DEVELOPMENT OF DIGITAL COMPETENCIES IN THE CONDITIONS OF SOCIAL DEVELOPMENT INFORMATIZATION

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Abstract

The article deals with the content and peculiarities of the introduction of the digital competencies concept, the prospects and advantages of the formation of a competent approach in the conditions of the information society. The article justifies that the active use of information technology in the educational process at all levels and directions enables the learning process to be more intense, complex and productive. In this context there were analyzed the "digital competency framework" where it was set out eight key competences: communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; sense of initiative and entrepreneurship; cultural awareness and expression. The paper discloses the stages of the development of a competent approach in European education, in particular on the example of Great Britain. The research gave the opportunity to conclude that the growing need to use modern computer technology in the workplace leads to the need for increasing computer literacy for most professions. That will be an important motivation factor for changing education system of Ukraine and its entry into the European educational space.

Keywords: digital competency, informatization, professional competence, information society, educational process.

INTRODUCTION

Rapid development of information technology that fundamentally changes the life of society is a characteristic feature of the last decade. Economic relations became extremely dependent on infrastructure information support, social relations moved from the sphere of purely direct interaction to the geographically and temporally remote due to the possibilities of digital space.

Such radical transformations require a new approach to understanding the consequences of these processes, the ability to adapt digital technology to the modern requirements of society, and to protect it from the negative manifestations of total informatization of social development.

Particularly important is the introduction of a competent approach to education as the basis of the link "science-research-innovation". Therefore, the objective of this article is to reveal the content and peculiarities of the introduction of the concept of digital competencies, to determine the prospects and advantages of the formation of a competent approach in the conditions of the information society. There is an attempt to study the stages of formation of a competent approach in European education, to carry out the analysis of "the framework of digital competence".

RESEARCH RESULTS AND DISCUSSION

Taking into account the time requirements towards expanded understanding and use of information technology in everyday and professional life, both in business processes and public administration lays the foundation for the progressive development of the ultimate national economy.

It is important to differentiate the notion of competencies from skills. The relation between competence and skills is defined in an OECD project as follows: "A competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context" [1]. That is, competency itself, not a simple set of knowledge or skills, determines the competitiveness of a person on the labor market.

The International Commission of the Council of Europe in its documents considers the concept of competency as general or key skills, basic skills, fundamental learning routes, key competencies, cross-curriculum skills, key perceptions, or background knowledge [2].

Combination of digital skills with social time requirements is an important condition for acquiring competencies.

Digital competence is a combination of knowledge, skills and attitudes, through technology, to perform tasks, solve problems, communicate, manage information, collaborate, create and share content effectively, appropriately, securely, critically, creatively, independently and ethically [3].

At the state level, improving the digital competency in all areas of functioning is a source of increased competitiveness of the country, since access to information, digital interactions and the intensity of use and improvement of information and communication technologies are the basic elements of almost all global competitiveness indices. As the UNESCO experts state, the notion of competence is identified as a combination of knowledge, skills, values and attitudes applicable in everyday life. [4].

Similar to IQ or EQ, that are being used for measuring the level of intelligent quotient and emotional intelligence, DQ (Digital Quotient) measures the digital skills, or digital intelligence.

DQ comprises 3 levels:

– "digital citizenship", that is, the use of digital technologies in everyday life for interacting with each other, communication, viewing digital content, etc .;

– "digital creativity", that is, the use of digital technologies for creating content, media, applications, etc.;

– "digital entrepreneurship", i.e. the use of digital technologies for business and professional activities, etc. [5].
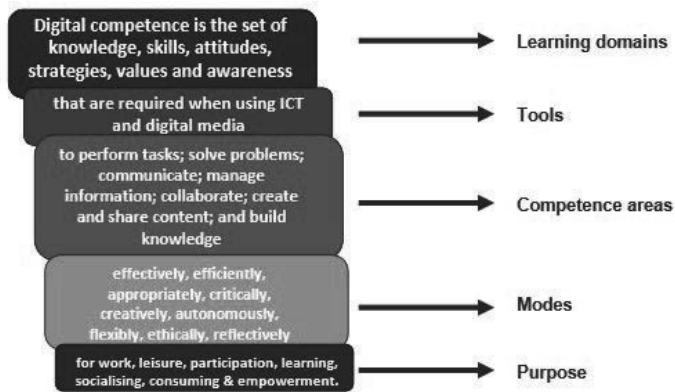
The definition of digital competencies is extremely complex and is explained by a set of determinants of the qualities of processes and properties that they must be characterized by.

The definition can be broken down into several building blocks, namely (Figure 1):

– learning domains;

– tools;
– competence areas;
– modes;
– purposes.

Training of skilled personnel should take into account the requirements of employers within the framework of new organizationally distinct forms of study. It is the implementation of the dual training system that opens up new perspectives in improving the efficiency of engineering education.

Figure 1. Parts of the definition

Source: [6]

Dimension 1: Competence areas identified to be part of digital competence. There were defined areas: 1) information and data literacy; 2) communication and collaboration; 3) digital content creation; 4) safety; 5) problem solving.

Dimension 2: Competence descriptors and titles that are pertinent to each area. There were defined 21 competencies.

Dimension 3: Proficiency levels for each competence. There are 4 main levels (foundation, intermediate, advanced and highly specialized) and their decompositions. Each level represents a step up in citizens' acquisition of the competence according to its cognitive challenge, the complexity of the tasks they can handle and their autonomy in completing the task.

Dimension 4: Knowledge, skills and attitudes applicable to each competence.

Dimension 5: Examples of use, on the applicability of the competence to different purposes. There were provided scenarios for two areas of use: employment and learning.

Since education remains the initial basis for the acquisition of digital competences, it is worth examining in more detail the peculiarities of its development in the context of facilitating the acquisition of these competences by pupils and students in Europe, the possibilities of adapting the experience of European countries in Ukraine.

The active use of information technology in the educational process at all levels and directions enables the learning process to be more intense, complex and productive. The combination of traditional techniques with modern interactive means is understandable and natural for the 21st century.

The European Union is active in expanding the ideas of informatization of development and the growth of professional competences, as reflected in such initiatives on the development of the "digital" economy:

– An Integrated Industrial Policy for the Globalisation Era Putting Competitiveness and Sustainability at Centre Stage [8];

– A Digital Agenda for Europe [9];

– The Entrepreneurship 2020 Action Plan [10] and many others.

These strategic documents contain the principles of development of professional activity on the basis of digital competences acquired by a person throughout the life, since the realized human potential is the source of the formation of values in the conditions of the information society.

As it is mentioned in [11], "Education forms the basis for a creative and productive workforce that drives R&D and innovation and is able to steer technological and digital developments, rather than react to them; education and training equip people with the skills they need on the labour market and enable them to respond to changing circumstances and structural change or disruption; education, training, re- and up-skilling help to smoothen the transition between jobs; education and training give people the chance to create jobs themselves; a highly-qualified and flexible workforce forms the backbone of a resilient economy that deals with shocks well and plays a pro-active role in the global economy".

Strategy "Europe 2020" [12] is aimed at transforming approaches to the functioning of European countries. The document identifies three main areas for achieving this goal, namely:

– intellectual growth (promoting knowledge, innovation, education and digital society);

– balanced growth (promoting industry development, increasing competitiveness);

– inclusive growth (raising the level of employment of citizens of European countries, acquiring appropriate skills that would correspond to the modern labor market, combating poverty).

A reference point for educational institutions in most European countries has long been the creation of a basis for the learning outcomes not to be mastered by certain tools for solving a problem, but for pupils' achievement of integrated competencies of a critical, creative and adaptive approach to outlining and solving a problem.

Increasing the level of digital competence for the use of information and communication technology (ICT) potential is a key priority of Europe 2020 strategy. [13].

Its main initiative "The Digital Program for Europe" [14] aims at achieve this goal. The low level of digital literacy and skills is considered inadmissible for the digital society and the digital economy as a whole. It also constrains the multiplier

effect that is characteristic of the use of information and communication technologies.

Great potential of ICT can be mobilised through a well-functioning virtuous cycle of activity. Attractive content and services need to be made available in an interoperable and borderless internet environment. This stimulates demand for higher speeds and capacity, which in turn creates the business case for investments in faster networks. The deployment and take-up of faster networks in turn opens the way for innovative services exploiting higher speeds. This process is illustrated in the outer ring of Figure 2 [14].
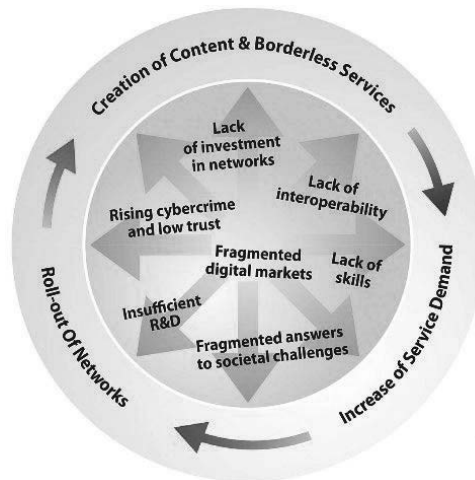

Figure 2. Virtuous cycle of the digital economy

Source: [14]

An important document, according to which the educational system in Europe has been centred is The Reference Framework, "Education and Training 2020" (ET2020) [15]. It provides common strategic goals of European Union countries in the realm of strengthening the efficacy of education and learning.

The 6 priorities for the 2016-2020 period are:
– relevant and high-quality skills and competences for employability, innovation, active citizenship and well-being (e.g. creativity, sense of initiative and critical thinking);
– inclusive education (i.e. including the increasing diversity of learners), equality, non-discrimination and the promotion of civic competences (e.g. mutual understanding and democratic values);
– open and innovative education and training, including fully embracing the digital era;
– strong support for educators (e.g. improved recruitment, selection and training processes as well as continuing professional development);
– transparency and recognition of skills and qualifications to facilitate learning and labour mobility (e.g. by means of the European quality reference framework);

– sustainable investment (including exploring the potential of the investment plan for Europe), performance and efficiency of education and training systems.

The Reference Framework sets out eight key competences [16]:

1) Communication in the mother tongue;
2) Communication in foreign languages;
3) Mathematical competence and basic competences in science and technology;
4) Digital competence;
5) Learning to learn;
6) Social and civic competences;
7) Sense of initiative and entrepreneurship;
8) Cultural awareness and expression.

Some European countries are actively implementing the declared strategic priorities of education. Thus, the analytical review "Learning to grow: what employers need from education and skills", Education and skills survey 2012, which was conducted by The Confederation of British Industry) revealed a very low level of proficiency in English (grammar, reading) 56%, mathematics 55%, information technology 66% of the modern British labor market. The same survey provided recommendations and requirements of employers addressed to education and government officials to improve educational standards, in particular, to increase the motivation of students aged 14-19 to acquire skills in technology, computer literacy, as well as to encourage them to enroll in IT specialties which will be in great demand in a few years [17].

This situation prompted educational reform in the state, in the field of computer technology and ICT, in particular. ICT curricula were considered obsolete, with a rather burdensome documentation, more focused on the ability to use technology, rather than the development of creativity in the use of software and digital content. Given the demands of the labor market and the appropriate training of students for a full-fledged life in digital society, the subject of ICT has been replaced by a new core subject "Computing", the training of which is more focused on the study of computer technology, programming. It is emphasized that the cognitive component of Computing helps develop skills of computational thinking (for example, algorithmic, logical, visual) for pupils of all ages at all key stages of training. Taking into account that "Computing" consists of two parts: informatics (including the academic part and programming) and information technologies (focusing on the use of computers in industry, trade, art and other fields), the National Curriculum in Computing has been developed after an in-depth consideration of the disciplines of Information and Communication Technologies and Computer Science, in terms of their teaching in schools of Great Britain (Table 1) [18].

In the development of the curriculum for the course "Computing" apart from educational institutions of Great Britain, such as Department for Education, Office for Standards in Education, Children's Services and (Ofsted) and business establishments, like Department for Business, Innovation and Skills, BCS, Confederation of British Industry, the companies of Google, Microsoft, Intellect have been involved.

A detailed analysis of the study materials (international documents of the European Union and the UK public education documents) has proved that for the

successful development of the countries of the European Union, the key to their competitiveness, overcoming economic crisis, creating a digital economy is a prerequisite for improving the quality and efficiency of education aimed at preparing young people for life in digital society. At this point, it is essential to stress on the importance of acquiring the appropriate digital skills, digital literacy, motivating young people to get enrolled in IT specializations.

Table 1. Comparative characteristics of the disciplines "Information and Communication Technologies" and "Computer Sciences" (a case in Great Britain)

No.	"Information and Communication Technologies" course	"Computer Sciences" course
1	Study of the main types of computer systems and their applications	Study of the structure of computer systems and the basic principles of their work
2	The main focus is on the human needs	The main focus is on the correctness of computing
3	Concentration on design, development, and evaluation of systems, with emphasis on user data requirements, functionality and availability	Concentration on algorithmic thinking and finding ways in which the problem can be broken into separate parts for its further solution
4	Focus on building or programming solutions using a combination of devices and software available at this time	Solving the problem and developing new systems by writing new programs and developing innovative computing directions
5	Focus on selecting, evaluating, designing and configuring relevant software and devices. Programming is the only way to achieve the desired results	Focus on the principles and technologies of creating new software and design for the formation of fundamentally new computations. Programming and coding are the main technologies for achieving the desired results
6	Integrated computer technologies help people, increase the efficiency of their activities, stimulate further development	The calculation is a "lens" that helps see and understand the nature of thinking in a new way
7	Focus on improving the level of education and the application of integrated computer technologies in different contexts, from academic to professional	The focus is on increasing the academic level of learning about computers and studying computer science

The growing need to use modern computer technology in the workplace leads to the need for increasing computer literacy for most professions. Understanding computer applications and programs becomes all the most important for getting a job.

CONCLUSION
Further research and study of the experience of the reform processes of the education system of leading European countries in the field of the implementation of integrated computer technologies in education is important for changing education system of Ukraine and its entry into the European educational space.

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