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Digital Technologies in Modern Education: Ethical Aspect*

Vladimir A. Tsvyk
Department of Ethics
Faculty of Humanities and Social Sciences
Peoples' Friendship University of Russia (RUDN University)
Moscow, Russia
E-mail: tsvyk_va@pfur.ru

Irina V. Tsvyk
Department of Philosophy
Moscow Aviation Institute (National Research University)
Faculty of Humanities and Social Sciences
Department of Ethics
Peoples' Friendship University of Russia (RUDN University)
Moscow, Russia
E-mail: tsvykirina@mail.ru

***Abstract*—The article is devoted to the ethical assessment of the possible consequences of the digitalization and computerization of all forms of educational activities. The positive and negative aspects of the widespread introduction of digital computer technology in the educational process were taken into consideration. It is noted that in ethical terms, the most dangerous consequence of the massive transfer of the educational process to computerized training schemes is the possible dehumanization of the educational process, the departure from it of the spiritual personality component.**

Keywords—digital society; computer technology; information society; education; teacher; creativity; personality

I. INTRODUCTION

The humanistic, harmonious development of the human personality is a strategic goal of spiritual production, a powerful branch of which is the education system. Education is a well-established process of transferring, processing and acquiring knowledge in the course of systematically organized training of a group of people over a certain period of time. Due to the existence of the institute of education, people for many centuries adopt the enormous experience of knowledge and skills accumulated by civilization over the entire period of its existence. Purposeful activity of people in obtaining and perfecting skills and knowledge for expanding the limits of knowledge is the main driving force of scientific and technological progress. In this context, the definition of the content boundaries of the very concept of "education" is very significant, the ethical aspects of which are determined in each specific case due to its multiple meaning. "Education is: a) a social institution whose main function is to prepare and integrate an individual into various spheres of social activity; b) a set of acquired by an individual (independently or in the process of training in special educational institutions) systematized knowledge and skills (especially professional); c) the process of learning, i.e. training; education; d) the level of education of an individual who has diverse knowledge and is distinguished by a high degree of culture; e) education of society, the people, as the level of civilization of the country "[1]. For the ethical evaluation of the educational process in all these cases, it is decisive to consider education not only in its teaching context, but mainly as an "education", "creation" of an individual.

The Law on Education of the Russian Federation states that "education is a single purposeful process of education and training, which is a socially significant benefit and is carried out in the interests of the individual, family, society and the state, as well as the totality of acquired knowledge, skills, values, experience and competence of a certain volume and complexity in order to intellectual, spiritual, moral, creative, physical and (or) professional development of a person, to satisfy his educative needs and interests "[2].

Within the framework of this approach, "education" refers exclusively to the individual, to a person and can be viewed as creating an image of the surrounding world and the person himself, his "I" in this world. Accordingly, professional education should be viewed as the formation of the image of the world of production (in a broad sense) and the image of one's position in the production system, one's professional activity.

However, education has an important creative function, not only in relation to the individual, but also in relation to society as a whole. The moral potential of education is determined by its status as a social and political institution [3]. It is a universal moral way of life of the people, serves to strengthen its statehood, the development of history and culture, language, the formation of spiritual and moral values. Due to this, a person-citizen is formed, the personality is integrated into the system of multinational cultures, and society, through education, a special ethic of life, creates itself based on adequate forms of pedagogical and social activities [4].

The development of society in recent decades is characterized by rapid penetration into all spheres of human life by new information and communication, computer, digital technologies. These changes led to the formation of a

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qualitatively new type of society, called “informational”. Computerization significantly affects the learning processes, the formulation and solution of scientific problems, the research in the field of thinking and cognitive processes. Computer technologies have become a powerful converter of economic, social and other activities [5]. The process of computerization and informatization is uneven in different countries and regions, but in general it has already progressed so much that it became possible to sum up some results and make a forecast for the future. Computerization of all spheres of human activity appears today as the most important task of society, and as an imperative of social development. Without solving this task, humanistic transformations, economic development of society that can ensure a decent life for all its citizens are impossible [6].

Currently, the main trend in education is connected with the digital revolution, which leads to the transformation of the labor market, the emergence of new competencies, improved cooperation, increased citizens' responsibility, their ability to make independent decisions, etc. It is necessary to constantly improve technologies and methods so that the level of information systems development and organizational processes are consistent with the constantly growing competencies of students and applicants.

In terms of their transformative effect, the cumulative effects of digital computer technology, the Internet, and electronic commerce are quite comparable to the changes that the industrial revolution had once caused. The digital revolution is changing the global economic, social and educational landscape, creating a new economic sector, transforming organizational structures, changing the values of work and lifestyle of people, raising intellectual capital to the dominant factor in the further development of scientific and technological progress [7].

II. Information Technologies, Computer Technologies and Digital Technologies: Concept and Essence

The processes of informatization of all forms of educational activity, the widespread introduction of digital computer technologies into the educational process are connected with the universal computerization of social and cultural reality. The concept of "technology" is often defined as a set of methods and techniques for processing raw materials, products and converting them into consumer goods. The modern understanding of this term includes both the method of definition (description) and the sequence of actions in the process of cognition of the studied factors and phenomena. In this case, information and communication technologies can be considered such technologies that are aimed at processing and transforming information.

Along with the concept of "information technology" in the research literature there are a number of such similar concepts as "computer technology", "new information technology", "information and communication technology", "digital technology". All these concepts are often used as synonyms, but there are fundamental differences between them. Various textbooks on computer science and information technology give different definitions of the concept of "information technology". Summarizing these definitions, we can formulate the most complete concept of information technology. Information technology is a combination of methods and tools, combined in a technological complex that provides all information processes carried out in the interests of the user. Information processes include the receipt, collection, transmission, processing, accumulation, storage, presentation and use of information. Information technologies have been used by humankind since its inception, but the very concept of “information technologies” appeared relatively recently (in the 80s of the 20th century) almost simultaneously with the concepts of “computer technologies”. Information technologies include all methods of processing data and knowledge, such as conversation, television, typewriter, computer, etc. From this position, any technology or teaching method is informational, since Learning is the process of communicating information. Computer technology is a type of information technology in which all methods and means of implementing information processes are carried out with the help of microprocessor-based computing ("computer") technology. As for the concepts of "new information technologies" and "modern information technologies", in many studies, these concepts are used to emphasize the use of modern computer technology to organize information processes. That is, these concepts are similar to the concept of "computer technology". It is worth noting that the concept of “new information technologies” has been found in literature for the second decade, and their definition of “new” is already outdated. Therefore, it is more logical to use the notion of “modern information technologies”, which characterize the current stage of development of society.

Another concept used in modern literature is the concept of "information and communication technology." This concept is narrower in relation to the concept of "information technology" and can be defined as part of information technology that organizes communication and access to information resources in all areas of activity. It is often assumed that this technology is implemented on the basis of local and global computer networks, and, thus, is a special case of computer technology.

In recent years, the concept of "digital technology" has also been actively used in the research literature. The first use of the term “digitalization” in a broad sense, implying changes in the current paradigm, caused by the increasingly widespread use of digital technologies, is attributed to Robert Vakhalovi, who used the definition of digital society in an article published in 1971.

In this case, digital technologies were understood as technologies based on the representation of transmission signals by analogue level bands, and not in the form of a continuous spectrum. Digital technology, therefore, works, as opposed to analog, with discrete rather than continuous signals.

According to the Oxford English Dictionary, the concept of digitalization today includes the adaptation and growth of

the use of digital or computer technologies in business and other activities.

Thus, the concept of "information technology" is the most common of the above. The concepts of "new information technologies" and "modern information technologies" are nothing more than "computer technologies", because at this stage of development of society, all new information technologies are somehow connected with computer equipment. These concepts are specific in relation to the concept of "information technology". The concept of "information and communication technology" today, is included in the scope of the concept of "computer technology" and "digital technology", because the technical equipment for its implementation is computer technology and digital transmission media. Although in a broader sense, information and communication technologies may not be computer based. With regard to education, it is best to use the concept of "computer technology" or "digital technology."

Information and communication technologies are “a wide range of digital technologies used for creating, transmitting and distributing information and providing services (computer equipment, software, telephone lines, cellular communications, e-mail, cellular and satellite technologies, wireless and cable communications networks, multimedia, as well as the Internet).

III. Computer Digital Technologies in Modern Education

Computer information technology is a complex of areas of activity that relate to technologies for creating, storing and processing information data using computer technology. Technical means of computer information technology include computers, software, the Internet and the network. They allow you to create, store, process, transmit and distribute a wide range of information resources.

The proliferation of digital technologies leads to qualitative changes not only in manufacturing and in global markets. Changes also capture the social sphere and education. Natural resources and cheap labor, although important, are becoming secondary factors of socio-economic development. The transition from the mass production of standardized products to the production of generally accessible individualized products began. It is based on automation and robotization (intellectualization) of all types of production processes. These changes began to be called the new industrial or technological (digital), revolution. This revolution is impossible without the transition from mass education for all to quality education and the full development of the personality of each. At the same time, the technological revolution not only sets new tasks for education, but also provides tools for their solution.

Today, the computer is becoming the first universal mass tool for working with all types of information. Modern computer programs allow new ways to work with image, sound, video and text (search, edit, compile, etc.), with calculations (spreadsheets, tools for processing statistical information and working with big data, automatic formal transformations of mathematical expressions, etc.), with information models of various objects, etc.

Computer technologies are actively used to transfer information and ensure the interaction of the teacher and the student in modern systems of open and distance education. A modern teacher should not only have computer literacy, but also be able to apply a variety of computer technology in their professional activities.

The main means of implementing computer technologies in the educational process at any level is a personal computer, the capabilities of which are determined by the software installed in it. The main categories of software are system and application (training) programs, as well as tools for software development. System programs, first of all, include operating systems that ensure the interaction of all other programs with equipment and the interaction of a personal computer user with programs. Service or service programs are also included in this category. Applications include software that acts as a toolkit when working with text, graphics, tabular data, etc. In modern education systems, universal office application programs and tools are widely used: text editors, spreadsheets, presentation programs, database management systems, organizers, graphic packages, etc. [8].

Fundamentally new quality acquired education with the emergence and spread of computer networks, which allowed radically changing the way of obtaining information. Through the global computer network the Internet, instant access to world information resources (electronic libraries, databases, file storages, etc.) is possible. In the most popular Internet resource, about two billion multimedia documents are available for familiarization and working.

There are other common tools available to the user, including e-mail, mailing lists, newsgroups, and chat. Special programs have been developed for real-time communication, which, after establishing a connection, transmit text entered from the keyboard, as well as sound, image, and any files. These programs allow you to organize the joint work of remote users with the program running on the local computer.

To ensure effective information retrieval in telecommunication networks, there are automated search tools, the purpose of which is to collect data on the information resources of the global computer network and provide users with a quick search service. With the help of search engines you can search for World Wide Web documents, multimedia files and software, address information about organizations and people.

The use of computer technology in the educational process is designed to solve important didactic tasks. First of all, it is the improvement of the organization of the educational process, the acceleration and intensification of the learning process, ensuring its flexibility and individual approach. In addition, computer technologies can significantly increase the productivity of students' self-preparation, ensure the development of their personality,

stimulate research activities and, in general, increase the level of independence in the learning process.

With the help of network tools, it becomes possible to have wide access to educational, methodical and scientific information, organization of operational consulting assistance, modeling research activities, conducting virtual training sessions (seminars, lectures) in real time. A powerful technology that allows storing and transmitting the bulk of the material being studied is educational electronic publications, both distributed on computer networks and recorded on electronic media. Individual work with them gives a deep learning and understanding of the material. These technologies allow, with appropriate refinement, to adapt existing courses for individual use, provide opportunities for self-study and self-test of the knowledge gained. Unlike traditional books, educational electronic publications allow you to submit material in a dynamic graphic form.

The advent of computer technology has made it possible to create a qualitatively new educational environment as a basis for the development and modernization of the education system. Computer technology is of key importance at all levels of the educational system. At each stage of cognitive activity, scientific research and in all branches of knowledge, computer technology performs the functions of both tools and objects of knowledge. Thus, the innovation of computer technology provides a revolutionary development of the educational process. Computer technologies belong to the class of innovative technologies that ensure the rapid accumulation of intellectual potential that guarantees the sustainable development of society.

Digital technologies are rapidly distributed and updated (high-speed Internet; high-performance digital mobile devices — smart phones, tablets, etc.; Web 2.0 tools — blogs, wikis, social networks, etc.; cloud services — Google, Office 365, and so on; a new generation of virtual reality devices and artificial intelligence). This opens up unlimited opportunities for access to digital tools, materials and services (which used to be the privilege of elites). Trainees and teachers receive unprecedented earlier control over their information space and its sharing. Their possibilities for self- and mutual control, for the formation of interest in learning, for meaningful (accepted by students) study work have expanded. The promising digital technologies that offer prospects to influence the development of the education system today include blockchain technology, artificial intelligence (AI) and virtual reality (VR).

Computer technologies in the educational process opened new, previously unseen opportunities for the development of distance education, which previously existed in the form of distance education and faced numerous problems related to the lack of necessary contact of a teacher and his student, poor control over the course of the learning process, etc.

Distance learning today is getting an education using the Internet and modern computer technology. With distance learning, educational information is exchanged using modern electronic and computer tools at a distance, thus, distance learning significantly expands the possibilities for obtaining high-quality professional education. Computer technologies provide prompt delivery to the students of the main volume of the studied material, including electronic educational resources; provide an opportunity for interactive cooperation of students and teachers, for example, during online discussions, round tables and seminars; they guarantee a quick assessment of the knowledge and skills acquired during the training. Since the necessary part of the distance learning system is self-study, with the help of modern computer technologies a student can study the material, using not only printed publications, but also videotapes, electronic textbooks and reference books, has access to electronic libraries and databases containing a huge amount of various information [9].

At the same time, the introduction of distance learning in higher professional education presents a number of difficulties. The transformation of education by many teachers and the administration of educational institutions are perceived as a threat to the very existence of the system. Teachers have not yet adapted to the results of student learning in the form of information resources uploaded to the system. The intangibility of the results of students' activities, their particular insubstantiality, turns into a false notion that education is accomplished as if without effort from the student himself. The administration draws the same conclusions regarding the teacher who controls the student's educational activities in virtual space and time, and not in the immediate vicinity of him, not in the classroom. The illusion of the impersonal nature of education arises. This phenomenon reflects a fundamental shift in education, the transition from the old paper infrastructure to the new informational infrastructure, possible due to the action of IT-technologies and web-practices.

IV. Ethical Problems of Computerization of the Educational Process

With the development and intensification of the practice of using distance and e-learning, computer technologies are increasingly acquiring the role of a significant social factor, which inevitably leads to a number of situations requiring ethical regulation [10]. The ethics of distance and e-learning, in addition to the generally accepted rules and norms of pedagogical ethics and ethics of higher education, also include certain elements of computer ethics, a special area of research dealing with ethical problems arising in connection with the development and application of computer technologies. Of course, the computer itself does not and cannot change ethical norms and regulations; it only increases, and in a substantial way, the technical and operational capabilities for immoral people to harm for their personal or corporate purposes.

An important role in the ethics of distance learning is also played by the communicative competence of the subjects of business relations. It includes the traditional forms of business correspondence that were established 150 years ago in England (etiquette of business correspondence, letters of thanks, press releases, other official documents), as well as the norms of so-called electronic etiquette (netiquette), i.e. ethical rules for working on the Internet,

with e-mail, mobile phones, etc. The norms of electronic etiquette are an extensive scope of the rules, the coverage of which requires a separate topic. For example, here are the following simple rules for electronic correspondence: 1) an email must be correct and correctly filled out; 2) you should always check the spelling of the address and the name of both the recipient and the sender; 3) for faster identification of your letter by the recipient, you should always briefly and clearly indicate the subject of the letter; 4) responding to a letter, pay attention to whether the subject should be changed; 5) before sending a letter, it is advisable to save it in a separate file; 6) an e-mail, just like a regular letter, must comply with the accepted rules of business correspondence; abbreviations and jargon are unacceptable; 7) you must always reply to emails or acknowledge their receipt; 8) when e-mailing should be especially careful with confidential information; 9) you cannot give publicity or publish information from personal letters without the consent of their senders [11].

So, modern social reality, based on information and knowledge, requires from the person formed abilities to receive new knowledge, creatively transform it and solve complex tasks on their basis. A serious tool for meeting these requirements is the computer information technology used in training. Properly organized educational process with the use of modern innovative technologies allows forming the necessary skills and abilities, contributing to the development of such important qualities for the future specialist as intuition, professional flair, flexibility and creativity of thinking, analytical skills. Therefore, the full implementation of computer information technology, of course, should be one of the priorities of the information educational policy of our society and the state.

The computer and digital revolution essentially changes the traditional methods of education, gradually displacing the teacher from the educational process. The use of a computer as the latter gives education fundamentally new moral and educational and methodological parameters, making some routine functions of the teacher's profession (especially verbal teaching methods) unnecessary. This introduces a completely different vector to the interpretation of the "pedagogical impact" category with a clearly pronounced tendency to reduce external (on the part of the teacher) impacts and increase the internal potential of an individual in its cognitive activity (self-education, independent search for the most acceptable computer solutions, self-control, etc.).

At the same time, to present the prospects of a complete transfer of the educational process to electronic-digital teaching methods only in romantic and iridescent tones would be a serious delusion. The global nature of the process of universal computerization has led to the exacerbation of many social and moral problems, which also fully affect the institution of education, has generated new negative collisions. Computerization affects the economic and psychological reorientation of a person in the outside world, forms a completely new ethical situation in society, changes people's behavior, and not only for the better. The transformation of computer technology into an integrated part of the educational process put forward a number of new moral problems. The global introduction of computer technologies into the educational process, and especially the desire to replace traditional educational technologies with them, can give rise to many problems and, ultimately, lead to a serious depletion of the educational process, which can turn from the most complicated creative process of "creation" of an individual into a primitive speed and volume, information transfer.

Among the negative consequences of the use of computer digital technologies in all forms of education, it is possible to single out the possible negative impact of computer equipment (with its long-term use) on the physiological state and health of both teachers and students. It should be noted that many hours of work with computers, printers, e-mail, etc. is very dangerous for human health. For those who often deal with computer processing of information, a disease occurs, which experts call "information fatigue syndrome", a state where a person loses the ability to adequately perceive information and make the right decisions based on it. Such a state can significantly impede the normal course of the educational process.

However, the most dangerous consequence of the complete transfer of the educational process to computer rails is the possible curtailing of the lively dialogical communication of the participants of the educational process — that communication, which is the most important and practically the only source for the development of students' speech and, consequently, their independent creative thinking. Without a developed practice of direct dialogue, a teacher with a student, students among themselves, etc., it is impossible to form the ability to correctly and accurately formulate your thoughts in a professional language, and therefore a full-fledged professional and personal development of students. "Dialogue with the computer" instead of lively human communication during the educational process acts as a surrogate for communication and is unable to fully replace it. Minimizing live, direct contact of the teacher and the student, replacing their communication in the course of traditional forms of education, such as lectures, seminars, personal consultations, with various "advanced" educational technologies (teaching computer programs, audio and video courses, etc. .) we risk missing the very possibility of the formation of creative thinking, which by its very origin is based on dialogue.

Thus, like any technical achievement, computer technologies have negative consequences, including in the field of education. So, in the cognitive-thinking plan, this is the formation of non-linear, associative, mosaic thinking, an overabundance of information, the weakening of creativity in a person. In humanitarian terms, information technologies mechanize and standardize educational activities, de-personalize the learning process, and weaken the overall humanitarian aspects of education [12].

In ethical terms, the most dangerous consequence of the mass transfer of the educational process to computerized learning schemes is the possible dehumanization of the educational process, the departure from it of the spiritual personality component, which in the course of using

traditional learning technologies was provided by the teacher's personality, his moral and spiritual influence on students.

The teaching profession, like no other, requires constant creativity. In forming their moral and ethical preferences, scientific worldview, and professional consciousness, teacher is also the creator of the same spiritual values of young people [13]. And if moral degradation, as a rule, is a consequence of the worldview vacuum, then the ideological and spiritual impersonality is born under the conditions of distorted moral orientations of the individual, contributing to its increasing distance from higher spiritual values. Educational institutions can only carry out their main social task, when in the course of the learning process not only knowledge is transferred, but the enrichment of students in the emerging consciousness of higher spiritual values takes place, and a creative person is formed.

Therefore, not even the most sophisticated electronic means can replace the personality of a teacher, a teacher who transforms students into their own professional and moral values: concern for ever-growing skills, high consciousness, ideological and spiritual maturity and moral purity [14].

V. CONCLUSION

Transformational processes in education began all over the world. They are needed in domestic education. Digital economics requires that everyone (and not only the best) students already on the training bench master the 21st century competencies (critical thinking, ability to self-learn, the ability to fully use digital tools, sources and services in their daily work) and can be creative (not by a pattern) to apply existing knowledge in a rapidly evolving digital environment. Education in a digital society is not a preparation for life and work, but lifelong education and personal development. Here is the task to form each ability to manage their own teachings. In the Federal State Educational Standard of the Russian Federation, this requirement is formulated as the task of mastering educational activities. However, there is no clear evidence that this requirement is actually met for each student. The proliferation of global information systems and artificial intelligence methods promises to help make the changes necessary for this.

In the modern world in the conditions of the digital society, computer technologies reveal to person unprecedented opportunities for educational growth and self-improvement, and it depends largely on the person himself whether we can properly manage these opportunities. Recognizing the obvious need and usefulness of actively introducing digital technologies into the educational process, one should harmoniously combine new technologies with traditional educational practices during this implementation. After all, if at present the Russian education system maintains its position, then it is thanks to a reasonable combination of valuable and bold innovations with a kind of traditional stability of functioning, while preserving the humanistic, ethical, value component of the educational process. It is in this combination the key to successful modernization of the educational system.

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