

# FORMATION OF A DIGITAL EDUCATION MODEL IN TERMS OF THE DIGITAL ECONOMY (BASED ON THE EXAMPLE OF EU COUNTRIES)

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**Abstract.** The *relevance* of the study is that the digital challenge is important and stimulating, requiring the formation of digital education in the digital economy. The *purpose* of the article is to develop a model of digital education as a factor of improving the efficiency of digital competencies that contribute to the development of the digital economy. The *object* of research is the formation of a digital education model as a factor in the implementation of digital literacy. The *subject* of the study is the impact of the digital education model on the development of the digital economy. The *methodology* for researching digital education, which cultivates a smart economy, smart governance and smart people, is represented by the Agile methodology (flexible adaptive), based on the use of the values of artificial intelligence and deep learning, which can create effective tools for education, increasing their effectiveness through rapid change. *The results of the study:* 1) analyzes the formation of digital competencies in the context of the European educational paradigm that contribute to the development of the digital economy; 2) identifies the directions of implementation of digital competencies in the context of the European educational paradigm; 3) reveals digital tools and educational platforms that contribute to the formation of digital education; 4) formulates the concept of quality, inclusive, accessible digital education as a factor in improving digital competencies and adapting education to the digital age; 5) traces the impact of digital education and digital competencies on the development of the digital economy. The concept of digital education contains both its potential and its risks, which can have serious consequences for the future of the educational process if digital literacy is not developed. The combination of four factors – cultural change, technological innovation, national policy leadership and internal development of the digital education system – stimulates the digital transformation of society.

**Key words:** digital education, digital competencies, digital education model, European paradigm, digital skills areas.

**JEL Classification:** A10, B10, O10, P10, P10

## 1. Introduction

The relevance of the topic is that the digital challenge is important and stimulating, as it changes not only access to knowledge, but also knowledge itself, which contributes to the development of the digital economy. The goal of digital education is to promote the success of all students and prepare them to be educated citizens. The basis of the digital education model in the digital economy is the

formation of digital literacy, which requires the selection of digital tools, the development of professional digital skills, control of the digital work environment, the use of ICT and its use in digital education will contribute to the development of digital literacy, which will make the formation and development of the digital economy impossible. The formation of the digital education model in the digital economy is a trend in the development of future

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educational innovation and transformation; a process that emphasizes technology to promote educational innovation and transformation, as well as its impact on the development of a digital society. Now, in the process of building the new ecology of the digital economy, under the background of building a high-quality education system and the catalyst of the external pressure of COVID-19, the digital transformation of education is facing a growth opportunity. However, there is still a certain gap between the current practice of digital transformation of education and the expected value orientation, so it is necessary to develop a model of digital education in the digital economy. Therefore, it is necessary to pay attention to the relevant research on the digital transformation of education, and take a more proactive position to meet the wave of education reform in the world in the digital economy.

## 2. Literature analysis and problem statement

The article analyzes the formation of digital competencies necessary for the implementation of the tasks of the digital economy. The basis of the model of digital education in the digital economy is the formation of digital competencies. The works of Andriukaitiene Regina, Voronkova Valentyna and Nikitenko Vitalina played an important role in the analysis of these problems. "The concept of digital transformation of e-education in the European Union: European experience" (2021); Afanasieva Lyudmyla, Oleksenko Roman. "Interculturality as a successful model for the development of a multicultural urban community" (2018); Voronkova Valentina, Nikitenko Vitalina. "Smart education in the digital age: from smart education to smart business" (2022), where digital education is presented as the education of an intelligent society that cultivates a smart economy, smart governance, and a smart person, as well as in the work of Oleksenko Roman; Molydychenko Valentin and Sherbakova Nina (2018) "Neoliberalism in Higher Education as a Challenge for Future Civilization". To clarify the directions of digital literacy in the digital economy, the works of Valentyna Voronkova, Vitalina Nikitenko, Vlada Bilohur, Roman Oleksenko, Taras Butchenko were used. "The conceptualization of smart-philosophy as a post-modern project of non-linear pattern development of the XXI century" (2022) by Voronkova Valentina, Kyvliuk Olga. "Philosophical reflection of smart-society as a new model of the information society and its impact on the education of the XXI century. Future Human Image. Future Human Image" by Buhaychuk Oksana, Nikitenko Vitalina, Voronkova Valentyna, Andriukaitiene Regina, Malyshev Myroslava. Interaction of the digital person and society in the context of political philosophy ("Interacción persona digital y sociedad

en el contexto de la filosofía política. Cuestiones políticas" (2022)), in which the digital economy is presented as one that cultivates digital literacy. In other words, digital education is the use of digital tools to enhance or change the educational experience. To analyze the formation of a digital model of education as a factor in improving the effectiveness of digital competencies, the work of Oleg Panchenko was used. "Formation of sustainable digital economic concept: challenges, threats, priorities" (2019); Nikitenko Vitalina, Voronkova Valentyna, Andriukaitiene Regina, Oleksenko Roman. "The crisis of the metaphysical foundations of human existence as a global problem of post-modernity and the ways of managerial solutions" (2021); Nikitenko Vitalina, Voronkova Valentyna, Oleksenko Roman, Andriukaitiene Regina, Liudmyla Holovii (2022). "Education as a factor of cognitive society development in the conditions of digital transformation" (2022). In order to reveal the digital tools and educational platforms that contribute to the formation of digital education, it was necessary to turn to the analysis of the works of Nesterenko Olena, Oleksenko Roman (2020), "Social philosophical reflection of the individual legal education philosophy as a basis for the democratic society functioning" (2020) by Oleksenko Roman. "Human in the Information Society as an Object of Socio-Economic Reflection" (2017). The concept of quality, inclusive, accessible digital education as a factor of improving digital literacy and adapting education to the digital age was formed by analyzing the work of Cherep A., Voronkova V., Cherep O. (2022). "Humanocracy as a factor of improving human resources management in organizations" (2022). Based on the current state of research, digital technologies can revolutionize the implementation of digital education tasks. These include digital learning, IoT and cloud computing for decision-making, data-driven optimization, and the adoption of digital education at all levels of the digital society and economy.

## 3. Purpose and objectives of the study

The purpose of the article is to develop a model of digital education as a factor in improving the efficiency of digital skills that contribute to the development of the digital economy. Objectives of the study: 1) to analyze the formation of digital competencies in the context of the European educational paradigm that contribute to the development of the digital economy; 2) to find out the directions of implementation of digital competencies in the context of the European educational paradigm; 3) to reveal digital tools and educational platforms that contribute to the formation

of smart education; 4) to formulate the concept of quality, inclusive, accessible digital education as a factor in improving digital competencies and adapting education to the digital age; 5) to trace the impact of digital education and digital competencies on the development of the digital economy. The object of the study is the formation of a digital education model as a factor in the introduction of digital literacy. The subject of the study is the impact of the digital education model on the development of the digital economy.

#### 4. Research materials and methods

To develop a model of digital education as a factor of increasing the effectiveness of digital skills that contribute to the development of the digital economy, the Agile method and philosophy are used to analyze the digital transformation of education, based on the use of artificial intelligence and deep learning values that can create effective tools for education, increasing its effectiveness through the rapid changes. Digital education is based on Data Fabric methods that ensure flexible and sustainable data integration between platforms and business users; on the value of cloud platforms and autonomous systems; on the value of Decision Intelligence that combines data, social and management sciences for effective decision making in the context of the formation and development of the digital economy. The study is based on an axiological method that allowed to analyze the values of applications that expand the possibilities of adaptability; the values of hyper-automation that ensure accelerated growth and sustainability of the digital economy through the rapid identification, verification and automation of a large number of processes using BIG DATA; the values of computing that increase confidentiality, protect information at the level of data, software or hardware; the values of cybersecurity networks that ensure security. The leading approach in the study is a systems approach, which allows to show the development of digital education as a system consisting of interconnected subsystems that function as a whole, as well as to model the processes of digital education for the future. The system dynamics methodology and modern computing capabilities developed by the authors of the Club of Rome have contributed to the creation of high-quality, inclusive, and accessible digital education as a factor in improving digital literacy and adapting education to the digital age that will bring prosperity to all. To do this, it is necessary to rethink the way of understanding the world, behavioral and political models, to develop new trends and to model new development scenarios.

#### 5. Research result

##### 1. Digital literacy as a factor in the development of the digital economy in EU countries

Teaching through the integration of digital technologies is a stimulating challenge to draw the attention of governments and the public to the main problem of the modern digital world – the formation of digital education. Digital literacy is an important element of learning, professional integration and civic life in a society whose technological environment is constantly changing. The Digital Skills Reference Framework (DSRF) defines digital skills and levels of progressive mastery throughout the learning process, which are constantly changing over time. The digital skills defined in basic education in advanced European countries are the subject of national certification issued through the Pix online platform. The Pix certification allows the certification of a digital skills profile certified and recognized by the State and through the registration in the inventory of the National Commission for Professional Certification (CNCP). The platform provides students with a digital skills certificate at the end of the cycle. The Pix platform allows students to evaluate their progress through tests. Starting in 5th grade, students register on the free Pix platform where they can track their progress. Contracted public and private schools have a Pix Orga space where teams of teachers can create test paths for different digital skills, track students' results, and support them in acquiring skills until they receive a certificate. The Ministries of National Education, Youth and Sport and Higher Education, Research and Innovation have developed a Digital Skills Core Framework (CRCN) that applies from primary school to university.

Five Domains of Digital Skills. The Digital Literacy Framework consists of five domains and sixteen digital literacies. Eight levels of progressive mastery of these skills are proposed for students in school, for students in higher education, and for adult learners. Levels 1 to 5 are offered specifically for primary, middle and high school students. These digital skills are the subject of a certificate issued by the Pix platform at the end of the fourth cycle of middle school and the last cycle of high school. PE – College of Morcenx is implemented in school, college and high school. Digital literacy is taught and assessed in lessons that are linked to programs and a common base of knowledge, skills, and culture according to a standardized digital literacy framework. Levels of digital literacy are assessed on a scale defined by the reference system. Calendar of milestones. In Cycle 3, the digital skills achieved by students are recorded in the periodic assessment of the unified school system. At the end of Cycle

4, all students receive a digital literacy certificate. The certificate is recorded in the student's school record. An accompanying document introduces the Digital Skills Reference Framework, with appendices describing the levels of proficiency and suggesting ways to implement it.

All levels and courses of digital education mobilize digital tools and resources that contribute to the development of digital literacy. The development of digital literacies is part of a long-term process that requires consideration of prior knowledge, progression through cycles and levels, and integration of the use and creation of digital literacies into learning approaches. Various bodies are mobilized to develop a course of study that is integrated into the project of a school, institution or network. Educational institutions rely on an accompanying document with relevant content and the formation of a digital culture in schools or institutions. Teams of Regional Academic Delegations for Digital Education (DRANE) and Academic Delegations for Digital Education (DANE), digital consultants (1st degree digital reference teachers, 2nd degree digital reference teachers) can be mobilized to support this work. Special attention is given to the activities carried out in Cycle 3, especially in the context of school-college links. Starting from Cycle 4, Pix Orga tools can be used to develop a skills-based approach to work and a learning pathway. At the academic level, local authorities and various partners are involved in creating a working environment conducive to the acquisition of these skills.

In Cycles 2 and 3, progress is monitored by mobilizing the tools available in the institutions (single school document, digital workspace, skills management software, portfolios). Particular attention will be paid to the accessibility of these services. The level of digital literacy mastery achieved by students in each of the five areas of the Digital Literacy Framework is recorded in a periodic school report card. The purpose of tracking digital literacy proficiency is to keep students and parents informed of the level of proficiency achieved. In addition, these elements allow teachers to build a learning path based on previous learning. It is important that assessment encourages and supports learning. Teachers are encouraged to take note of the most recent CM2 periodic report to determine student performance and identify the most appropriate instructional strategies. In secondary schools, this part of the Unified School Record (USR) can be completed a priori by any member of the teaching staff for each student. The school director will ensure that the educational council appoints a teacher to coordinate this task.

In the 4th Cycle and in secondary school from the 5th grade, students can register on the Pix platform

where their progress is regularly monitored. They train individually or in campaigns defined by teachers. The platform offers teachers a Pix Orga space for each institution, created as a dashboard for monitoring education, in order to: 1) choose test routes adapted to learning objectives through campaigns organized by skills; 2) assess students' digital skills with real-time monitoring of their participation; 3) analyze results by viewing them through the dashboard (success and failure rates for each question, for each skill, on an individual or collective scale, etc.); 4) prioritize learning needs, both individual and collective. Public and private colleges and schools certify students in the fourth and final Cycle (Resolution of August 30, 2019). All colleges and schools are considered accredited institutions for certification. Students must have previously created their digital skills profile on the Pix platform by obtaining at least level 1 (maximum level = level 8) of the five skills in the reference framework (maximum number = 16 skills). No other prior certification, diploma or training is required. It is important that all students create a Pix account. The certification test is customized for each candidate. Its purpose is to test the Pix skill profile by performing positioning tests on your Pix account for free. The official certification test takes 2 hours. Schools organize the certification according to the information circular and Pix certification centers. The Pix certification is recorded in the Unified School Record (at the end of the 4th Cycle) or in the High School Record (at the end of the last Cycle) to certify the level of proficiency achieved by the student. It does not affect the acquisition of a national diploma or a bachelor's degree. The National Curriculum is part of the Master Plan for Professional Development. Its strategic mission is to carry out training activities, in close collaboration with academic training services, to ensure the formation of digital competencies (skills) that are a factor in the development of the digital economy.

#### *2. Digital literacy programs for digital education*

The development of a digital education model as a factor in improving the effectiveness of digital literacy contributes to the development of the digital economy. Therefore, a model of effective professional development of teachers using digital technologies should be developed to improve teaching practice. Various international organizations have developed programs for the implementation of digital literacy of digital education:

1. Digital Technologies for Teaching (T4T) is a World Bank program that helps countries implement effective teacher professional development programs that use technology solutions to train and support teachers.

2. Refugee Education Development Program. The UNHCR Refugee Education Report 2022, based on data from more than 40 countries, provides

a clear picture of the state of refugee education. The document shows how refugee children and youth lag behind their peers in access to inclusive, quality education.

3. Learning Management Systems for Education. The World Bank has developed guides on specific EdTech topics aimed at providing digital education knowledge to improve digital learning skills. The Learning Management Systems (LMS) program is designed to serve as a starting point in the decision-making process to determine the best course of action for selecting and implementing an online learning platform. ProFuturo was highlighted as an example of good practice in the selection process for a new digital educational resource platform, including design, development, piloting and information gathering to ensure appropriate selection. The knowledge package includes teacher competencies and competency frameworks for distance and blended learning. ProFuturo was selected as an example of a framework that details what teachers need to know and do to improve their roles and develop their digital skills.

4. The Global Coalition for Education's transformative innovation program in action. This document, published by UNESCO as part of the Digital Education Transformation Summit, presents a new global collaborative model promoted by the Global Coalition for Education (GCE). The program is based on a methodology that mobilizes actors and resources needed to develop proactive responses, coordinates actions to maximize impact and ensure efficiency, and provides opportunities for distance learning through a variety of high-tech, low-tech, and non-tech solutions. ProFuturo is mentioned as a partner of the Global Education Coalition (GEC) through its collaboration with the Global Learning House (GLH), which provides free supplemental educational resources for recovery programs to reduce learning gaps created during COVID-19, and provides teachers with resources to improve their pedagogical knowledge and practices using information and communication technologies (ICT).

5. Consultation programs on digital technologies and digital education in the 2023 GEM report in June, the International Teachers' Task Force on Education 2030 and the Global Education Monitor (GEM) team held a consultation meeting to gather feedback and input on the proposed research areas for the 2023 Education Technology Report. The consultation focused on how education systems can help teachers effectively use and manage digital technologies, as well as the barriers they face.

6. The UN Summit on Education Transformation collected examples of good practices in education that contribute to the achievement of the SDGs, discussing the challenges of digital education and

digital skills and the process of their implementation. ProFuturo was selected as an example of good practice for its innovative approach to digital education, which defines the digital environment in education as a space structured by different technological tools that allow users to access digital resources and services, the digitization of knowledge, artificial intelligence technologies and their application to education.

Digital technologies are seen as tools that help build digital literacy, create knowledge using digital technologies, and contribute to the development of digital education. Digital education is about the approach to these tools, the thoughtful use of digital tools, and the impact of digital tools on learning. These "digital tools" can range from a PowerPoint presentation to full MOOCs, including flipped classrooms. It can include blogging assignments, using social media in the classroom, creating curriculum, and using digital tools to test ideas. It is an attempt to transform teaching and learning through the thoughtful use of digital technologies. As such, it is primarily a critical pedagogical approach that uses digital tools in the classroom and explores their impact on education.

Digital education encourages teachers to give students the space they need to work independently and creatively, inviting them to create products that demonstrate "their own learning" as well as products that demonstrate knowledge. This emphasis on critical and independent thinking links digital education to the ideas of constructivism: students learn best when they are active participants rather than passive recipients of knowledge. Learning is a social process, and the goal of teaching and learning is to provide students with a series of experiences that facilitate their connections and knowledge construction. The process of digital education itself revolves around three main ideas: collaborative learning, free will, and transformative learning.

3. *Educational platforms as factors in the formation of digital education and digital literacy*

The following can be distinguished between educational platforms as factors in the formation of digital education and digital literacy. Educational platforms as factors in the formation of digital education consider the content, including concepts and skills, methods that they can use to achieve content goals. Educators decide which technology can support content and instruction by asking three important questions: What will students learn, or what knowledge can they gain? What method(s) will help students achieve these goals? What tools and resources will students need to be successful? The use of technology can force teachers to see knowledge as dynamic and to rethink their role as interactive rather

than prescriptive, finding opportunities for students to drive learning:

1. Kahoot is an educational platform that offers question-based games. With this educational tool, teachers can create quizzes, discussions, or polls to supplement classroom instruction. The material is projected in the classroom, and students answer questions as they play and learn, promoting game-based learning, increasing student engagement, and creating a dynamic, social, and fun learning environment.

2. ClassDojo is a digital classroom tool that improves student behavior by giving teachers instant feedback to their students and rewarding good classroom behavior with points. The program provides students with real-time notifications such as "Bravo, David!" and "+1" for collaborative work. The collected information on student behavior can later be shared with parents and administrators via the Internet.

3. Edmodo is an educational tool that brings teachers and students together and is similar to a social network. It allows teachers to create online groups for collaboration, distribute educational materials, measure student performance, and communicate with parents.

4. Project is a digital tool that allows users to create multimedia presentations. It also has dynamic slides where students can include interactive maps, links, online quizzes, Twitter graphs, and videos, among others. During class, teachers can share academic presentations with students that are visually customized for different devices.

5. Padlet is a digital bulletin board that allows participants (students and teachers) to post by attaching various images, videos, text files, links, etc.

6. Padlet software tools motivate students to collaborate and think as a team, so customize the background and control who has access to the table. The biggest benefit of all these changes is that today's students are going into the future with open minds and unlimited possibilities.

#### *4. High quality, inclusive and accessible digital education as a factor of adaptation to the digital age*

The word "digital" is both a noun and a polysemous adjective with multiple meanings. The Larousse dictionary states that digital is the representation of information or physical quantities by means of symbols, such as numbers, or by means of signals with discrete values. It refers to systems, devices, or processes that use this form of discrete representation, as opposed to analog. The term has become established in technical and scientific literature. Digital refers to all programs that classify, sort, and distribute data. This term includes interfaces, smartphones, tablets, computers, televisions, and networks that transmit data. Digital technology is a whole that includes tools, content, and use.

Digital practice is a specific human activity in socio-technical environments based on information and communication technologies. As digital information becomes more accessible, students are confronted with a mass of data whose relevance is difficult to assess. They learn to critically analyze information from the media. The blog helps build social cohesion in the group and encourages authors to create and share. Studies have evaluated three educational uses of a blog: 1) teaching students project management; 2) written expression in a foreign language; 3) peer support and assistance for new teachers.

The Digital Agenda for Education (2021–2027) is an updated policy initiative of the European Union (EU) that sets out a common vision for high quality, inclusive and accessible digital education in Europe and aims to support the adaptation of Member States' education and training systems to the digital age. The action plan, adopted on September 30, 2020, is a call for greater cooperation at the European level in the field of digital education to overcome the challenges and opportunities of the COVID-19 pandemic, to present opportunities for the educational and professional community (teachers, students) at the national, European and international levels. The Digital Education Framework (2021-2027) promotes the development of digital education and digital literacy for the next generation, with the aim of creating a more sustainable, digital and resilient European Union (Nikitenko, Voronkova, Andriukaitiene, et al., 2021).

The concept of digital education is a key factor in the realization of the European Education Area by 2027. It contributes to the objectives of the European Skills Plan, the European Social Action Plan and the Digital Compass 2030: The European Way for the Digital Decade. The Commission has established the European Digital Education Center, which has strengthened cooperation and exchange in the field of digital education at EU level. The digital transformation has transformed society and the economy, having a deeper impact on everyday life, and has demonstrated the need for higher levels of digital literacy in education and training systems and institutions. The COVID-19 pandemic has accelerated the trend towards online and hybrid learning, opening up new and innovative ways for students and teachers to organize their teaching and learning activities and to interact more flexibly online. These changes have required a determined and coordinated effort at the EU level to support education and training systems in addressing the challenges identified and exacerbated by the COVID-19 pandemic, while at the same time providing a long-term vision for the European digital education pathway (Nikitenko, Voronkova, Oleksenko, et al., 2022).

A 2018 study by the Organization for Economic Cooperation and Development (OECD) found that,

on average, less than 40% of educators across the EU feel ready to use digital technologies in learning, with differences between EU Member States; more than a third of 13- and 14-year-olds participating in the 2018 International Computer and Information Literacy Study (ICILS) lacked basic digital skills; a quarter of low-income households do not have access to computers and broadband, with differences across the EU affected by household income (Eurostat, 2019); 95% of respondents to the open public consultation on the Digital Education Action Plan believe that the COVID-19 pandemic marks a turning point in the use of technology in education and training. The concept of digital education encompasses both its potential and its risks, which have serious implications for teachers, researchers, educational staff and students. To ensure that these risks are taken into account, it is necessary to define a legal and regulatory framework for digital technologies that guarantees transparency, non-discrimination, accountability, data protection, intellectual property, cybersecurity, democracy, and freedom of action and choice. Such an approach is essential to facilitate the development of the full potential of digital education in the digital age (Nesterenko, Oleksenko, 2020).

##### *5. The impact of digital education and digital literacy on the development of the digital economy*

With the deepening of the Fourth Industrial Revolution, new generation digital technologies such as big data, artificial intelligence and blockchain have been vigorously developed and applied, and the development of human society has comprehensively entered the digital era. The programs of EU countries have developed a comprehensive digital development deployment to accelerate the pace of building a digital society, adapting to the new trend of digital technologies integrated into the digital society. Digital transformation has become a revolutionary force for countries to promote the modernization process and achieve effective governance. The share of digital transformation in global GDP is growing, and it has become a stabilizer of the economic downturn in the post-epidemic era. Although digital transformation has given a new impetus to global economic digital development, it requires joint construction, education management. Digital transformation has safeguarded the continued growth of the global economy, but the huge difference in the speed of transformation has also created new development challenges. To promote the coordinated development of the digital society, it is necessary to strengthen coordination and cooperation among different countries, governments and markets to achieve higher quality, more equitable and sustainable development based on digital innovation, so that the results of digital transformation can truly benefit ordinary people. The digital divide creates

new inequalities as it becomes a barrier to digital use due to insufficient digital access opportunities, such as the Internet (Oleksenko, 2017). All this can lead to a new digital divide. For example, the lack of digital skills among the elderly, the lack of digital education in remote rural areas, the problem of teenagers addicted to the Internet, the income gap caused by the level of digital literacy. The grand design of the digital society is gradually becoming a reality. The digital era has brought new meaning to people and the environment. Digital transformation is the innovation of production methods, which has led to digital operations can be organized and managed through "one-stop shopping", "digital twin city" and "digital earth model". Big Data is a new stage in the development of informatization, the full realization of a new concept of progress. Information technologies and their application in all aspects of economic and social development contribute to data (information) becoming an important strategic resource after material and energy resources. Digital education lays the foundation for realizing the acquisition and accumulation of data resources; the network construction platform facilitates the circulation and aggregation of data resources; the possibilities of intelligent display through data integration and analysis represent digital intelligence. The digital economy refers to a set of economic activities with digital knowledge and information as key production factors, a modern information network as an important carrier, and the effective use of information and communication technology as an important driving force to improve efficiency and optimize economic structure. Large data resources and advanced big data technologies are necessary conditions for promoting the development of the digital economy in the new stage of informatization (Cherep, Voronkova, et al., 2022).

## **6. Conclusions**

Digital education in Europe promotes public-private partnerships and integrates digital skills into the overall mission of education and teaching methods. At the same time, digital literacy is far from being able to secure the digital economy, as it is only one component of a complex ecosystem aimed at ensuring the proper use of digital technologies and quality education for all. Despite the desire to innovate in their teaching methods, including through digital technologies, appropriate training opportunities for teachers and researchers remain insufficient. Initial teacher training programs are often outdated and do not provide teachers with the digital skills that should be integrated into their teaching methods. Digital literacy can serve as a complementary learning tool and should not be seen as a cheap alternative to high-quality initial teacher

education and professional development. Digital educational tools should be designed and used in the best way to meet the specific professional and educational needs of students, teachers and researchers, while respecting professional autonomy and academic freedom of teaching, so that teachers and students, especially those from the most vulnerable groups, have equitable access to digital technologies and ICT tools. To achieve this goal, national governments need to plan sustainable public investments that have an impact and are effective enough to meet the pedagogical needs of teachers, researchers, educational staff and students. significant

contribution to digital tools and software. In order to achieve this goal, national governments need to plan sustainable public investments that have an impact and are effective enough to meet the pedagogical needs of teachers, researchers, educational staff and students. significant contribution to digital tools and software. The availability of digital technologies creates a common set of services and architectures to host complementary products, including digital artifacts, digital platforms help generate ideas, identify and allocate resources, exploit digital market opportunities, gather information, and create innovations to meet the growing needs of users.

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