DEVELOPING DIGITAL COMPETENCES OF PUPILS AND STUDENTS

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Abstract: The paper focuses on developing digital competences of pupils and students. In the context of technological development in recent decades, as well as the phenomenon of globalization, determining the key competences necessary for the training of any citizen in order to successfully adapt to a rapidly evolving world, characterized by a high level of interconnection, has become a necessity. Key competences for lifelong learning represent a combination of knowledge, skills, abilities and attitudes appropriate to each context and are necessary for personal fulfillment and development, for social inclusion, active citizenship and employment, guaranteeing more flexibility in the workforce, allowing it to adapt more quickly to changes in today's world. They also represent a major factor in innovation, productivity and competitiveness and contribute to employee motivation and satisfaction, as well as to the quality of work.

Keywords: digital competences, lifelong learning and training, education system, skills, knowledge

1. Introduction

In the context of the rapid development of information technology and the characteristics of the labour market, digital literacy is recognised at European Union level as an important part of functional literacy, mastery of digital technology being essential for both personal and professional life. The European Parliament Recommendation on key competences for lifelong learning mentions digital competence as one of the key competences that must be developed throughout life. Digital competence is the confident, critical and responsible use of digital technologies, as well as their use for learning, at work and for participation in society. It is important the need to encourage, support and increase the conscious use of digital and innovative educational practices, with the first two priorities being: better use of digital technology for teaching and learning and the development of digital skills and abilities relevant to digital transformation.

Today, educational institutions contribute more and more to shaping the personality and cultivating its traits. The teaching staff must be animated by a strong receptivity to everything that is new and important in their specialty and in pedagogy, and in practice demonstrate a continuous effort towards self-improvement, in order to meet educational objectives. The use of interactive teaching-learning-evaluation methods in teaching activity contributes to improving the quality of the instructional-educational process, having an active-participatory character and a real active-formative value on the student's personality. Interactive methods are attractive because they stimulate the active involvement of the student in carrying out the didactic task; stimulate initiative; ensure good practical application of knowledge, skills and abilities; ensure an interactive approach to the teaching-learning-evaluation act; capitalize and stimulate the creative potential, act on the critical thinking of students; students become responsible in solving the tasks set before them; develops free communication between students.

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In the context of technological development in recent decades, as well as the phenomenon of globalization, determining the key competences necessary for the training of any citizen in order to successfully adapt to a rapidly evolving world, characterized by a high level of interconnection, has become a necessity. Key competences for lifelong learning represent a combination of knowledge, skills, abilities and attitudes appropriate to each context and are necessary for personal fulfillment and development, for social inclusion, active citizenship and employment, guaranteeing more flexibility in the workforce, allowing it to adapt more quickly to changes in today's world. They also represent a major factor in innovation, productivity and competitiveness and contribute to employee motivation and satisfaction, as well as to the quality of work.

2. Key competences for lifelong learning and training

In this context, a genuine European training profile is emphasized, which targets eight key competences, equal in importance and interdependent, as follows: communication in the mother tongue; communication in foreign languages; mathematical competences; basic competences in science and technology; digital competence; learning competences; sense of initiative and entrepreneurship; social and civic competences, cultural awareness and expression. Digital competence is part of the eight key competences and represents a composition of knowledge, skills, attitudes and values, formed and developed through learning, "which can be mobilized to identify and solve the characteristic problems that arise in the process of accumulating, storing, processing and disseminating information, through the tools offered by information technologies". (Creeber and Martin 2021, p.102) Digital competence involves the critical and responsible use of media and communication in education, work and leisure, with a particular emphasis on the development of critical thinking, communication skills and information management at high standards. The components that make up a digital competence are:

• Knowledge: understanding and awareness of the nature, role and opportunities of Information and Communication Technologies (ICT) in everyday contexts.

• Skills: the ability to search, collect and process information, to use it in a critical and systematic manner, skills to use digital tools to produce, present and understand complex information, the ability to access, search and use Internet services.

• Attitudes: critical and reflective attitude towards available information, responsibility in the use of interactive media, interest in involvement in communities and networks for cultural, social and/or professional purposes.

It is considered that at the basic level, the information technology skills that a person must possess are the use of multimedia technology to receive, evaluate, store, produce, present and exchange information; communicate and participate in networks via the Internet, etc. In this context, "the training and development of digital skills in students, as well as their renewal in users from any field, has become a vital necessity of today's society". (Gere 2020, p.56)

The European Commission has designed the European Digital Competence Framework for Citizens (DigComp), structured around five domains: "digital and information literacy, communication and collaboration, digital content creation, safety and problem solving. The five domains comprise 21 competences". (https://ec.europa.eu/jrc/sites/jrcsh/files/DIGCOMP-FINAL-%20UPDATED% 2002-06-2016.pdf)

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In essence, the DigComp framework identifies 21 areas of competence included in the five key domains, which describe what it means to be digitally literate. Citizens need to be competent in each of these domains in order to achieve goals related to work, employment, learning, leisure and participation in social life. DigComp acts as a common reference tool, allowing people to measure their digital competence and identify gaps in knowledge, skills and attitudes in the five key domains. The DigComp framework is used in most European countries to plan and deliver digital training studies, as it is flexible and can be adapted, depending on the needs, so that it can develop its own digital competence tests.

3. The Romanian education system

The Romanian education system operates with the eight European key competences, digital competence being one of them. “Digital competence involves the confident, critical and responsible use of digital technologies in learning, work and social participation contexts”. (Gilster 2021, p.98) It includes digital literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including online well-being/comfort and cybersecurity skills), respect for intellectual property, problem solving and critical thinking.

The development of key competencies in pupils and students must take into account the training profile of the graduate, at the different levels of study, a profile that represents a regulatory component of the National Curriculum and describes the expectations expressed towards graduates.

According to the educational policy document "Benchmarks for the design and updating of the national curriculum", approved by Order of the Minister of Education and Research no. 5765 of October 15, 2020, the training profile of the pre-university education graduate, from the point of view of the description of possession of key competencies - respectively digital competencies, is presented as follows:

Elementary level (at the end of primary education)	**Functional level** (at the end of compulsory education)	**Developed level** (at the end of upper secondary education)
Solving simple learning tasks using familiar digital devices and applications, which assume simple functions and rules of use.	Solving various learning tasks by confidently using digital devices and applications according to their operating rules.	Creative problem solving, which involves the organization of data, information and digital content, using devices, digital applications and networks, according to the principles and mechanisms of their operation.
Showing curiosity for accessing and creating simple digital content that addresses specific learning needs.	Demonstrating interest in accessing, creating and sharing diverse digital content that addresses specific learning needs.	Demonstrating interest in the development of digital content and the use of new technologies, including those that leverage artificial intelligence, in response to specific learning needs.

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Using digital devices in compliance with simple rules aimed at physical and social-emotional safety.	The responsible and safe use of digital technologies, by following the rules regarding the construction and protection of identity in the digital environment and by critically reporting on the advantages and risks in the online environment.	The critical use of digital technologies, by analyzing the opportunities, limitations and risks they involve and by respecting ethical and legal principles, which target personal data and intellectual property.
Applying simple rules of collaboration and interaction in the online environment.	Demonstrating active citizenship through interactions and collaboration in digital environments.	Active participation in the knowledge society by using new technologies as an environment to support digital citizenship.

https://www.educred.ro/resurse-cred/

Table 1. Graduate profile – by competency levels – digital competency

Graduates of bachelor's or equivalent university studies, regardless of the fundamental field of the bachelor's cycle completed, need to acquire specific skills in the field of digital techniques. The digital skills that students can acquire upon graduating from a digital skills course are:

- skills regarding the creation of digital materials and the results of their application;
- new ways of using digital techniques in teaching, including by participating in online courses, creating materials in collaboration with students, individually and in groups, as well as using social networks;
- skills regarding distance communication and interactive participation, including by using the feedback method in training;
- skills regarding the use of online resources for promoting interactive multimedia teaching materials, the use of automation tools for taking over digital content and publishing on social media platforms and optimizing promotion through search engines and learning through the use of digital technologies.

Regarding the curricular approach to digital competence, at the European level, in most countries, digital competence is developed as a cross-curricular theme in primary education. “At upper secondary level, the number of countries where digital competence is taught as a cross-curricular theme decreases slightly’. (Hafner, Miller 2021, p.63) Compared to lower secondary education, there are fewer countries that offer separate compulsory subjects for all students in this area.

In Romania, digital competence is generally included in the curriculum as a separate subject, compulsory for secondary education (lower secondary and high school and vocational), respectively optional (for primary education). Thus, since 2005, Information and Communications Technology (ICT) is a compulsory subject for all tracks, profiles and professional specializations/qualifications, in high school and vocational education, with 1-2 hours allocated in the curriculum framework. Informatics, as a compulsory subject, is studied in high school, in the mathematics-informatics and intensive computer science classes.

By the National Education Law no. 1/2011, with subsequent amendments and additions, Information and Communications Technology is provided to be introduced as a compulsory subject in middle school and as an optional subject in primary education (art.68). By OMENCS 3590/05.04.2016, the Curriculum Framework for Middle School

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was approved, which provides for the introduction of the subject of Informatics and ICT as a compulsory subject in middle school from the following school year, with one hour allocated per week. In the process of curricular development for all subjects in middle school, the school curriculum for the subject of Informatics and ICT was also developed (approved by Order MEN no. 3393/28.02.2017). The general competences of this subject are in line with the key competences expressed as targets in the Europe 2020 strategy for Education and Training 2020 (ET 2020) for European cooperation in vocational education and training, with common strategic objectives for the Member States.

Regarding the minimum number of hours recommended for the study of this subject in the compulsory curriculum, in Romania it is placed at the average level of European countries at the level of lower secondary education - gymnasium, while at the level of upper secondary education - high school and vocational education it seems to be the highest number of hours allocated to ICT (digital skills) as a separate compulsory subject in the curriculum.

However, for secondary education, the school curriculum is overloaded and sometimes exceeds the comprehension power of secondary school students. At the same time, it is necessary to update the school curriculum for the subject of Computer Science and ICT for high school education and correlate it with the new curriculum already completed by secondary school students. “The need to use modern methods in the teaching-learning-evaluation process must be emphasized, underlining the practical component, this being a generator of real experience in the use of technology”. (Livingstone 2019, p.78)

Pedagogical practices and the curriculum in the Romanian education system must be adapted to the current progress of technology and respond to the challenges that young graduates face when entering the labor market or arriving at universities. Most teachers mention that they rarely use technology in teaching, and when they do, they limit themselves to presentations projected using a video projector. Most students do not have access to a computer or a mobile device during classes, and when this happens, it is almost exclusively during Computer Science classes. “Nine out of ten students do not know any other way to access information than using a specific search engine”. (Martin 2021, p.54) Also, most teachers do not encourage students to use resources available on the Internet, nor do they systematically present reliable online resources (virtual libraries, educational platforms, online magazines, etc.).

Since computer skills are essential in today's society, most kindergartens in Romania have at least one computer that can be used in teaching-learning activities, as computer-assisted instruction further stimulates children's interest in new things. In kindergarten, the computer can be used several times a day: during the chosen games and activities stage, in optional activities or in activities carried out with the entire group of children, taking into account some recommendations and suggestions from specialists regarding the use of the computer as a beneficial element for the child's development, among which we mention the use of digital programs that help discovery, oriented towards learning.

“Half of European education systems are currently implementing curriculum reforms related to digital skills, given the dynamics of development of areas that require the use of digital technologies”. (Lessig 2021, p. 86) These reforms largely aim to introduce digital skills into the curriculum where they were not previously addressed or to give greater importance to this area. Some reforms are also intended to change the

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curricular approach, update content or strengthen certain areas, such as coding, computational thinking or security. The report also shows that reforms are often directly linked to the implementation of a digital education strategy.

Although perhaps not to the desired extent, in pre-university education in Romania digital competence is also developed as a cross-curricular theme, an example being vocational and technical education. Regarding the development of digital competence through non-formal activities, this is usually carried out in children's palaces and clubs (educational units for extracurricular activities).

Considering assessment as a key element of any education system, which can contribute to its overall improvement, it is important to analyze the relationship between digital education and the assessment and recognition of students' digital skills. At the European level, only two countries (Austria and Norway) test students' digital skills in primary schools. In lower secondary education, these skills are tested in a quarter of education systems, and the number increases to almost half at upper secondary education level, while half of the systems do not have a national testing of digital skills at school level. In Romania, since 2010, the digital skills of all high school graduates are assessed and certified by taking a mandatory test as part of the baccalaureate exam.

Since 2010, the results obtained in the ECDL exams, completed with the ECDL Start and ECDL Complete certificates, have been recognized and equated with the digital skills assessment test as part of the baccalaureate exam. Subsequently, the results obtained in the ECDL exams, completed with the ECDL Start BAC and ECDL PROFIL BAC certificates, and the results obtained in the CERTIPORT exams, completed with the IC3 GLOBAL STANDARD 4 certificate, are recognized and equated with the digital skills assessment test within the baccalaureate exam. It is worth noting that, at European level, of the education systems that include information about digital skills in the certificates awarded at the end of secondary education (ISCED 3), only three (Bulgaria, Malta and Romania) record this information in the certificates of all students. Some practitioners believe that this test within the national baccalaureate exam should also be eliminatory and have a minimum admission score. At the same time, the assessment of digital skills at the end of the 8th grade is also considered necessary, which should aim to test and validate basic digital skills.

According to the principle of obtaining concrete results in the case of any digital skills development programs, digital skills must be standardized, monitored and constantly updated, but also assessed through standardized testing. One option is the adoption and equivalence of European and internationally recognized digital skills frameworks and programs, with standardized testing and certification, given the existence of European skills frameworks (e.g. DigComp) and internationally recognized standard digital skills programs (e.g. ECDL), which have already proven their efficiency, which must be followed, applied and equivalent in the development of the digital skills profile for pupils and students. At the same time, it is necessary to use the online environment for national assessments, when the subjects would allow remote testing, respectively the development of a secure remote assessment and testing system.

From the evaluative research and studies conducted to identify the perceptions and opinions of respondents regarding access, mode of conduct, participation in school activities through technology and the internet, during the suspension of face-to-face classes, support needs and priority areas of intervention from central and local authorities and proposals to increase the efficiency of organizing the learning process,

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the following aspects result regarding the digital skills of students in pre-university education:

- teachers believe that, “for 68% of students, the insufficient level of digital skills represents a serious impediment to online learning”; (Prensky 2021, p.23)
- students start using the internet around the age of 9; almost all students use their smartphone to access the internet; “approximately 40% of students stated that they do not use the internet for a specific purpose”; (Rowles and Brown 2022, p.31)
- over a third of teachers believe that some students in the classes they worked with online did not demonstrate sufficiently developed digital skills, which would allow them to autonomously use various tools and applications - especially in rural areas and at primary and preschool levels of study;
- almost half of students in pre-university education believe that the school subject is no longer adapted to the current reality, and over a third believe that the school curriculum does not respond to the students' study interests;
- parents of middle school and high school students want IT/ICT classes for their children, and “approximately 1 in 3 parents of middle school students believe that IT should be taught as a priority during face-to-face classes; 67% of parents of middle school and high school students believe that they have the necessary knowledge to use devices”; (Watson 2023, p.24)
- two-thirds of students believe that they managed on their own in terms of participating in online lessons and activities, and a quarter needed help only at the beginning;
- difficulties in using technology are greater for students from rural areas and small urban areas than for students from large urban areas.

Although the assessments of students, parents and teachers regarding the digital skills of students are divergent, the need for their development, especially for primary school students, as well as for middle school students in rural and small urban areas, as well as the importance of the ICT discipline within the national curriculum, is still evident.

Simultaneously with the development of digital skills, the fulfillment of requirements such as: promoting inclusion, diversity and mental health must also be pursued. Digital training programs must also include the development of digital skills of parents, especially in rural areas/disadvantaged communities/for families with children with disabilities, necessary not only in terms of the support they can provide to children, but also as a method of re/qualification for the labor market.

4. Conclusions

In conclusion, it can be said that triggering sustainable, large-scale changes in terms of familiarization with technology, development, protection and continuous improvement of digital skills in students, requires joint efforts and focused actions, involving and engaging all stakeholders: learners, teachers, families, school managers, education decision-makers and local communities.

The change in the way the educational process is organized, namely, the transition from a traditional teaching-learning-evaluation method to a modern interactive method, brings the concept of interactivity back onto the agenda of discussions and

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research in educational institutions. Currently, the educational process is oriented towards the formation and development of digital skills of the entire student contingent. Practically, any course can be supported by this teaching tool, for the purpose of professional growth of both the teacher and the student. The use of interactive technologies effectively leads to the development of digital skills. Studying the course unit Information Technologies is necessary for training students as specialists capable of operating in the changing and growing conditions of modern society and the needs of the labor market. Thus, the application of interactive information technologies is vital, as they increasingly contribute to the development of the educational process, making it more accessible, more interesting and more captivating. The interactive whiteboard is truly a relevant teaching tool that motivates us to carry out the instructional-educational process more qualitatively; the examples projected on the interactive whiteboard are more convincing than those displayed on the classic whiteboard. The lessons and activities carried out with the help of the interactive whiteboard increase the spirit of creativity.

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