

Halyna KOSSOVA-SILINA,
PHD, Associate Professor at the
Department of learning technologies,
labor protection and design
Bila Tserkva Institute of Continuous
Professional Education of the State
Higher Educational Institution
«University of Educational
Management»
ORCID ID: 0009-0009-2451-1298
e-mail: siolga13@gmail.com

PROBLEMS OF DIGITAL INCLUSION IN VOCATIONAL (VOCATION-TECHNICAL) EDUCATION INSTITUTIONS

Abstract. The content of the article presents an analysis of the problems and trends in the development of modern digital technologies of inclusive education in the field of professional education, taking into account the development of relevant guidelines for customers of educational services. Current problems of digital inclusion in vocational education institutions are considered, namely: high-quality digital Ukrainian-language content that is accessible to various nosologies of education seekers with special educational needs, and the problem of training pedagogical workers in educational institutions to implement the concept of digital inclusion.

It was determined that the use of digital technologies means a paradigm shift in approaches to teaching and learning, which is a potential for the transformation of professional education and an opportunity for customers of educational services to succeed in the global economy, ensuring the personalization of the educational process and overcoming the distance between the academic environment and production. At the same time, realizing this potential requires concerted action to address issues such as the digital divide, technology obsolescence, and quality and trust issues.

In the context of inclusive educational innovation, digital accessibility is an important aspect of ensuring that all people, including persons with disabilities, have equal access to digital technologies and services.

During the study of trends in the development of modern learning technologies in the field of professional and technical education, the staff of the department conducted an analysis of the interaction of inclusive learning technologies and modern digital technologies, focused on understanding how these two elements can interact to create an inclusive educational environment. The ways and possibilities of using digital

technologies in the process of inclusive education are determined. The implementation and integration of digital technologies requires significant investment in infrastructure and ongoing support to ensure their sustainability and effectiveness. A successful example of such an infrastructural solution is the single educational-digital ecosystem of the Bilotserk Institute of Continuing Professional Education, which combines the intellectual, scientific, professional, educational, and technological potential of the subjects of the network educational-digital environment, provides for the use of digital, andragogic and interactive technologies in virtual space.

The findings of the study indicate that although digital technologies have the potential to significantly improve the quality of vocational education, their successful implementation depends on addressing the associated challenges. It is important to constantly evaluate, study and introduce new initiatives in the field of digital learning and digital inclusion into the educational process, constantly update the educational process through the integration of digital technologies, ensure the appropriate quality of educational programs and resources.

Keywords: inclusion, digital inclusion, inclusive competence, digital competence, professional education.

Introduction. Digital accessibility (digital inclusion) means the ability of people with disabilities (people who belong to socially sensitive groups, with developmental disabilities, etc.) to access and use digital technologies and services on an equal basis with others [8].

At least two problems can be noted in the implementation of the concept of digital accessibility. The first is related to the shortage of quality digital Ukrainian-language content, which is available for various nosologies of students with special educational needs. On the other hand, pedagogical workers of vocational education institutions are not yet always ready to widely use these or other digital tools in education, i.e. we are talking about the formation and development of relevant digital and inclusive competences of specialists of vocational education institutions.

The study of the problem of the development of цифрової та inclusive competence of vocational education specialists in the conditions of martial law is carried out by the Department of Educational Technologies, Occupational Safety and Design of the Bila Tserkva Institute of Continuous Professional Education of the State Higher Educational Institution «University of Educational Management» of the National

Academy of Educational Sciences of Ukraine (further – ВТІСРЕ) within the framework of the general theme of the research work of ВТІСРЕ «Trendwatching of the labor market in the system of training and professional development of specialists in the conditions of the post-war recovery of Ukraine» (№ 0122U202007), which was approved by the protocol of the Academic Council of the Higher Educational Institution "University of educational management" No. 12 of the National Academy of Pedagogical Sciences of Ukraine dated December 21, 2022 and the protocol of the Academic Council meeting No. 10 Bila Tserkva Institute of Continuous Education of State Higher Educational Institution «University of Educational Management» of Educational Sciences of Ukraine from 21.12. 2022.

Analysis of recent research and publications. The problem of forming the inclusive competence of teachers who work as education seekers with special educational needs has been the subject of scientific research by domestic and foreign researchers. Theoretical and practical aspects of the problem of the development of inclusive competence of pedagogical workers as a component of their special (professional) competence served as the subject of many studies. Among them are the works of scientists such as O. Kazachiner, N. Figol, Y. Boychuk, O. Borodina, I. Kalinichenko, I. Kucherak, O. Mykytyuk, O. Savytska, Z. Udovych and others.

The concept of «inclusive competence» is considered in the works of Y. Boychuk, H. Kossova-Silina, H. Kravchenko. Inclusive competence is interpreted by them as the level of knowledge and skills necessary to perform professional functions in the conditions of inclusive education; as the necessary amount of knowledge and skills embodied in the ability to perform professional functions, taking into account the special needs of students with special educational needs, to integrate them into the environment of an educational institution, creating conditions for development and self-development; as an integral characteristic of a pedagogue (teacher, assistant), which affects the ability to solve professional tasks in the conditions of an inclusive approach to educational activity [1, 4. 6].

According to the "Digital Agenda of Ukraine - 2020" project, the field of "digital" skills and competencies in Ukraine is developing patchily, chaotically and separately from academic (so-called formal) education. Outdated teaching methods, lack of educational standards, trained teachers, as well as the unavailability of digital technologies for the educational process have led to an extremely low level of digital literacy in all existing segments of the state education system. Moreover, project experts note that the most massive and extensive formal education system does not meet the needs of the labor market, it is unable to form high-quality labor resources [5].

The purpose of the article is to analyze the problems and trends in the development of modern digital technologies of inclusive education in the field of professional education, taking into account the development of relevant guidelines for customers of educational services.

Presenting main material. Modern digital technologies are able to provide a flexible, accessible and individual learning experience; they greatly facilitate access to a wide range of resources and learning materials, allowing customers of educational services to work with content at their own pace and according to their individual learning styles; support interactive and collaborative learning through tools such as discussion forums, video conferencing and real-time feedback.

The use of digital technologies means a paradigm shift in approaches to teaching and learning, which is a potential for the transformation of professional education and an opportunity for customers of educational services to succeed in the global economy, ensuring the personalization of the educational process and overcoming the distance between the academic environment and production.

At the same time, the realization of this potential requires coordinated measures aimed at solving such problems as the digital divide, the obsolescence of technologies, problems with quality and trust in them [2].

In the context of inclusive educational innovation, digital accessibility is an important aspect of ensuring that all people, including persons with disabilities, have equal access to digital technologies and services.

We note a number of problems regarding the implementation of the concept of digital accessibility of educational services in the professional education system.

The first problem is *related to the lack of quality digital Ukrainian-language content, which is available for various nosologies of students with special educational needs.*

It should be noted that awareness of the importance of digital accessibility for socially vulnerable (socially sensitive) segments of the population is growing in Ukraine. This includes the increasing involvement of web content, mobile applications and other electronic media in the educational process and socialization. The private sector is actively involved in the promotion of digital accessibility, in particular, IT companies, public organizations. For example, several Ukrainian IT companies have developed accessible websites and mobile applications for people with disabilities.

Digital Inclusion is the first Ukrainian-language multifunctional mobile application for the development of speech, free communication and social integration of people with communication disorders. The development of the mobile application was carried out in cooperation with the Ministry of Education and Science of Ukraine, the public organization "Healthy Society" and the social enterprise "DivoGra" of the TECH4ALL program. Digital Inclusion is a free app that can be downloaded from the App Gallery, App Store, and Google Play.

Connect by BeWarned is a mobile application that adapts spoken language to printed text and vice versa, allowing hearing impaired people to communicate with others. The application is extremely simple and easy to use: a hearing impaired person can easily communicate with others by typing a text that will be transformed into a voice phrase. In turn, the voice will automatically turn into printed text. The application has ready-made text templates, and it is also possible to add your own.

Experts recommend using the English-language BeWarned application together with this application. It has certain useful functions. The application detects and signals danger. It automatically analyzes sounds of potential danger in real time (shouts, car horn, alarms, dog barking, etc.). In case of such situations, Be Warned informs the user about it with the help of light signals and vibration. The application also allows you to "hear" music. The application transforms music tracks into vibrations, as well as into light signals with the help of an equalizer. In this way, hearing impaired people can enjoy music by experiencing it visually and tactilely.

Huawei has developed an application for the smartphone Facing Emotions, capable of recognizing human emotions and playing corresponding sounds, as well as displaying images on the screen. Developers believe that this will help visually impaired people better understand the emotions of interlocutors. The program transforms seven key emotions found on the human face into seven unique sounds. This enables the blind and partially sighted to gain experience and understanding when communicating with others.

These are just some of the Ukrainian-language multifunctional mobile applications designed to improve the social integration of people with communication disabilities.

Public organizations (in collaboration with educational institutions or autonomously) also play an important role in promoting digital accessibility for learners with special educational needs. Among the most active is the Ukrainian Society of the Blind, which has launched several initiatives to promote digital accessibility, such as developing a web portal for people with visual impairments and promoting the use of accessible e-books. One of the key initiatives of the Ukrainian Society of the Blind is the "Accessible Book" project, which aims to make digital books and other content more accessible to the blind and visually impaired in Ukraine. The project developed a range of tools and software to convert digital content into accessible formats, such as audio and Braille, and helped improve the accessibility of digital content for visually impaired people in Ukraine.

Another problem of digital inclusion in the system of professional education is the *insufficient level of readiness of pedagogical workers of professional education institutions for the wide use of digital tools*. Thus, the formation and development of relevant digital and inclusive competencies of specialists in vocational education institutions is relevant.

The activities of the department of learning technologies, labor protection and design of the Belotserk Institute of Continuing Professional Education are aimed at solving these tasks. Employees of the department have developed and implemented appropriate educational and scientific-methodical support for continuous professional development of teachers of vocational education in the conditions of informal and informal education.

Electronic training courses on the relevant topics have been developed and are being implemented in the educational process: «Creation of a safe and inclusive educational environment in a professional education institution», «Inclusive education. Work with students with special educational needs», «Organization of education in the conditions of a digital educational environment», «Artificial intelligence in the activities of a professional education teacher», «Mobile applications as a tool for effective training of students» and others. In order to meet the professional requests and needs of vocational education specialists regarding the implementation of modern learning technologies, the development of digital and inclusive competences of teaching staff of vocational (vocational and technical) education institutions in the conditions of military and post-war conditions, the staff of the department developed and implemented a system of short-term thematic courses, called in a short time to provide meaningful and targeted scientific and methodological support to teachers.

The educational and professional program for short-term professional development courses "Digital tools for interactive online learning and artificial intelligence in the professional activity of a teacher of vocational education" is aimed at increasing the level of digital competence of pedagogical workers in the field of

artificial intelligence using digital tools in professional (vocational and technical) institutions education. The content of the program reflects modern approaches to the organization of the educational process and during the creation of modern interactive educational content with the help of digital tools and artificial intelligence, which contains a complex of educational components, in particular, content modules, control measures, etc., aimed at achieving specified learning outcomes (competencies), which gives the right of specialists to obtain certain educational and professional qualifications in accordance with social and educational challenges, employers and key stakeholders.

The content of the educational and professional program for short-term professional development courses «Inclusive education in professional (vocational and technical) education institutions» is aimed at increasing the level of competence of pedagogical workers in the field of organizing inclusive education for students with special educational needs in professional (vocational and technical) education institutions. The program reflects the current state of the legislative and regulatory framework for ensuring the right of persons with special educational needs to obtain quality education, contains a complex of educational components, in particular, content modules, control measures, etc., aimed at achieving specified learning outcomes (competencies).

The following should be noted among educational and methodical publications aimed at developing the relevant competencies of vocational education specialists.

Educational and methodological manual «Inclusive education in vocational education institutions under martial law» The relevance of the publication is determined by the rights of persons with special educational needs to obtain quality education, taking into account their needs and capabilities, and the need for appropriate training of vocational education specialists to perform the tasks of inclusive education under military conditions state The manual was developed with the aim of developing the readiness of teaching staff of vocational education institutions for inclusive

education of students with special educational needs, including students who are internally displaced persons injured during military operations.

The educational and methodological manual «Artificial intelligence in the activity of a teacher of vocational (vocational and technical) education» was developed to help teachers of vocational education institutions in the context of organizing their professional activities in the conditions of digitization of the educational process. The manual focuses on scientific approaches to the study of artificial intelligence, highlights the role and place of artificial intelligence in the modern educational process, provides examples of the introduction of intelligent systems into the educational process.

The electronic educational resource «Technology of creating educational simulators for the development of the professional competence of the teacher of vocational education in the conditions of the latest challenges» presents the author's interactive educational platform using online digital tools and modern educational content. The educational resource contains examples of key aspects that must be taken into account when creating educational simulators, namely: digital pedagogy, systemology, visual accessibility, human-centeredness and examples of interactive and practical spaces.

Conclusions. During the study of trends in the development of modern learning technologies in the field of professional and technical education, the staff of the department conducted an analysis of the interaction of inclusive learning technologies and modern digital technologies, focused on understanding how these two elements can interact to create an inclusive educational environment. The ways and possibilities of using digital technologies in the process of inclusive education are determined, including: digital tools for evaluating learning results, joint visualization tools, tools for group communication, mobile applications for people with communication disorders (Digital Inclusion, Connect by BeWarned, Facing Emotions and others).

The use of digital technologies in the training of customers of educational services with special educational needs can take place in various organizational forms: online courses, online counseling, online trainings, hackathons, webinars, the use of interactive digital platforms, electronic virtual laboratories, electronic social networks, creating presentations, communication platforms based on scientific interests, virtual technoparks and others. Electronic educational content includes: library and information resource provision of education; collections of electronic educational resources, the corresponding content of the sites of educational institutions.

The implementation and integration of digital technologies requires significant investment in infrastructure and ongoing support to ensure their sustainability and effectiveness. A successful example of such an infrastructural solution is the single educational-digital ecosystem of the Bila Tserkva Institute of Continuous Professional Education, which combines the intellectual, scientific, professional, educational, technological potential of the subjects of the BTICPE network educational-digital environment, provides for the use of digital, andragogic and interactive technologies in BTICPE virtual space.

Prospects for further research. The findings of the study indicate that although digital technologies have the potential to significantly improve the quality of vocational education, their successful implementation depends on addressing the associated challenges. It is important to constantly evaluate, study and introduce new initiatives in the field of digital learning and digital inclusion into the educational process, constantly update the educational process through the integration of digital technologies, ensure the appropriate quality of educational programs and resources.

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Галина КОССОВА-СІЛІНА,

кандидатка педагогічних наук, доцентка кафедри технологій навчання,
охорони праці та дизайну Білоцерківського інституту неперервної
післядипломної освіти ДЗВО «Університет менеджменту освіти»
Національної академії педагогічних наук України
ORCID ID: 0009-0009-2451-1298
e-mail: siolga13@gmail.com

ПРОБЛЕМИ ЦИФРОВОЇ ІНКЛЮЗІЇ В ЗАКЛАДАХ ПРОФЕСІЙНОЇ (ПРОФЕСІЙНО-ТЕХНІЧНОЇ) ОСВІТИ

Анотація. У змісті статті представлено аналіз проблем та тенденцій розвитку сучасних цифрових технологій інклюзивного навчання в галузі професійної освіти з урахуванням розвитку відповідних орієнтирів замовників

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освітніх послуг. Розглянуто актуальні проблеми цифрової інклюзії в закладах професійної освіти, а саме: якісний цифровий україномовний контент, який є доступним для різних нозологій здобувачів освіти з особливими освітніми потребами, та проблема підготовки педагогічних працівників освітніх закладів до реалізації концепції цифрової інклюзії.

Визначено, що використання цифрових технологій означає зміну парадигми в підходах до викладання і навчання, що є потенціалом для трансформації професійної освіти та можливістю замовникам освітніх послуг досягти успіху в умовах глобальної економіки, забезпечуючи персоналізацію навчального процесу та подолання дистанції між академічним середовищем і виробництвом. Водночас реалізація цього потенціалу вимагає узгоджених заходів, спрямованих на вирішення таких проблем, як цифровий розрив, застарілість технологій, проблеми з якістю та довірою до них.

У контексті інклюзивної освітньої інноватики цифрова доступність є важливим аспектом забезпечення того, щоб усі люди, включно з особами з інвалідністю, мали рівний доступ до цифрових технологій і послуг.

В ході дослідження тенденцій розвитку сучасних технологій навчання в галузі професійно-технічної освіти співробітниками кафедри проведено аналіз взаємодії технологій інклюзивного навчання та сучасних цифрових технологій, зосереджений на розумінні того, як ці два елементи можуть взаємодіяти для створення інклюзивного освітнього середовища. Визначено шляхи та можливості застосування цифрових технологій в процесі інклюзивного навчання. Впровадження та інтеграція цифрових технологій вимагає значних інвестицій в інфраструктуру та постійну підтримку для забезпечення їхньої стійкості та ефективності. Успішним прикладом такого інфраструктурного рішення є єдина освітньо-цифрова екосистема Білоцерківського інституту неперервної професійної освіти, яка поєднує інтелектуальний, науковий, професійний, освітній, технологічний потенціал суб'єктів мережевого освітньо-цифрового середовища, передбачає використання цифрових, андрагогічних та інтерактивних технологій у віртуальному просторі.

Висновки, зроблені в результаті дослідження, вказують на те, що хоча цифрові технології мають потенціал для значного підвищення якості професійної освіти, їхнє успішне впровадження залежить від вирішення пов'язаних із цим викликів. Важливим є постійне оцінювання, вивчення та впровадження в освітній процес нових ініціатив у сфері цифрового навчання та цифрової інклюзії, постійне оновлення освітнього процесу через інтеграцію цифрових технологій, забезпечення відповідної якості освітніх програм та ресурсів.

Ключові слова: інклюзія, цифрова інклюзія, інклюзивна компетентність, цифрова компетентність, професійна освіта.

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