SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2022
ORGANIZATION AND MANAGEMENT SERIES NO. 164

DIGITAL COMPETENCES OF THE INFORMATION SOCIETY ERA IN THE ASPECT OF SAFETY IN CYBERSPACE

Wiesława ZAŁOGA

Military University of Technology, Faculty of Security, Logistics and Management, Institute of Organization and Management; wieslawa.zaloga@wat.edu.pl, ORCID: 0000-0001-7758-0187

Purpose: The main objective of the article is to diagnose the level of digital competences of respondents in terms of knowledge, skills and attitudes in the areas of: problem solving, online safety, creating digital content, communication and cooperation, and the ability to use information and data.
Design/methodology/approach: Two research approaches were used in the research process - the first was based on quantitative research using a questionnaire as a data collection method, and the second was based on a general analysis of the content of the subject literature and netographic content.
Findings: The components of digital competences can be verified depending on the needs of social groups. It is dictated by the regularities that the application of certain principles of interaction is based on the principles of functioning of small and large social groups in various social and professional environments. This allows the conclusion that the level of companies' involvement in new technologies may affect the level of digital competences of employees.
Research limitations/implications: The main limitation of the research was the small sample size, limited generallization in the analysis of the literature content and a wide scope of the research resulting from the areas of knowledge, skills and attitudes in the field of digital competences.
Practical implications: A practical implication from the perspective of digital competency management is the creation of opportunities and the provision of tools to raise the level of digital competences by building awareness and practical skills of managers in terms of knowledge, skills and attitudes in the areas of: problem solving, online safety, digital content creation, communication and collaboration and the ability to use information and data.
Social implications: The impact of the research on society is of great importance from the point of view of managing employee competencies as a company's value. Digital Competence focuses on the critical and responsible use of, and an interest in, digital technologies for learning, working, and participation in politics and society. These include media literacy, digital content creation, security as well as intellectual property, problem solving and critical thinking issues.
Originality/value: The article addresses the challenges related to the need to develop digital competences in various sectors of the national economy. The value of the article results from the current challenges in the field of digital skills of the society. The time of the pandemic has shown the importance of issues related to knowledge, skills and a critical attitude towards digital activities on the web.

Keywords: digital competences, IT competences, information competences, online safety.
Category of the paper: research work.

1. Introduction

The development of information and communication technologies in the last dozen or so years has irretrievably changed such aspects of people's lives as work, access to information, communication, education and social relations. Developing the ability to use computer applications as well as resources and communication in the network, putting emphasis on solving problems in various fields with the conscious use of methods and tools derived from computer science, is not only an aspect that facilitates the acquisition of knowledge by the student and teaching by the teacher. Free access to the Internet creates opportunities for constant and quick retrieval of news, provides tools that are helpful in work, study, communication and entertainment. However, while the network has become an important means of supporting the learning process, it also carries risks. The article discusses the issues related to the digital competences of the information society in the aspect of online security. The article is based on data obtained from scientific and information sources. The argumentation of the presented content is based on scientific publications in the area of digital competences of the digital society and the data obtained as a result of the author's research. The publication cites co-authoring articles and publications affiliated by prestigious experts conducting research in the field of digital competences. The article uses data from reports on the assessment of digital competences in an international perspective. The considerations in the publication were supplemented by the author's research carried out as part of the research project: Leadership in the light of the conditions of modern intellectual capital management and its impact on national security - a detailed study entitled "Digital leadership in Polish enterprises". The empirical research was commissioned by the Institute of Organization and Management of the Faculty of Security, Logistics and Management of the Military University of Technology in Warsaw (research grant no. UGB 865/2021). The CAWI interviews were conducted on a randomly selected research sample of respondents who served as owners, managers and board members in small, medium and large manufacturing, service and trade enterprises. The study covered 16 voivodeships in Poland. 163 respondents took part in the survey.

Research results confirm the existence of the digital competency gap. The analysis of the conducted research clearly shows that in order to undergo digital transformation in the professional environment, one should focus on developing digital competences, which are the key to the success of society in the digital reality. The obtained research results define the profile of digital competences of the information society. The subject matter presented in the article is of great importance for the perspective of maintaining appropriate attitudes, knowledge and

skills in the aspect of security in cyberspace. This study is a contribution to further research and subsequent articles on the dissemination of knowledge about the importance of the level of digital competences and the benefits of having them. As a result, extensive empirical material was obtained, the analysis and description of which goes far beyond the possibilities of a single scientific article. Based on the postulate mentioned in the article, the aim of this publication is also to systematize and argue a specific social phenomenon in order to present a rational understanding of the implementation of further empirical research.

In the Integrated State Informatization Program for 2014-2022, digital competences constitute the fourth set of basic skills, next to reading and writing, mathematics and language skills. The way of shaping digital competences is digital education, targeted at the needs of various social groups of citizens. Citizens' digital skills are an indispensable factor that builds social capital, influencing the competitiveness of the economy in a global perspective.

Digital competences are becoming a condition for full participation in social and professional life, and at the same time are essential for social and economic development. Dissemination of the use of skills has an impact on increasing the demand for products and services related to technologies, and indirectly facilitating the development of companies from the new technology sector. The development of digital competences in the society and the implementation of new solutions are also important for increasing innovation and increasing the competitiveness of companies and the efficiency of the institution's operation (Batorski, Płoszaj, 2012, p. 7).

In times of digital transformation, modern organizations face many challenges, such as the rapid development of technology, social and demographic changes. However, among all these changes, it is worth deepening one - digital transformation. According to many researchers, the imperative for these companies is to strive for a sustainable competitive position and economic success (Berman, 2012; Fiolka, 2019; Warner, Wagner, 2019). Digital transformation can be understood as a process that aims to improve the subject by causing significant changes in its properties through a combination of information, computing, communication and communication technologies (Vial, 2019, p. 121).

The definition of digital competences defines a set of skills that determine the effective use of digital space. Therefore, these will be both IT competences in the field of hardware and software skills, use of various applications, as well as information competences in the field of searching for the necessary information from electronic and traditional sources. Digital competences are also the ability to use digital media creatively, communicate and build relationships through electronic media, and the ability to ensure their security. As part of digital competences, the user of digital media should also have a level of knowledge of legal regulations and should be able to use new technologies in an ethical manner. Therefore, the concept of digital competences covers a very wide set of skills that determine the efficient and conscious use of new technologies and active participation in the life of the information society (Batorski, Płoszaj, 2012, p. 7).

Digital competences in terms of knowledge, skills and attitudes also apply to cyberspace security. The feeling of security is undeniably one of the basic human needs that can be guaranteed by the state thanks to the available means and techniques. Security has many definitions. Scientists agree that there is no clear definition of safety. The most common definition of security is the state and the process (Koziej, 2021).

Currently, there are many categories of security, among which information security has found its place. As one of many scientists, Piotr Potejko defined information security as: "a set of actions, methods and procedures undertaken by authorized entities, aimed at ensuring the integrity of collected, stored and processed information resources, by securing them against undesirable, unauthorized disclosure, modification or destruction" (Potejko, 2009, p. 193).

Another definition of information security is the protection of information against unwanted (accidental or deliberate) disclosure, modification, destruction or preventing its processing. The progress of civilization, the development of the media, the expanding amount of information shape new phenomena, expanding the catalog of national security with new areas, as was the case with information security.

In today's world, information is more valuable than money or raw materials. It exerts a great influence on states, societies and individuals. Being in possession of information has become a condition for a better and safer life, and the information itself began to be protected as a material good. Currently, there are security categories, among which information security has found its place. One of the greatest resources of information nowadays is cyberspace, which at the same time can pose a threat to the user.

Due to the objectives of the project, it was of key importance to operationalize the level of digital competences of the social environment in terms of knowledge, skills and a critical attitude towards digital activities online. Therefore, each of the specified areas of competence includes a complete list of activities resulting from the recommendations of the EU Council that can be carried out in this area by assigning appropriate indicators. The study used a five-point Likert scale, which allowed the respondents to assess digital competences in terms of the current state and the expected state. The respondents who were involved as a result of accepting the survey invitation assessed the project as very comprehensive and at the same time very exhaustive. This reflects the complexity of the concept of digital competences which are involved in many aspects of our lives.

2. Digital competences of the information society in practice

In the European Commission's 2020 report on digital progress, EU DESI "DESI Digital Economy and Society Index for 2021 Poland" (hereinafter EU DESI5 report), it was indicated that more than half (56%) of society do not have basic digital skills, .in. such as using information and data, communicating over the Internet or keeping yourself safe online.

According to the EU DESI report, in 2019 only 44% of citizens had basic digital skills, while the EU average was 56% (Director of the Public Administration…, 2021, p. 6).

For the new programming period 2021-2027, the European Commission has for the first time set a specific target to increase the proportion of citizens with basic digital skills from 56% in 2019 to 70% in 2025. The EU DESI report for 2021 shows that Poland ranks 24th in the 27 EU Member States in the Digital Economy and Society (DESI) Index for 2021. The statistics are illustrated in (Figure1).

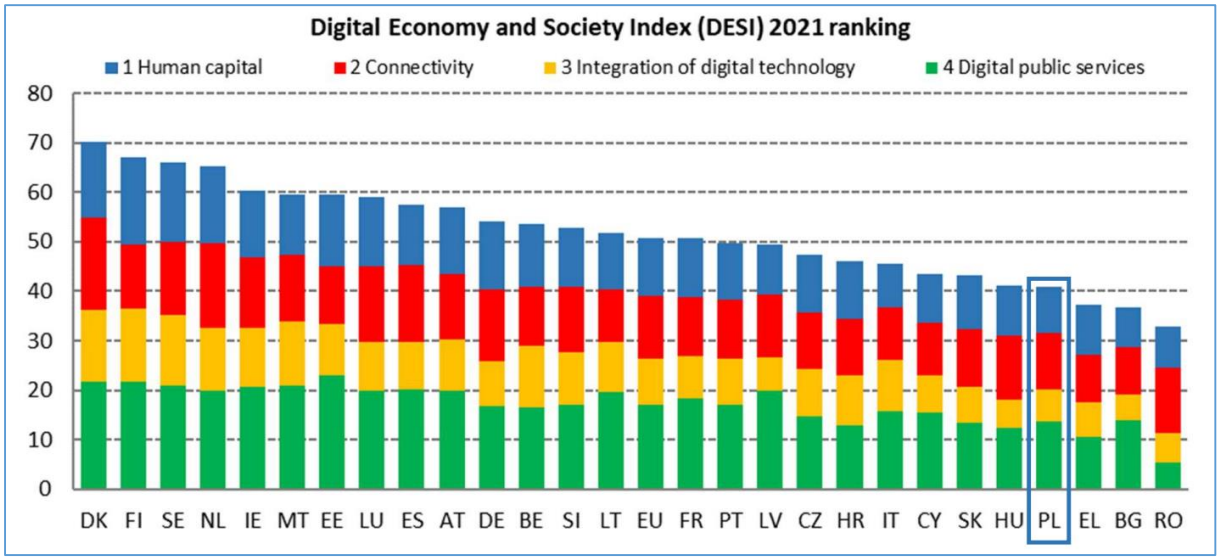

Figure 1. Ranking of the Digital Economy and Society Index for 2021.

Source: Digital Economy and Society Index (DESI) 2021, p. 7.

It would seem that along with the technological progress, the level of competences of the Polish society should develop. However, the report shows that in 2021 there was a decrease in the ranking by one place compared to 2020.

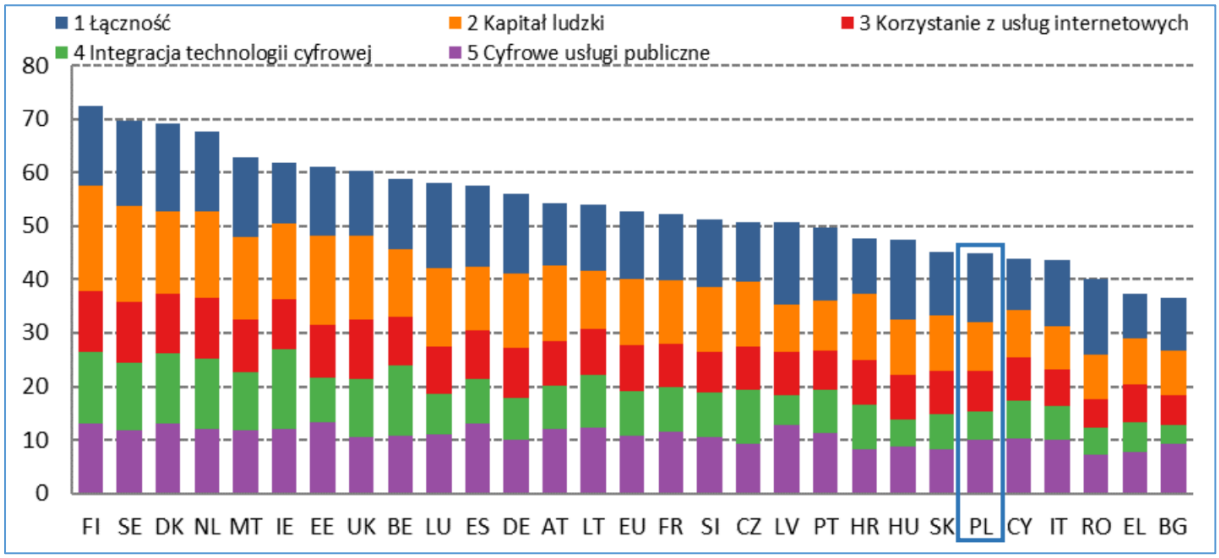

Figure 2. Ranking of the Digital Economy and Society Index for 2020.

Source: Digital Economy and Society Index (DESI) 2020, p. 3.

In the ranking of the digital economy and society index (DESI) for 2020, against the background of 28 EU Member States, Poland ranks 23rd. Based on pre-pandemic data, Poland's score has improved, as has the EU average.

Recommendations of the European Parliament and the Council of Europe (2006) indicate eight key competences in the process of lifelong learning: communication in the mother tongue; communication in foreign languages; mathematical competences and basic scientific and technical competences; digital competences; learning to learn; social and civic competences; entrepreneurship; Cultural awareness and expression. Digital competences have been identified as one of the European Commission's priorities in the latest policies, activities and strategies.

The term "digital competences" is used relatively rarely in the literature on the subject, more often appearing in legislative materials, including the European documents and studies quoted in this chapter. In EU documents, the concept of digital competences is embedded in the concept of eight key competences "necessary for personal self-fulfillment, being an active citizen, social cohesion and obtaining employment opportunities in the knowledge society (Tarkowski, Mierzecka, Jasiewicz, 2015, p. 27).

The concept of digital competences is one of the many terms used to describe the area of competences related to the ability to use information, media and ICT. In European terminology, the key terms in this area are digital skills, e-skills and digital literacy. The Operational Program Digital Poland uses terminology based on the terms used in the Digital Agenda for Europe, in which the key term is digital competences. Kirsti Ala-Mutka (2011, p. 27) proposes a categorization that shows the relationship between computer literacy, network literacy, information literacy, media literacy and digital competences. (digital literacy, e-literacy) (Tarkowski, Mierzecka, Jasiewicz, 2015, p. 27).

In the literature on the subject, the authors also use the division into medium-related Internet skills, which relate to the use of hardware and basic software, and content-related Internet skills, which include information, communication and content creation competences. (Ala-Mutka, 2011, pp. 23-29). Digital competence (digital literacy) is defined as the ability to understand and use information available in various formats and electronic sources. The most important element of e-competences, however, is not the efficient use of ICT tools (Tarkowski, Mierzecka, Jasiewicz, 2015, p. 27).

As defined in the EU Council Recommendations of 22 May 2018 on Key Competences for Lifelong Learning, digital competences include confident, critical and responsible use and engagement with digital technologies for learning, working and participating in society. They include information and data literacy, communication and collaboration, media literacy, digital content creation, security including digital comfort and cybersecurity competences, intellectual property issues, problem solving and critical thinking (Director of the Public Administration…, 2021, p. 4).

Having the best tools to fight or reduce online threats, nothing can replace common sense, knowledge, skills or the basics of using, or rather, "life" in cyberspace. Therefore, the best antivirus program, the best firewall or the best laws will not replace experience, knowledge and responsible attitude. All these tools can only be an accessory for people who know how to recognize dangers on the Internet.

The competences discussed were analyzed in the framework of the conducted research in three areas - knowledge, skills and attitudes. On the level of knowledge, digital competences require (Ferrari, 2013, pp. 7-10):

- knowledge of the nature, role and potential of information society technologies (TSI) in personal and social life and at work,
- knowledge of computer applications (word processors, spreadsheets, databases, information storage) and the possibility of their use,
- knowledge of potential threats related to the Internet and electronic communication (e-mail, web tools),
- understand how TSI can foster creativity and innovation,
- awareness of issues related to truthfulness and reliability of the information,
- awareness of the legal and ethical aspects of the interactive use of TSI.

At the skill level, digital competences require (Ferrari, 2013, pp. 7-10):

- searching for, collecting, processing, evaluating and critically using information,
- using tools to create, present and understand complex information,
- search for and use of services offered on the Internet,
- using TSIs as a tool to support critical thinking, creativity and innovation.

At the level of attitudes, digital competences require (Ferrari, 2013, pp. 7-10):

- critical and reflective attitude towards available information,
- responsible use of interactive media,
- interest in participating in communities and internet networks for cultural, social or professional purposes.

The implementation of the research project referred to five areas of digital competences in terms of knowledge, skills and attitudes of respondents (Ferrari, 2013, pp. 7-10):

- information and data literacy - Expressing information needs, retrieving data, information and content in digital environments. Assessment of credibility and reliability of data sources, information and digital content. Data storage, organization and processing in a structured environment;

- communication and collaboration - Interaction, communication and collaboration using digital technologies. Adapting communication strategies to specific audiences and awareness of cultural and generational diversity in the digital environment. Participation in society through the use of public and private digital services Seeking empowerment and civic activities through appropriate digital technologies. Managing your own digital identity and reputation;
- digital content creation - Digital content creation and editing. Improving and integrating information and content with existing knowledge while understanding how copyright and licenses should be applied. Knowledge of how to provide understandable instructions for a computer system;
- security - Protect devices, content, personal data and privacy in digital environments. Ability to avoid health risks and threats to physical and mental well-being when using digital technologies. Awareness of the importance of digital technologies for social well-being and social inclusion. Awareness of the environmental impact of digital technologies and their use;
- problem solving - Identifying needs and problems and solving conceptual problems and problem situations in digital environments. The use of digital tools to introduce innovation in processes and products. Search for opportunities for self-development and ongoing tracking of digital evolution.

As a result of the analysis of the research process, it can be concluded that there is a competency gap in terms of the level of digital competences held in relation to the expectations of the respondents. As shown by the data on the chart, the respondents assessed their competences in the field of security the lowest. The respondents gave the lowest level of knowledge in the area of security (3.2). The ability to avoid health risks and threats to physical and mental well-being when using digital technologies is a very big problem nowadays. Respondents referred to online safety as a state of certainty. It is a state that each participant in the research process would prefer to feel - as opposed to being threatened.

Generally speaking, a threat can be called the state opposite to security. It is a situation in which someone feels threatened or an event that reduces the level of security of a given entity. The threat is characterized by the likelihood of its occurrence and its interdisciplinary nature (Marczyk, 2018, pp. 1-2).

At the level of (3.5), the respondents assessed their knowledge in the area of the ability to use information, data and solve problems. In relation to the current situation, the respondents obtained the highest results (4.0) in terms of knowledge in the area of communication and cooperation as well as creating digital content. As shown in the graphic presentation (Figure 3), the respondents' expectations in terms of knowledge, skills and attitudes in the surveyed areas are much higher than the level of their competences at the time of the survey.

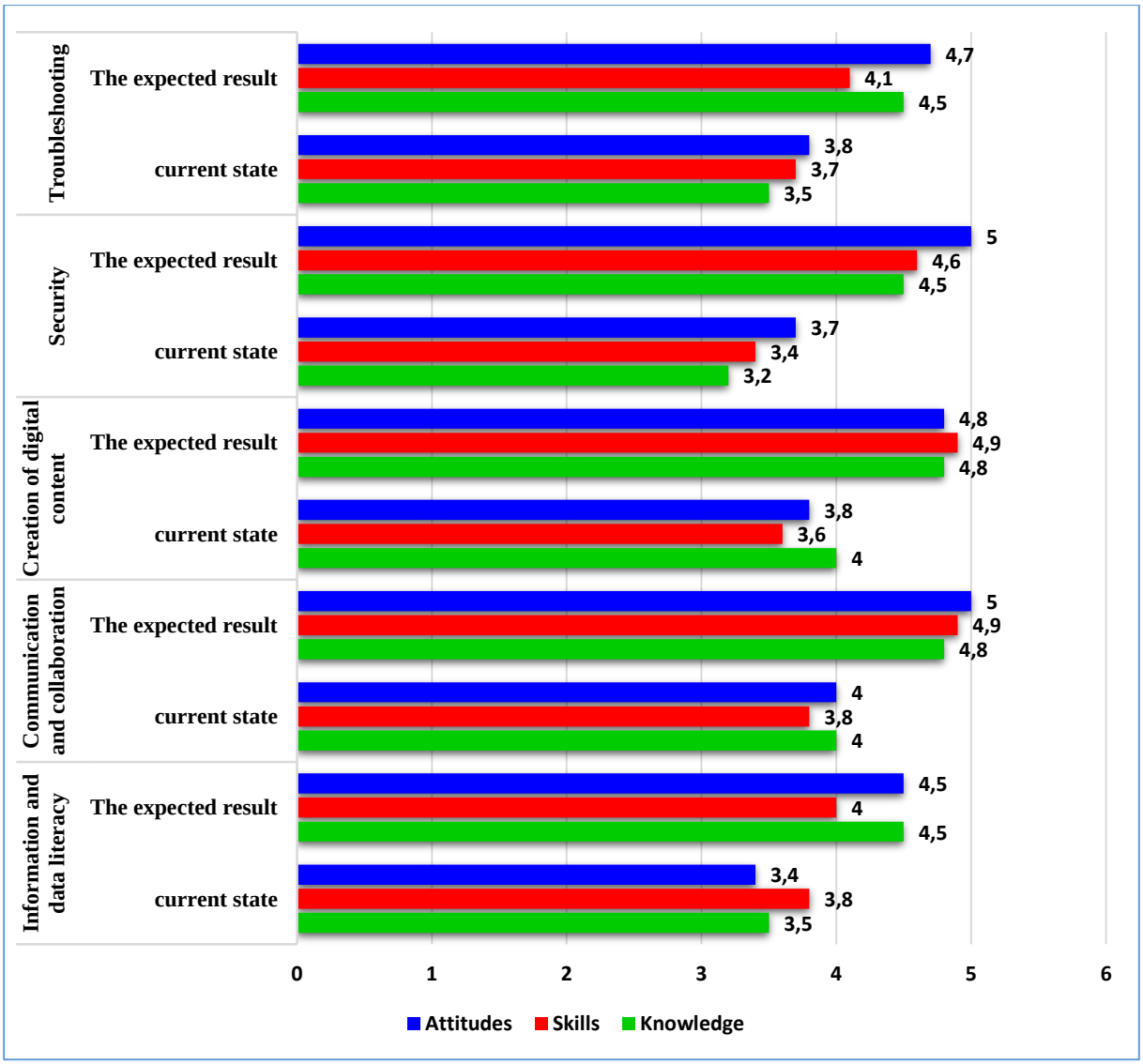

Figure 3. The level of possessed and expected digital competences according to respondents' opinions. Source: own study.

It is worth considering taking actions that will affect the development of digital competences of professional environments. Employees should be able to learn how to use new technological solutions in terms of knowledge, skills and attitudes in the areas of information and data literacy, communication and collaboration, digital content creation, security and problem solving. As a result of the research, it is postulated to introduce a training program that will increase the digital competences of employees. It is worth applying to examining the level of digital competences held by employees before and after the training.

3. Summary

Digital Competence focuses on the critical and responsible use of, and an interest in, digital technologies for learning, working, and participation in politics and society. These include media literacy, digital content creation, security (https://pl.wikipedia.org/wiki) as well as intellectual property, problem solving and critical thinking. All these factors are needed to consciously perceive the vast amount of information that the Internet provides us every day, especially those so important as political information. While young people have these competences in their blood, by using social media from an early age, older people, not born in the Internet era, may find it harder to assimilate these competences, which often results in excessive faith by such people in everything they read in the Internet networks

In order to obtain the above competences, it is necessary to understand how digital technologies help in communication, increase creativity and innovation, and to be aware of the opportunities, effects and risks associated with them. It is very important to understand the mechanisms and logic underlying the evolving digital technologies, as well as the ability to use various types of electronic devices, as well as software and networks. One should remember about the critical reception of information and its accuracy and credibility in the case of data made available on the Internet. In the political sense of digital communication, it is necessary to be able to use it to support active citizenship (https://pl.wikipedia.org/wiki), cooperate with other people and exchange views while respecting the views of others A frequent activity of the media and politicians nowadays is the deliberate division of the nation into groups by increasing the concentration of statements on sensitive and controversial topics, which should be aware of every recipient. Therefore, using digital technologies requires a reflective and critical approach, but also willingness and curiosity and a perspective approach to their development.

Essential skills for cybersecurity are primarily the ability to filter, manage and protect information, content, data, and digital identities, and to use software, devices, artificial intelligence and robots effectively. The development of the information society, combined with the expansion of the Internet reach, is accompanied by the penetration of other aspects of human activity into cyberspace. The global reach and the possibility of immediate access from almost anywhere on Earth, combined with low operating costs, has made more and more entities (governments, institutions and companies), as well as individuals, decide to transfer various elements of their daily activities to cyberspace. Many Internet users cannot imagine their lives without quick access to the latest information and e-mail, internet banking, online shopping, electronic ticket booking or contact with family and friends via social networks and instant messaging. Accessible via computers, mobile phones, tablets and even cars, the Internet has become one of the main utilities alongside electricity, gas and running water. It has become synonymous with freedom of speech and the unhindered flow of information, and in some cases has successfully served as a vehicle for revolution and social change.

The effect of the conducted critical analysis of the literature allows us to conclude that the components of digital competences can be verified depending on the needs of social groups. It is dictated by the regularities that the application of certain principles of interaction is based on the principles of functioning of small and large social groups in various social environments. The deepening of digital competences gives the opportunity to expand and interpret all interactive activities, provokes prosocial thinking and conditions collective experience. The description of digital competences proposed in the literature is vague, thus it seems to impoverish and narrow the understanding of the essence of the conscious choice of the proposed components of digital competences.

The aim of the article was fully achieved. The level of digital competences of respondents was diagnosed in terms of knowledge, skills and attitudes in the areas of: problem solving, Internet safety, digital content creation, communication and cooperation, and the ability to use information online.

The author of this publication hopes that the presented content will allow us to better understand the problematic situation, while being aware that the presented study is not an exhaustive description of the complexity of the phenomenon of digital competences. It seems justified to further explore the presented issues, and thus to conduct research that will be published in subsequent cyclical publications.

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