technique of reading the educational content. It consists of five steps, mentioned as well in the technique title. (1) *S (Survey)* – overall skimming of the text to get the general idea of it; (2) *Q (Questions)* – anticipatory selection of what is of interest (a theme, an idea, a concept, by raising questions to the material proposed for reading); (3) *R (Read)* – in-depth look inside the text to capture its essence; (4) *R (Recite)* – close the book, or the article page and try to think critically about what was read and connect it with the personal experience;

Learning and reading technique	Technique Characteristics
	(4) *R (Review)* – reviewing the content and getting back to the questions raised in the beginning to identify the answers received or launch other readings to get answers to remaining questions.
ARMS (Anticipate, Read, Map, Summarize)	This study technique implicates actively and critically going through the educational material, and it allows a deeper understanding of it. Using this method challenges students to pay attention to what they read, to make the information they read meaningful, and helps them monitor their understanding of what they read. ARMS is the acronyms of the key concepts of the technique and also identify the main steps to be followed: anticipate the content, deep and critically read the text, organize the material in a mind-map or a concept-map, and summarize it.
Feynman Technique	It is a study technique, developed by the physician Richard Feynman (1985), to help students with the understanding of complex concepts. Feynman's technique is an effective tool for learning new things, deepening things learners already know or preparing for an exam. The essence of this technique is: if one wants to understand something, one should explain it. The main objective is getting to the core of the concept, and being able to explain it in a simple way.

Due to the fast pace of technological development, it is necessary to revise the practical and theoretical approaches to the content of education, and professional pedagogical training. Experts agree that innovative approaches to training future professionals should be systematic and comprehensive (Numonjonov, 2020).

Role of Teachers in the New Digital Era

The development of e-learning and the massive introduction of distance learning technologies into the educational process are the main trends in the development of education throughout the world. Under these conditions, completely new activities of the teacher arise, the teacher faces new professional problems, the solution of which requires new professional competencies. The concept of "tutor" (i.e., teacher-mentor, teacher-assistant), which arose around the 14th century in classical English universities, acquired a new meaning in distance learning. In online education, tutors or teachers have to have knowledge and skills that would enable them to navigate themselves in the online environment and be able to connect with their students to guide and scaffold their learning experience. Teachers in the new educational format should have (1) scientific and methodological knowledge to implement educational programs using distance learning technologies; (2) skills in adapting the educational content to distance teaching, and (3) organizational and technical abilities to connect and interact with students.

The task of online tutoring remains the one of guiding and facilitating the learning process. Although, the novelty of the learning environment, the insufficient knowledge on how learning happens and how it is generated by the environment in which it happens, teachers may struggle with finding the appropriate ways to get the most out of learning. Teachers should explore various ways that they could track and adjust the individual learning path of each student in an online environment (which might be supported by several learning tracking apps), examine various solutions to dynamically evaluate all learning outcomes and test various approaches to conduct group discussions and make the online learning interactive.

Table 2. Activities of Teachers in Online Settings

Activities in online education
• Presenting and discussing the course content
• Providing continuous and instant feedback on student progress
• Evaluating of assignments/tests
• Providing academic support and tutoring for students
• Motivating students

Activities in online education
• Designing the learning conditions • Data managing • Storing students' records • Facilitating students' interaction with the educational institution administration

The challenge with maintaining students' interest in learning and motivation throughout the online course might need to be taken seriously into consideration. The main role of the online teacher remains the activation of the learning process and guidance through the whole learning process (Dumitru, 2015). Teachers in online educational space should (1) guide and supervise student's learning activities; (2) develop student's sense of responsibility for the study and handing in on time all educational tasks; (3) independently regulate and control their learning process; (4) develop analytical skills and critical self-awareness and (5) critically and wisely use available information sources (Hickson, 2011).

The use of digital learning systems and platforms has led to a change in the structure of the presentation of educational material, allowing more flexibility and autonomy in choosing learning path, presentation and extraction of information and knowledge building, and even providing a personality-oriented educational activity. Modern distance learning platforms are called learning management systems (LMS) (Coates at al., 2005), knowledge management systems (KMS) (Maier & Hadrich, 2011), or online learning environments (OLE) (Moore et al., 2011). A variety of roles and tasks of teachers in the new online or hybrid learning format implies additional training to assist teachers in adjusting to the digital learning format, in mastering all educational and research technologies and introducing these technologies into the practice of educational institutions.

Digital Well-Being

When introducing ICT into the educational process, one should take into account the characteristic features of any technology. Many ICT applications in education fail or perform below expectations as the fundamental features of the technology are lost due to the focus on individual devices rather than on the system as a whole. The abundance of digital resources does not imply strong digital literacy skills, moreover frequent use of digital tools and

technology does not imply information literacy improvement (Kisilowska, 2022; Nikou & Aavakare, 2021). „Students are faced with numerous, complex demands when engaged in distance education and on-line learning" (Bol & Garner, 2011, p. 104). Digital literacy competence is discussed from an ecological perspective in using digital technologies in a special environment, in compliance with hygiene standards and user responsibility.

Frequency and intensity of usage of Internet resources as such do not improve. Moreover, Internet users often suffer from the consequences of problematic Internet use and fear of missing out (FOMO). Several studies (Przybylski, et al., 2013; Kisilowska, 2022) identified a dependency between the level of information literacy and the scale of FOMO intensity. Consequently, information literacy does not protect against problematic Internet use, on the contrary – sometimes it is a factor contributing to it (Kisilowska, 2022). There is a need to include a digital wellbeing perspective in information literacy education – to put more attention on attitudes towards the Internet as an environment of everyday life. Moreover, another concern raised with the wide use of technology is the concern in terms of privacy, regarding the issue of storing personal data on external media, and not in a personal storage domain. Therefore, it is important to consider both the technical side of the matter and the social acceptability of certain approaches. The more the population relies on online sources, the more vulnerable they are to information that can affect society in the most adverse way (Quaglio & Millar, 2020). Information is created, shared and stored on an unprecedented scale; however, few know when, how and to what extent the information is stored, retrieved, understood, used and applied. The difficulty in distinguishing fake news or fake science from reports and from reliable sources is often developing into a phenomenon called „confidence deficit syndrome" (United Nations, 2019, p. 18).

It is crucial to develop literacy skills to help them navigate through this great amount of informational content, to benefit from it and not to be overwhelmed by it and be able to prevent its dangerous and harmful effects. Remote learning can affect mental health, by increasing the anxiety level and loneliness feelings (Kotera et al., 2021; Bećirović & Dervić, 2023). When using digital learning solutions, it is important to fully understand and take into account the limitations that underlie their operation, to be aware of their fundamental limitations and the information security issues. Providing assistance and guidance for students to become more careful consumers of the information they consume online, to teach them how to act in unpredictable and uncertain situations (Breakstone et al., 2018), and to

have "literacy of personal data" (Pangrazio et al., 2020, p. 419).

Conclusion

Digital era triggered a number of large-scale actions that are transforming education today, such as creation of a hybrid learning space, based on a flexible approach and on digital technologies; creation of a global competitive infrastructure for transmission, processing and storage of data; investment in training of highly qualified professionals, development of digital technologies and platform solutions in higher education area. Digital technologies alone, neither platform solutions, nor “digitized” content will not lead to an improvement in the educational quality, nor to an improvement in the quality of skills and people’s quality life in general. In order to effectively benefit from the potential of digital technologies, it is necessary to clearly set specific objectives to develop digital solutions for education, adapt the technological potential to specific tasks for teachers and students, and to better promote mastering skills, values and relevant knowledge in the digital age. Digital literacy is enhanced by the desire of learners to make use of digital technologies to gain a wider and more diverse access to educational resources. However, ensuring online safety and necessary skills to learn wisely and safely in the online environment is raising the question of revising and critically engaging with the educational content. In the light of moving to hybrid learning spaces, education is focused on developing several universal skills, one of them is digital literacy, which imply the ability to use software tools and software packages (Nguyen & Habók, 2023), the ability to search for information online and to critically assess the quality of the information found in digital settings, and the ability to connect, engage and participate actively in the network society, to self-expression, build an accurate online identity and participate actively and consciously in the online world.

It is necessary to provide global competitiveness of educational research on development of digital literacy skills, by providing conditions for the effective learning and increasing the competitiveness of education, reducing noticeably the routine workload for all actors in education, and developing life skills in the digital environment.

References

Alt, D., & Raichel, N. (2020). International and multidisciplinary perspectives reflective

journaling and metacognitive awareness: Insights from a longitudinal study in higher education. *Reflective Practice*, 21(2), 1-14. https://doi.org/10.1080/14623943.2020.1716708

Alt, D., & Raichel, N. (2022). Problem-based learning, self-and peer assessment in higher education: towards advancing lifelong learning skills. Research Papers in Education, 37(3), 370-394. https://doi.org/10.1080/02671522.2020.1849371

American Library Association. (2000). Information Literacy Competency Standards for Higher Education. Retrieved from https://alair.ala.org/bitstream/handle/11213/7668/ACRL%20Information%20Literacy%20Competency%20Standards%20for%20Higher%20Education.pdf?sequence=1&isAllowed=y

Arefian, M. H. (2022). Perceptions of self-assessment literacy and self-directed reflection during online learning for Iranian EFL student teachers. *Reflective Practice*, 23(6), 623-634. https://doi.org/10.1080/14623943.2022.2096584

Barrot, J. S., Llenares, I. I. & del Rosario, L. S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies*, 26, 7321–7338. https://doi.org/10.1007/s10639-021-10589-x

Bećirović, S., & Dervić, M. (2023). Students' perspectives of digital transformation of higher education in Bosnia and Herzegovina. *The Electronic Journal of Information Systems in Developing Countries*, 89(2), e12243. https://doi.org/10.1002/isd2.12243

Belshaw, D. (2014). *The Essential Elements of Digital Literacies*. Retrieved from http://digitalliteraci.es

Belshaw, D.A.J. (2011). *What is digital literacy? A Pragmatic investigation*. Thesis submitted in 2011 to the Department of Education at Durham University. Retrieved from https://dougbelshaw.com/doug-belshaw-edd-thesis-final.pdf

Bol, L., & Garner, J. K. (2011). Challenges in supporting self-regulation in distance education environments. *Journal of Computing in Higher Education*, 23(2), 104-123. https://doi.org/10.1007/s12528-011-9046-7

Boronenko, A., Kaysina, A. V., & Fedotova, V. S. (2019). Razvitiye tsifrovoy gramotnosti shkol'nikov v usloviyakh sozdaniya tsifrovoy obrazovatel'noy sredy [Development of digital literacy of schoolchildren in conditions for creating a digital educational environment]. *Perspektivy Nauki i Obrazovaniya*, 2(38). https://doi.org/10.32744/pse.2019.2.14

Breakstone, J., McGrew, S., Smith, M., Ortega, T., & Wineburg, S. (2018). Why we need a new approach to teaching digital literacy. *Phi Delta Kappan*, 99(6), 27–32. https://doi.org/10.1177/0031721718762419

Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary education and management*, 11(1), 19-36. https://doi.org/10.1007/s11233-004-3567-9

Dumitru, C. (2022). New Literacy Instruction Strategies Considering Higher Education Hybridization. In S. Silva, P. Peres, & C. Silva (Eds.), *Developing Curriculum for Emergency Remote Learning Environments* (pp. 1-20). IGI Global. https://doi.org/10.4018/978-1-6684-6071-9.ch001

Dumitru, G. (2015). Teacher ‘s Role as a Counsellor. *Procedia-Social and Behavioral Sciences*, 180, 1080-1085. https://doi.org/10.1016/j.sbspro.2015.02.211

Dumitru, G. (2019). The teachers' need for training in order to help their students through educational counseling. In *2019 11th International Conference on Electronics, Computers and Artificial Intelligence (ECAI)* (pp. 1-4). IEEE. https://doi.org/10.1109/ECAI46879.2019.9041992

Feynman, R. P., & Sackett, P. D. (1985). ‘‘Surely, You’re Joking Mr. Feynman! ’Adventures of a Curious Character. *American Journal of Physics*, 53(12), 1214-1216.

Hickson, H. (2011). Critical reflection: Reflecting on learning to be reflective. *Reflective practice*, 12(6), 829-839. https://doi.org/10.1080/14623943.2011.616687

Ilomäki, L., & Lakkala, M. (2018). Digital technology and practices for school improvement: innovative digital school model. *Research and Practice in Technology Enhanced Learning*, 13, 25. https://doi.org/10.1186/s41039-018-0094-8

Kalantzis, M., & Cope, B. (1997). *Multiliteracies: Rethinking what We Mean by Literacy and what We Teach as Literacy the Context of Global Cultural Diversity and New Communications Technologies*. Leicestershire: Centre for Workplace Communication and Culture.

Kennedy, J. (2014). Characteristics of massive open online courses (MOOCs): A research review, 2009-2012. *Journal of Interactive Online Learning*, 13(1).

Kerr, S. T. (200). Why we all want it to work: Towards a culturally based model for technology and educational change. *British Journal of Educational Technology*, 2005, 36(6). https://doi.org/10.1111/j.1467-8535.2005.00570.x

Kirsch, I., & Guthrie, J. T. (1977). The concept and measurement of functional literacy. *Reading Research Quarterly*, 485-507. https://doi.org/10.2307/747509

Kisilowska, M. (2022). Fear of Missing Out, Information Literacy, and Digital Wellbeing. In S. Kurbanoğlu, S. Špiranec, Y. Ünal, J. Boustany, & D. Kos, (Eds.), *Information Literacy in a Post-Truth Era. ECIL 2021. Communications in Computer and Information Science*, vol 1533. Springer, Cham. https://doi-org.am.e-nformation.ro/10.1007/978-3-030-99885-1_15

Kotera, Y., Chircop, J., Hutchinson, L., Rhodes, C., Green, P., Jones, R. M., Kaluzeviciute, G. & Garip, G. (2021). Loneliness in online students with disabilities: qualitative investigation for experience, understanding and solutions. *International Journal of Educational Technology in Higher Education*, 18(1), 1-16. https://doi.org/10.1186/s41239-021-00301-x

Koulianou, M., & Samartzi, S. (2018). Greek teachers' metacognitive awareness on reading strategies. *New Trends and Issues Proceedings on Humanities and Social Sciences*, 5(1), 68-74. https://doi.org/10.18844/PROSOC.V5I1.3384

Kuzminov, I. I. & Frumin, I. D. (2019). *Trudnosti i perspektivy tsifrovoy transformatsii obrazovaniya.* [Difficulties and prospects of digital transformation of education] Izdatel'skiy dom Vysshey shkoly ekonomiki. Retrieved from https://www.researchgate.net/publication/334453213_Trudnosti_i_perspektivy_cifrovoj_transformacii_obrazovania#fullTextFileContent

Leguina, A., Mihelj, S., & Downey, J. (2021). Public libraries as reserves of cultural and digital capital: addressing inequality through digitalization. *Library & Information Science Research*, 43(3), 101103. https://doi.org/10.1016/j.lisr.2021.101103

Maier, R., & Hadrich, T. (2011). Knowledge management systems. In R. Maier & T. Hadrich (Eds.) *Encyclopedia of Knowledge Management*, Second Edition (pp. 779-790). IGI Global. https://doi.org/10.4018/978-1-59904-931-1.ch076

Marín, V. I., & Castaneda, L. (2023). Developing Digital Literacy for Teaching and Learning. Handbook of Open, Distance and Digital Education, 1089.

Mastrothanais, K., Kalianou, M., Katsifi, S., & Zouganali, A. (2018). The use of metacognitive knowledge and regulation strategies of students with and without special learning difficulties. *International Journal of special education*, 33(1), 184-200.

Mayor, F. (1998). The Universal University. *Higher Education Policy*, 11(4), 249-55.

McAuley, A., Stewart, B., Siemens, G., & Cormier, D. (2010). *The MOOC model for digital practice*. Retrieved from https://www.oerknowledgecloud.org/archive/MOOC_Final.pdf

Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, 27(3), 3171-3195. https://doi.org/10.1007/s10639-021-10739-1

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same? *The Internet and higher education*, 14(2), 129-135. https://doi.org/10.1016/j.iheduc.2010.10.001

Mukan, N., & Fuchyla, O. (2016). Functional literacy learning in the system of adult education in Belgium. *Advanced education*, 34-39. https://doi.org/10.20535/2410-8286.76533

Nikou, S., & Aavakare, M. (2021). An assessment of the interplay between literacy and digital Technology in Higher Education. *Education and Information Technologies*, 26(4), 3893-3915. https://doi.org/10.1007/s10639-021-10451-0

Nguyen, L. A. T., & Habók, A. (2023). Tools for assessing teacher digital literacy: a review. *Journal of Computers in Education*, 1-42. https://doi.org/10.1007/s40692-022-00257-5

Numonjonov, S. D. (2020). Innovative methods of professional training. *ISJ Theoretical & Applied Science*, 1(81), 747-750. https://dx.doi.org/10.15863/TAS.2020.01.81.134

OECD. (2001). *Education at a glance 2001*. Paris: OECD. Retrieved from https://www.oecd.org/education/skills-beyond-school/educationataglance2001-home.htm

Pangrazio, L., Godhe, A. L., & Ledesma, A. G. L. (2020). What is digital literacy? A comparative review of publications across three language contexts. *E-learning and Digital Media*, 17(6), 442-459. https://doi.org/10.1177/2042753020946291

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in human behavior*, 29(4), 1841-1848.

Quaglio, G., & Millar, S. (2020). *Potentially negative effects of internet use. In-Depth Analysis, Panel for the Future of Science and Technology.* Retrieved from EPRS | European Parliamentary Research Service. https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/641540/EPRS_IDA(2020)641540_EN.pdf

Robinson, F. P. (1946). *Effective study*, Rev. Harper.

Rosli, M. S., Saleh, N. S., & Omar, M. F. (2020). Technology-assisted cognitive augmentation: An OLE prototype to nurture cognitive skills in chemistry. *AIP*

Conference Proceedings, 2215(1), p. 020021). AIP Publishing LLC.

Shi, Y., Ma, D., Zhang, J., & Chen, B. (2021). In the digital age: a systematic literature review of the e-health literacy and influencing factors among Chinese older adults. *Journal of Public Health*, 1-9. https://doi.org/10.1007/s10389-021-01604-z

Simon, J. (1956). The Teaching of Reading and Writing: An International Survey. *The Elementary School Journal*, 57(2).

Syaharuddin, S., Mutiani, M., Handy, M. R. N., Abbas, E. W., & Jumriani, J. (2022). Putting Transformative Learning in Higher Education Based on Linking Capital. *Journal of Education and Learning (EduLearn)*, 16(1), 58-64. https://doi.org/10.11591/edulearn.v16i1.20373

UNESCO (2013). *Global coalition for a literate world. Discussion paper*. Paris: UNESCO. Retrieved from http://ttunesco.files.wordpress.com/2013/01/global-coalition-for-a-literate-world_5-august-2013-clean-version.pdf.

UNESCO (2018). *Literacy*. (2018, March 19). Retrieved from https://en.unesco.org/themes/literacy

United Nations. (2019). *The Age of Digital Interdependence, Report of the United Nations Secretary-General's High-level Panel on Digital Cooperation*. Retrieved from https://digitallibrary.un.org/record/3865925

Van Deursen, A. J., & Van Dijk, J. A. (2014). *Digital skills: Unlocking the information society*. Springer.

Van, L. H., Li, C. S., & Wan, R. (2022). Critical reading in higher education: A systematic review. *Thinking Skills and Creativity*, 44, 101028. https://doi.org/10.1016/j.tsc.2022.101028

Yin, Z. H., & Choi, C. H. (2022). Does digitalization contribute to lesser income inequality? Evidence from G20 countries. *Information Technology for Development*, 1-22. https://doi.org/10.1080/02681102.2022.2123443

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