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Digital Inclusion and Digital Inequalities in Ukraine: The Level of Information Competence among the Population and Teachers

Cyfrowa inkluzja i nierówności cyfrowe na Ukrainie: poziom kompetencji informacyjnych wśród społeczeństwa i nauczycieli

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ABSTRACT

This article explores the challenges of digital inequalityand digital inclusion in Ukraine within the context of the country's ongoing digital transformation. The purpose of the study is to assess the level of information literacy and digital inclusion among the Ukrainian population, including educators. The research focuses on the state of digital competence and access to digital resources across different social groups.The study addresses the following questions: What is the current level of digital literacy among the Ukrainian population and educators? How does unequal access to technology affect digital inclusion in society? The methodology includes interpreting and conducting a comparative analysis of data obtained from two nationwide surveys, as well as using online questionnaires to gather responses from teachers regarding their digital competence. The results indicate that digital literacy varies significantly among social groups, largely due to disparities in access to education and digital technologies. Particular attention is given to vulnerable groups,

especially older adults. The study also includes teachers' self-assessments of their digital competence and provides recommendations for reducing digital inequality in Ukraine.

Keywords: digital literacy; digital inclusion; digital divide; digital competencies; Ukraine

INTRODUCTION

The rapid development of information and communication technologies (ICT) has become one of the defining features of modern societies. The global trend of informatisation has led to the widespread integration of digital technologies into many areas of human activity, including education, finance, healthcare, and public administration. As a result, the demand for information continues to grow, while an increasing number of services are moving to digital platforms. Information has become a strategic economic resource, contributing to the development of the information market and attracting significant investment. Consequently, the level of informatisation is widely regarded as an important indicator of a country's socio-economic development.

Digitalisation has accelerated in recent years, particularly during the COVID-19 pandemic, which significantly increased the reliance on digital technologies. In this context, digital skills have become a key factor for citizens' participation in the digital economy. Therefore, the development of digital competencies has become a strategic priority for many countries. Ukraine is also implementing digital transformation policies that increasingly align with European digital development strategies.

At the European level, several policy documents adopted in 2022–2023 define the framework for reducing digital inequalities and supporting digital inclusion. These include the *Digital Decade Policy Programme 2030*, the *Declaration on European Digital Rights and Principles*, and the *2030 Digital Compass*. These initiatives aim to ensure that at least 80% of EU adults possess basic digital skills by 2030, compared to about 58% today. In this context, European experts increasingly consider the digital divide not only a technological or economic challenge but also a potential human rights issue.

Despite the rapid spread of digital technologies, unequal access to ICT and differences in the ability to use digital resources continue to widen the digital divide both within and between countries. This inequality particularly affects socially vulnerable groups and populations with limited access to education and technological infrastructure.

In Ukraine, digital literacy remains uneven across the population, while unequal access to information, knowledge, and technologies contributes to the deepening of digital inequality. This situation may reduce the country's competitiveness in the global information society and create risks for information security.

International rankings illustrate these challenges: Ukraine ranked 81st in 2014, 71st in 2015, and 64th in 2016, remaining 64th in 2020 in global digital development rankings.

Disparities in Internet use in Ukraine are largely determined by age, place of residence, and social factors. Younger people demonstrate higher levels of Internet use, while regional differences remain significant. For example, the highest proportion of households with Internet access is observed in Kyiv, whereas some regions demonstrate considerably lower connectivity levels. Social inequality also influences access to digital technologies and information resources.

In such conditions, digital inequality creates significant socio-economic challenges. Certain groups gain advantages in access to information and digital services, while others remain excluded from digital opportunities. This situation deepens economic disparities and social instability. These challenges are particularly acute for countries with transition economies, including Ukraine.

Moreover, the increasing complexity and specialization of information require continuous improvement of digital infrastructure, electronic resources, databases, and search systems. However, not all countries are able to ensure such development. For instance, although Ukraine is the 35th most populous country in the world, it ranks only 70th out of 80 countries in the telecommunications readiness index. The uneven distribution of information resources and their users further intensifies digital inequality. In the current context of war caused by the aggression of the Russian Federation, overcoming digital inequality requires coordinated efforts from government authorities, local communities, entrepreneurs, and educators.

Summarising the key determinants of digital inequality and their impact on socio-economic development, several major challenges can be identified:

- unequal use of ICT opportunities at international and national levels;
- disparities in investment in ICT across countries;
- unequal access to ICT and digital resources among different social groups;
- differences in ICT knowledge and digital skills among the population;
- imbalance between population income and the cost of telecommunication services.

RESEARCH METHODOLOGY

The purpose of the study was to investigate the current state and challenges faced by Ukrainian society and its educational sector regarding the population's information literacy and digital inclusion. The study focuses on specific target groups, including IT specialists, the elderly, young people, teachers, and educators. The article highlights issues related to digital inequality, particularly addressing the insufficient level of digital literacy, unequal access to digital services, and the

decline of educational infrastructure necessary for building digital competencies among the population.

Considering the situation of problems of digital inequality and digital inclusion in the context of digitalization processes in Ukraine, the authors used the following main criteria for analysis: relevance for the needs of beneficiaries and stakeholders, relevance of the context and relevance in time.

This study focuses on the digital divide experienced during the war in Ukraine. It includes an analysis of current research data and examines the digital skills of Ukrainian citizens in comparison to those of other countries. A review of previous studies and relevant legal documents related to the issue is also presented.

The digital competence of Ukrainian teachers is assessed through self-evaluations aligned with European framework recommendations. This assessment is based on surveys conducted between 2021 and 2022, which included educators from all regions of Ukraine. The digital competencies of these teachers are categorized into five areas: "information and digital literacy," "communication and cooperation," "creation of digital content," "security," and "problem-solving." To ensure honest responses, all surveys were conducted anonymously. The analysis and interpretation of the quantitative data regarding Ukrainian educators were performed using descriptive and mathematical statistics. Based on the analysis, the authors highlight a number of recommendations of different levels for authorities, scientists, educational institutions and public associations to overcome the digital divide and inequality in digital literacy.

RESEARCH AND DISCUSSION. LITERATURE REVIEW

Researchers emphasize that the development of information and communication technologies in the second half of the 20th century led to revolutionary changes in the organization of the information sphere within society. This development intensified both global and regional information exchanges, engaged a significant number of people in the information process, and resulted in high rates of information production (Onyschenko et al., 2011). Ukrainian scientists view the issue of informatization in education as part of the broader trend of societal informatization, describing it as a revolution aimed at nurturing creative individuals who can effectively apply their knowledge and skills. These individuals are expected to work with information resources for successful endeavors in any area of public life, thereby contributing to society's innovative development (Bykov, 2010). Vember asserts that a key indicator of informatization in education is the use of computer-oriented tools. Compared to traditional educational and methodological resources, these tools offer new opportunities and enable the implementation of modern pedagogical technologies at an enhanced level, which, in turn, stimulates the advancement of didactics and teaching methods (Vember, 2007).

Kademiya and Shahina consider the main ways of using information technologies in education to be the creation of information environments of educational institutions, pedagogical software products, the creation of websites of educational institutions, the development of distance courses, the use of ICT in the management of educational institutions, the creation of electronic libraries, media libraries, etc. (Kademiya, Shahina, 2011). Despite significant progress in recent years in the field of creation and use of educational digital resources, modern researchers note that the majority of information resources intended for use in the learning process in the Ukrainian education system are characterized by a low didactic level,due to the fact that, mainly, computer training programs are created by specialists in the field of programming, as a rule, without the participation of specialists in the field of pedagogy, didactics, psychology (Moroz, Kapush, 2018).

The growing awareness of the importance of digitalization across all areas of life, along with the need for relevant skills, is reflected in the recent regulatory and legal initiatives in the field of ICT by the Ukrainian government. These initiatives aim to align Ukrainian legislation with European standards while also highlighting the increasing focus of the state on developing the digital industry. In 2022, President Volodymyr Zelensky signed Law No. 2807-IX, titled "On the National Informatization Program," which took effect on March 1, 2023. This law establishes the Unified Information System for Accounting of the National Informatization Program, designed for the creation, management, monitoring, processing, and storage of programs, tasks, projects, and related materials associated with the National Informatization Program. The implementation of this system will help address various objectives, including: ensuring the development of the information society; applying information and digital technologies in public administration and socio-economic relations; overcoming digital inequality; integrate Ukraine into the global information environment.

ICT is one of the most important factors in stimulating economic growth and development of civil society, employment of the population, and expansion of competition (Zakon, 2016). In general, Ukraine has a high level of human potential in the field of IT services and is one of the largest exporters of IT specialists to developed countries. This is due, on the one hand, to a certain level of education, as well as additional opportunities and freedoms in digital employment in the global labor market, and on the other hand, to the low level of wages and social protection in Ukraine. In the conditions of a deep crisis, it is the digital labor market that helps alleviate employment problems in Ukraine, the drop in the population's paying demand, and the mass emigration of skilled labor (Razumkov, 2020, p. 176).

Several key facts illustrate the rapid development of the IT sector in Ukraine. The industry has been growing by approx. 25–30% annually, significantly outpacing the global average. Over the past decade, the share of IT services in

the country's total exports has increased dramatically, and Ukrainian companies have gained recognition among the world's leading software developers. More than 80% of Ukrainian IT services are export-oriented and focused on foreign markets. The government has also prioritised the development of the IT sector, aiming to increase its contribution to GDP and strengthen support for IT education and workforce development. Despite the challenges of war, including mobilisation and relocation of companies, Ukraine's IT service exports continued to grow, highlighting the resilience and strategic importance of digitalisation for the country's future recovery and development.

Digital literacy is an important life skill that affects all areas of modern life and professional activity. Digital literacy of society is a key prerequisite for using the tools of electronic democracy, increasing the accountability of state authorities, preventing corruption, and increasing the participation of citizens in the life of the state. Therefore, improving the level of digital skills of everyone without exception is an important element of the development of modern society. Thus, the UNESCO Information for All Program (IFAP) formulated "information society development indicators" based on international experience, where digital literacy is defined as the most important life skill. For seven of the sixteen indicators of the development of the information society, the central role is played by digital literacy.

In 2019, the government of Ukraine introduced institutional transformations in the field of regulation of the state's digital development, in particular, the Ministry of Digital Transformation was created, which is responsible for state policy in the areas of digital development of society and digital innovations. Among the priority measures implemented by the ministry was the creation of the online platform "Action. Digital Education" for the development of digital literacy of the population, the mobile application "Action," conducting the first sociological survey of citizens' digital skills in the history of Ukraine, etc. (Ministry of Digital Transformation of Ukraine, 2020).

During 2019–2021, the Ministry of Digital Transformation of Ukraine conducted two nationwide surveys "Digital Literacy of the Population." Such a large-scale sociological study of digital skills was conducted for the first time in the history of Ukraine. The assessment of the digital skills of the population was carried out in terms of four groups of digital skills, in particular, information, communication, life problem solving skills, digital content creation skills. Respondents' answers were analyzed in terms of frequency of use of digital skills in the last three months and overall, depending on the presence/absence of skills in one or all of the 22 identified subgroups. The research was conducted according to the methodology of digital skills assessment, which is applied by the European Commission.

The published reports present the results of the assessment of the level of digital skills both in Ukraine in general and by individual sections: regional context, age groups (especially youth under 18 and 3–5 age groups of adults), education level, employment status, inclusive features (people with hearing impairment). In general, according to the results of the 2019 study, 53% of the population of Ukraine is below the "basic level" mark. A more detailed analysis of the obtained results showed that 37.9% of Ukrainians aged 18–70 have digital skills below the basic level; 15.1% do not have them at all (Village, 2019). During the same study, the level of interest of Ukrainians in learning digital skills was determined. The population aged 18–70 was surveyed, the sample was 1,800 people.

Studies show that only 47% of Ukrainians aged 18–70 consider learning digital skills relevant, with interest mainly concentrated among younger people. This tendency reflects a clear correlation: individuals with higher digital competencies are more motivated to develop them further, while those with lower skills often perceive such learning as unnecessary.

A follow-up study by the Ministry of Digital Transformation of Ukraine (2021) revealed several positive trends. The share of Internet users increased to 92%, compared to 88% in 2019, while the overall level of digital skills grew by 5.2%, including a 4% increase among older age groups.

Despite these improvements, digital competencies remain uneven. Only 56% of Ukrainians demonstrate problem-solving skills above the basic level, such as using online banking, e-commerce, or online learning platforms. At the same time, 53% of the population still lack basic digital skills, and 15.1% of people aged 60–70 have no digital skills at all. More advanced communication and information skills are relatively widespread: about 75% of Ukrainians demonstrate above-basic communication skills, while 74% show above-basic information literacy. However, only 28% possess software skills above the basic level, such as using office applications. Overall, the report indicates gradual progress: the share of people with above-basic digital skills increased from 25.5 to 32.6%, while the proportion of those with no digital skills decreased from 15.1 to 11.2%.

Despite the rapid development of informatisation and the recognition of digital transformation as a state priority, the problem of digital inequality remains significant in Ukraine. This primarily concerns disparities in digital skills among different social groups and unequal opportunities for their development. The gap between older and younger generations, men and women, as well as urban and rural populations in terms of Internet access and the use of modern technologies continues to widen.

Research also highlights considerable differences in the use of computers in education, particularly between rural and urban students and teachers, as well as between schools and higher education institutions. Moreover, despite the relatively high growth rate of computer literacy among Ukrainian students, their

competitiveness compared to foreign students is gradually declining (Silenko, 2006).

Two main factors influence the extent of the spread of the Internet: the level of material security and the education of various strata of the population. This refers to the "digital divide," a concept explained by the Council of Europe as the gap between those who have access to technology, the internet and digital literacy training and those who do not. It affects all generations – both rural and urban communities – and a wide variety of industries and sectors (Council of Europe, 2023). The digital divide has a set of components, the level of development of which determines the degree of its depth.

In 2007, a law was adopted in Ukraine, which for the first time determined the strategic directions of the development of the information society in Ukraine, which provided, in particular, "the creation of conditions to ensure computer and information literacy of all sections of the population" and "giving every person the opportunity to acquisition of knowledge, abilities and skills in the use of information and communication technologies during education, upbringing and professional training" (Zakon, 2007).

Despite the adoption of Presidential Decree No. 497/2019, aimed at improving access to mobile Internet and reducing the digital gap between urban and rural areas, the problem of digital inequality in Ukraine remains unresolved. According to a UNDP study conducted by the Kyiv International Institute of Sociology in 2021, about 39% of Ukrainians do not use electronic services, including 60% of women and 40% of men, which indicates a significant gender and age digital divide. Compared to 2020, the share of people who do not use e-services decreased by about 8 percentage points. However, the main reasons for non-use remain unchanged: 62% report no perceived need for digital services, 22% lack the necessary digital skills, and 17% do not have Internet-connected devices.

Internet access also reflects clear regional and demographic disparities. In 2019, Internet penetration in Ukraine reached 71%, with the highest usage in central and northern regions and significantly lower levels in the south. Internet use is also strongly age-dependent: the largest share of users is among people aged 25–34 (25%), while only 8% of people aged over 65 use the Internet. Such disparities in access to digital technologies contribute to digital inequality and may lead to discrimination in the information sphere, contradicting international and national principles of equal access to information.

In order to eliminate the digital divide, the Ministry of Digital Transformation undertook to solve an important problem: fully digitize state services; provide 95% of transport infrastructure and population centers with high-speed Internet access, as well as involve 6 million citizens in digital skills development programs. On December 24, 2019, the Ministry presented the National Digital Literacy Platform "Action: Digital Education," which was launched on January 21,

2020. Public courses aim to bridge the digital divide and give people more opportunities for development (UNDP, 2020).

On the Deputies' appeal No. 428d9/15-2021/17341 of January 25, 2021, which was made as part of the preparation of a report on state policy in the field of adult education in Ukraine (Andreev et al., 2021), information was received from a number of organizations, institutions and public organizations whose activities are aimed in particular at overcoming the digital divide of Ukrainian citizens.

The municipal non-commercial enterprise of the executive body of the Kyiv City State Administration "Educational Agency of the City of Kyiv," in the structure of which there is a separate division of the Education Hub of the City of Kyiv (one of the social partners of the Hub is the Association of Innovative and Digital Education), provided the following information. More than 500,000 Ukrainians are registered on the Hub website, more than 10,000 Kyiv residents attended offline trainings, more than 800 training events were held, and more than 600 online training lessons were created. The educational platform of the Education Hub of the city of Kyiv (www.eduhub.in.ua) hosts: online courses for acquiring Soft Skills, in particular online courses in the international SCORM format; online platform for emotional support of teachers and career counseling of students of the city of Kyiv (http://help.eduhub.in.ua), etc. Among others, the target audience of the Educational Hub includes citizens who belong to vulnerable categories (large families, people with disabilities, the elderly, etc.).

All educational courses are created according to the Digital Competence Framework 2.1, Digital Competence Framework for Educators. All language programs and educational courses are developed considering the norms of the Council of Europe's Reference Framework of Competences for Democratic Culture, Common European Framework of Reference for Languages: Learning, Teaching, Assessment.

The public organization "Education Era" (EdEra) reported that its activities are aimed at comprehensive development, raising the level of education in general and online education in particular. The online media literacy course is designed for the general user and aims to help students evaluate the information flows they encounter in their daily lives and equip students with skills they can use to recognize misinformation and propaganda. The course was created in cooperation with IREX and EdEra. Very Verified is part of the "Learn to Discern in Education (L2D-Ed)" project, which is funded by the US Embassy and the British Embassy in Ukraine with the support of the Ministry of Education and Science of Ukraine.

The public organization "Social Perspective" organizes webinars for educators "Inclusive education and distance education," which is aimed at solving the problem of low-quality educational services for students with disabilities studying in classes with inclusive education in general educational institutions and institutions of pre-professional higher education in the conditions of distance education.

Currently, other projects aimed at overcoming the digital inequality of citizens are being implemented in Ukraine.

Training of specialists for the IT industry in Ukraine. An important tool in overcoming digital inequality is the training of specialists in informatization and information technologies. In general, almost a third of higher education institutions in Ukraine offer IT programs (Osvita, 1996).

Analysis of statistical information shows that Ukraine ranks first in terms of the number of graduates of IT specialties (EU4Digital, 2019, p. 36) and, according to Ukraine Invest, it is among the top three countries in the world in terms of the number of certified specialists in the IT field (FSR, n.d., p. 25). However, there is still a shortage of IT specialists in the country. This fact is confirmed in the report on the state of formal IT education in Ukraine, which states that about 30,000 new IT specialists enter the labor market every year, while the market needs more than 50,000 specialists per year (Lebedev, Samokhodskyi, 2021, p. 2).

According to the press service of the Ministry, "the demand for IT specialists significantly exceeds the potential of the domestic market. Every year, Ukrainian universities graduate 15,000–17,000 such specialists in various fields. At the same time, about 40,000 vacancies for IT workers are opening in the country. In addition, a certain part of Ukrainian specialists goto work abroad, some work on a freelance basis." During the introduction of martial law in Ukraine (May 2022), the most vacancies were opened for specialists in the field of IT. In 2021, the Ministry of Education and Science of Ukraine and the Ministry of Digital Transformation of Ukraine presented the Roadmap for the Reform of IT Education, which presents 15 initiatives for the transformation of general secondary, higher, professional pre-higher and non-formal IT education on 2022–2023 (KMU, 2021). The Roadmap states that the problems of IT education exist at all levels – from schools to universities (the main ones are presented in Table 1).

Table 1. Problems of IT education in Ukraine at different levels of education

Complete secondary education	low quality of education in rural areas	there are not enough teachers who use modern approaches to teaching STEM subjects	80% of students are influenced by their parents when choosing a profession
Professional, professional-technical, professional pre-university	low quality of vocational pre-higher education	low prestige of professional education	–
Higher education	lack of financial autonomy of higher education institutions	the non-competitive salary of a teacher and practicing IT specialist	weak management in educational institutions

Non-formal education, lifelong education, self-education	complex licensing system	unequal tax conditions with foreign ones	restrictions in recognition of results obtained outside formal education

Source: Authors' own study.

The development of the information society requires state attention, which involves the creation of an appropriate system of motivation of the population regarding the implementation and use of ICT. In this sense, the least protected (vulnerable) sections of the population need special attention.

Thus, in 2007, the Law "On the Basic Principles of Information Society Development in Ukraine for 2007–2015" was adopted, which states that in the process of ensuring computer and information literacy as the basis for building an information societyand promoting the development of human potential, special attention should be paid to the organization of assistance to pensioners, low-income people, and people in need of social assistance. At the same time, numerous observations show that for vulnerable social categories of citizens, access to the Internet is completely unavailable, regardless of where they live – in a city or a village (Law of Ukraine, 2007). We present the results of the analysis of two categories of Ukrainians who belong to the vulnerable strata of the population.

In Ukraine, as in many developed countries, the number of elderly people has increased in recent decades. According to 2021 statistics, more than 9.8 million people over the age of 60 live in Ukraine, of which 3.5 million are men and 6.3 million are women. Today, every fifth Ukrainian belongs to the older generation, and there is currently an established trend of growth in the number of people aged 65+ (KMU, 2019).

In the information society, the primacy is given to youth; people of the third age become a marginalised segment of the population, which does not have a significant impact on the development of society, but rather is perceived as ballast (Ryzhanova, 2011). Their socialisation in the conditions of the information society is complicated by the emergence of a new type of social reality – a virtual one, to which they do not have time to adapt, which leads to their exclusion. Instead, older people, as an important heterogeneous group of the population with different needs and different educational and educational experiences, have the right to receive the necessary knowledge, skills and attitudes to acquire media and information literacy in a way that is convenient for them, in accordance with individual goals and needs.

Conclusions of the Council of the EU from October 12, 2020 "Human rights, participation and well-being of older people in the era of digitalization" (European Council, 2020), as well as conclusions of the Ministerial Conference of the Council of Europe "Artificial intelligence – a smart policy. Challenges for media and

democracy" dated June 10–11, 2021 (Council of Europe, 2021) are documents in which representatives of the governments of European countries seek to assist older people in acquiring knowledge, skills and awareness of safe access to the digital environment and the realization of their rights in this context.

However, one declaration is not enough. They must be considered and applied during the development of policy, in the daily practice of the development of digitalization of society. In particular, in the issues of guaranteeing the right of older people to full participation in society, creating a favourable and inclusive society, eliminating ageism, realizing the potential of all generations.

The implementation of the aforementioned law (Law of Ukraine, 2007) provided for the implementation of specific principles to promote the socio-economic progress of our state and the development of society in the information direction. In Section III, in particular subsections 8, 9, 10 of the Law of Ukraine, pensioners are singled out as a separate category of people who need to be supported in increasing computer and information literacy, involvement in the use of ICT for the implementation of national policy on creating appropriate conditions for the development of Ukrainian information society. It can be concluded from this that the role of the elderly in the information society of Ukraine is growing significantly and it is possible to overcome age discrimination.

A feature of the country is a significant generational gap in the context of the intensity of use of digital technologies. In other words, those Ukrainian families in which representatives of the older generation play an important role do not use Internet services. The share of Internet users older than 55 increased in three years from 12 to 15%. Penetration in the 55–64 age group today reaches 44%, 15% of Ukrainians over 65 use the Internet (INAU, 2018).

However, the researchers note that the situation has not changed significantly. At present, informational support for the elderly is mostly related to household functions: payment of utility services, transmission of meter readings, etc. However, a significant number of people in this age category still have not formed ICT skills. In addition, the involvement of elderly people in the labor market, civic activity, critical analysis of information, safe behaviour on the Internet, etc., is not calculated at all. That is, in order to perform socially useful functions, elderly people lack knowledge on the use of technical means of communication. Our research shows (Lukianova, 2021) that there is a demand for the development of computer literacy among the elderly. Pursuant to the order of the Ministry of Social Policy of Ukraine dated August 25, 2011, No. 326 "On the implementation of the social-pedagogical service »University of the Third Age«" in 9 regional territorial centers of social services of the city of Kyiv, Universities of the Third Age are organized and functioning. In the 2020–2021 academic year, these universities organized training at 68 faculties, among which 10 faculties (the largest number) provided the development of computer literacy among people of retirement age.

INFORMATION LITERACY OF UKRAINIAN TEACHERS

Ukrainian teachers currently play a crucial role in maintaining the connection between students and schools under the challenging conditions caused first by the COVID-19 pandemic (2020–2022) and later by the full-scale Russian invasion in 2022. These circumstances highlighted the need for flexible teaching approaches, the effective organization of distance learning, and the development of teachers' digital competences. The transition to online and blended learning required educators to adapt traditional pedagogical models and creatively use various communication channels and digital platforms, as many households effectively became classrooms.

Recent analytical studies conducted by Ukrainian researchers confirm the growing need for new approaches and methods of using digital tools in education. In 2022, the Institute of Digitalisation of Education of the National Academy of Educational Sciences of Ukraine conducted a large-scale survey involving 54,254 educators, including teachers, school administrators, and methodologists (Ovcharuk, Ivaniuk, 2022). The study examined the organization of distance learning, educators' readiness to use digital technologies, and their self-assessment of digital competence based on international frameworks.

The results indicate that the implementation of ICT in Ukrainian schools remains insufficient. Major challenges include limited access to digital devices, unstable high-speed Internet connections, and inadequate management of digital infrastructure in educational institutions. At the same time, the survey showed varying levels of teachers' digital competence in areas such as information literacy, communication, and collaboration, highlighting the need for further professional development and improved digital support within the education system.

Regarding the creation and management of content, 53.2% of teachers can use collaboration tools and share, for example, shared documents/files created by other people, which corresponds to the level of an independent user; 19.6% can create and manage content using collaboration tools (e.g. project management systems, online spreadsheets), which corresponds to the level of a professional user.

When asked about the ability to use online services, only 38.9% of respondents said that they actively participate in online spaces and use several online services (e.g. public services, electronic banks, an online store, etc.), which corresponds to the level of a professional user.

When asked about knowledge of rules for using content in accordance with copyright protection, 39.6% of teachers know how to refer to and use copyrighted content, corresponding to the level of an independent user; 13.4% of respondents noted that they know how and when to apply licenses and copyrights, which corresponds to the level of a professional user. Regarding the availability of

programming skills among teachers, only 21.3% of respondents noted that they know the basics principles of one at least programming language, which corresponds to the level of an independent user.

In the field of "Safety," when asked about the ability to protect the system of devices and programs, 21.1% of respondents indicated that they can install security programs on the devices they use to access the Internet (e.g. antivirus, firewall), which corresponds to the level of an independent user.

Questions about solving problems that arise when using digital technologies, only 8.8% of respondents said that they can solve most of the problems that most often arise when using digital technologies, which corresponds to the level of an independent user. This survey shows that teachers need to improve their digital literacy. More than 40% of teachers expressed awareness of the need to update skills in the field of digital technologies; they partially mastered the skills of using ICT, but they are not enough to fully and effectively carry out distance learning and fulfil the educational tasks set before them.

DISCUSSION

In the last decade, we have seen a significant increase in the use of communication technologies throughout the world. However, the benefits of digital technologies can only be realised if the user has the necessary skills and abilities, as well as the conditions and the appropriate environment.

The results of this study clearly highlight the differences in digital literacy among various segments of the Ukrainian population. It also examines the measures taken by educational institutions and the Ukrainian government over the past decade to improve digital literacy. Currently, these issues have been exacerbated by the violence unleashed by the Russian Federation against Ukraine, which has resulted in the loss of educational infrastructure and the occupation of territories. The ongoing war is having a devastating impact on the lives and futures of approx. 5.7 million school-aged children in Ukraine, negatively affecting their education (UNICEF, 2023), as well as the 6,221,100 refugees due to the conflict (UNHCR, 2023).

Additionally, the consequences of the COVID-19 pandemic have influenced access to digital education in Ukraine and beyond. This is supported by the research of Wigati and Fithriyah (2022). Furthermore, the findings of this study align with previous research that emphasises the importance of understanding the ethical, political, and social dimensions of digital literacy (Marín, Castañeda, 2022). It also corresponds with studies examining participants' perceptions and their levels of digital competence (Zhao et al., 2021), research focused on digital literacy among older adults (Oh et al., 2021), and studies investigating strategic approaches to promoting digital literacy from various perspectives (Nguyen, Habók, 2023).

However, the results of this research and the overview of the situation in Ukraine should be interpreted with caution due to limitations in the current education process and restricted access to essential skills and knowledge as a result of the war. The situation has significantly changed over the past year. Future research should involve a more in-depth study of the perceptions of different strata of the Ukrainian population regarding their digital literacy, including self-assessments of their digital skills.

The findings of this study indicate that the development of digital competencies among the population of Ukraine remains an important priority for both the educational system and public policy. The current level of digital literacy is influenced by several factors, including the ongoing war, forced migration of large numbers of citizens, destruction of educational infrastructure, and limited access to digital technologies for certain social groups. These conditions contribute to the persistence of digital inequality and highlight the need for coordinated actions by government institutions, educational organizations, and civil society.

Education plays a central role in overcoming the digital divide, as educators are responsible for developing citizens' digital competencies and promoting the effective use of ICT in learning processes. In this context, strengthening digital infrastructure in educational institutions, improving teachers' digital skills, and expanding access to digital learning resources remain key priorities. Special attention should also be given to vulnerable population groups that have limited access to digital technologies.

However, the results of this study should be interpreted with caution due to several limitations. First, the research relies primarily on available statistical data and survey results, which may not fully capture the rapidly changing digital environment in Ukraine, especially under wartime conditions. Second, the ongoing war and the consequences of the COVID-19 pandemic significantly affect access to education and digital resources, which may influence the reliability of certain indicators.

Future research should therefore focus on a deeper analysis of digital literacy among different social groups, particularly vulnerable populations and educators. Further studies should also examine the long-term impact of digital transformation policies, the effectiveness of educational initiatives aimed at developing digital competencies, and the role of digital inclusion in the post-war recovery of Ukraine.

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ABSTRAKT

W artykule podjęto problem nierówności cyfrowych oraz inkluzji cyfrowej na Ukrainie w kontekście postępującej transformacji cyfrowej państwa. Celem badania jest ocena poziomu kompetencji informacyjnych i stopnia inkluzji cyfrowej wśród ukraińskiego społeczeństwa, w tym wśród nauczycieli. Analiza koncentruje się na poziomie kompetencji cyfrowych oraz dostępie do zasobów cyfrowych w różnych grupach społecznych. W badaniu postawiono następujące pytania badawcze: jaki jest obecny poziom kompetencji cyfrowych wśród społeczeństwa ukraińskiego oraz nauczycieli oraz w jaki sposób nierówny dostęp do technologii wpływa na poziom inkluzji cyfrowej w społeczeństwie. Metodologia obejmuje analizę i interpretację danych pochodzących z dwóch ogólnokrajowych badań, a także analizę wyników ankiet internetowych przeprowadzonych wśród nauczycieli w celu określenia poziomu ich kompetencji cyfrowych. Wyniki wskazują na znaczne zróżnicowanie poziomu kompetencji cyfrowych pomiędzy poszczególnymi grupami społecznymi, wynikające przede wszystkim z nierównego dostępu do edukacji oraz technologii cyfrowych. Szczególną uwagę poświęcono grupom wrażliwym, zwłaszcza osobom starszym. W artykule przedstawiono również wyniki samooceny kompetencji cyfrowych nauczycieli oraz sformułowano rekomendacje dotyczące ograniczania nierówności cyfrowych na Ukrainie.

Słowa kluczowe: kompetencje cyfrowe; inkluzja cyfrowa; wykluczenie cyfrowe; kompetencje cyfrowe; Ukraina