Digital Technology: Risks or Benefits in Student Training?

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Abstract

The relevance of the study is due to the trends of mass migration of daily educational operations of a University student into the virtual space of digital technologies, the transformations of dominant in the student environment of behavioral and cultural patterns, the spread of nomadism (electronic nomadism) as a new form of personality identity. These radical changes have a direct impact on all areas of student training and cause a mixed attitude on the part of the pedagogical community. The article, taking into account new trends in the transformation of the educational environment of the University reveals the pedagogic discourse of digital technology; the classification of risks and the benefits of digital technology in the preparation of the student is established. The algorithm of realization of advantages of digital technologies in innovative transformation of student training is proved. The effectiveness of the algorithm is proved by the results of monitoring of digital technologies’ implementation in the educational process of the University. The materials of the article will be useful in the development and use of instrumental platforms of digital technologies in the educational process of the University; recommended for teachers, methodologists, University managers and students.

Keywords: Algorithm, Implementation of Digital Technologies, Instrumental Platform of Digital Technologies; Information and Educational Environment; Nomadism; Risks and Advantages; Digital Competence

1 Introduction

The development of digital technologies of the XX1 century is a process that forms innovations that radically restructure the life of modern man. Billions of daily connections of people, businesses, and devices have led to an explosive growth of websites and applications with different content (2, 9). Everyone, having a laptop and a smartphone, being in any part of the world where he/she can connect to the Internet, becomes part of this system. Mass migration of daily educational operations into digital technologies leads to intensive communication of the student with a computer or smartphone, provides him/her with unique functionality, speed of operations and the ability to communicate with the world, but at the same time forms a strong dependence on individual locations of the system. There is a process of the person’s merging with the communication device and the computer or smartphone become a part of him/her. It is proved that the functionality of a computer or smartphone is perceived by a modern student as an extension of his/her body. Social network and instant messenger as a communication technology have become part of his/her daily life (6, 9). It is difficult to imagine a modern office or production room without the Internet, digital and other automated mechanisms that lead to fundamental changes in all processes. Leading experts are unanimous in the fact that in the next 15-20 years the world is waiting for the widespread use of platform models, that is, reformatting of the usual organizational structures of all sectors of the economy, industry, agriculture, education and culture, the transformation and change of dominant behavioral and
cultural patterns of personality (2). A natural consequence of these processes is the rooting of nomadism trends in the student environment—electronic nomadism as a form of identification of the individual, which today is a little-studied phenomenon in the scientific discourse and is a special problem for the educational process of the University. It is established that the sources of digital technologies in the University constitute an extensive Arsenal of educational materials that intensively affect the entire set of pedagogical interaction of students and teachers, are an open set of information systems designed to provide various tasks of the pedagogical process, filled with digital learning tools, the list of which is constantly growing and improving. Today it is high-speed Internet; high-performance digital mobile devices—smartphones, tablets; web 2.0 tools—blogs, wikis, social networks; cloud services—Google, Office 365; a new generation of robotic devices and artificial intelligence (3, 6, 9). It is proved that all these devices make the instrumental platform of digital technologies, open and accessible to each student. Ideally, a graduate of the University in such an environment forms the whole set of creative qualities and abilities expected from him/her not only by the modern labor market, but also by scientific spheres that solve the problems of creating robotics, artificial intelligence and other futurological areas (1, 2). In connection with these trends, there is a permanent interest of specialists and researchers to study the features of digital technologies and the results of their use in the educational process of the University. Therefore, this article pays the main attention to the substantiation of theoretical and methodical grounds of reducing risks and expanding the benefits of digital technology in the training of the University student. Pedagogical modeling, the key idea of which is to reduce risks and expand the benefits of digital technologies in the educational process of the University, is implemented as a leading research method. The article, taking into account the new trends in the educational environment of the University, reveals the pedagogical discourse of digital technologies; the classification of risks and benefits of digital technologies in student training is established. The algorithm of realization of advantages of digital technologies in innovative transformation of the student training is proved. The effectiveness of the algorithm is proved by the results of monitoring of digital technologies’ implementation in the educational process.

2 Literature Review

The significance of the revolutionary transformations of the educational process, mediated by the implementation of digital technologies, is noted in a significant number of studies (2, 4, 5, 10). No less well-known group of other studies devotes its studies to the substantiation of the advantages of digital technologies in the process of creating an innovative, open and accessible to the student information and educational environment of the University (1, 6). The works devoted to the use of digital technologies as modern technical means in the educational process are defined (2, 9). Most of these researchers believe that the main disadvantage of digital technologies is the ignoring the values of ethical problems in the process of immersing the student in the world of digital technology, often causing rejection of reality with all its consequences (10). The advantages of the most studies include numerous opportunities for personal self-development and self-determination of students and teachers; reducing the bureaucratic and routine load of teachers; improving the quality of monitoring; the development of new forms and methods of organization of the learning process; the effectiveness of the digital package of scientific and methodical support of the educational process; expanding the possibilities of building an independent educational trajectory of the student’s personality, access to modern educational resources, increasing the transparency of the educational process, improving the process of communication with all its participants (1, 6, 9). Researchers give much interest to the pedagogization of conceptual and categorical apparatus of digital technologies, clarifying and correcting the discursive content of digital technologies as an innovative model of the educational environment of the University (2, 4, 9). A significant amount of research is devoted to the aspects of designing innovative models of digital technologies in the subject areas, in the educational process, in research projects on the problems of robotics and artificial intelligence (5, 7). In a number of works, digital technologies of the educational environment of the University are identified with digital technologies of the network community of teachers and students (6). The authors are based on the trends in the implementation of hybrid models of the educational process, leading to the creation of an active community, United by the values and interests of its members, building activities based on a common information resource. The study found that despite the active interest of specialists to the problem of digital technologies, presented in a significant number of publications, it is premature to talk about a holistic understanding of the transformation of the University educational process based on their use. To date, there are objective conditions and circumstances that require in-depth and comprehensive study of all aspects of this non-trivial problem. Therefore, the substantiation of the theoretical and methodical approach to the use of digital technology tools in the educational process of the University and the definition of the risks and benefits of their implementation in the training of students today seems justified and appropriate.

3 Results and Discussion

3.1 Pedagogical Discourse of Digital Technologies in the Information and Educational Environment of the University

In the course of this study, the pedagogical discourse of the concept is determined by the transformations of the educational environment of the University, due to the intensive introduction of digital technologies. It is no coincidence that the four vectors of education of the XX1st century: learn to know, learn to do, learn to live together, learn to live, declared by UNESCO, focus on learning technologies as the leading life landmarks that help everyone to find their life and professional path in a constantly and intensively changing world (7, 10). Over the past decade of the XXI century, the paradigm of the educational environment of the University has changed significantly. The usual scheme of life activity of a modern student is his/her
involvement in the virtual space of digital technologies, which is for him/her self-sufficient and even comfortable space. Constantly being in the electronic world, the student carries out educational, professional, socio-cultural activities, communicates with their own kind, spends free time, and expands information. He/she perceives reality itself through the digital world, and contact with it is mediated. The emergence of electronic dependence is not recognized by the individual, since the main amount of real time is associated with virtual world and is perceived as the norm (10). The student has a thirst for conquering new virtual spaces (levels), in which he/she performs actions that give impetus to the next search. This trend in the scientific literature (10) is denoted by the term nomadism (electronic nomadism). The characteristic features of the modern student – nomadic person: he/she is not attached to anything in his/her life, he/she has no point of support in the form of homeland, the core values and constant bias, the whole way of life is identical to a virtual environment is moving and flowing (4). It is proved that the lack of life principles and attachments, the constant roaming on the networks give rise to a state of disorder in existence, which exacerbates existential fears. Moreover, the electronic world allows simulations to multiply, leading the student to all sorts of phobias and lack of understanding of reality, which complicates the process of communication, business cooperation, creates barriers to future growth and development (10). Transience, mosaic nature and the antinomy of the information field in the electronic world affects mental abilities of the student. It is proved that the knowledge of the student are superficial and quickly forgotten; thoughts often do not show clarity and logical sequence, which has a direct impact on actions and behavior. Actions that force the student to constantly switch attention, lead to confusion in perception and memory failures. The extracted information is not carefully read, analyzed and compared. As a rule, it pops up on a particular occasion, quickly read and just instantly disappears from memory. As a result, the rejection of opportunities “to act humanly, to be responsible for something and to know something” is formed (2). It is established that the trends of nomadism in the pedagogical community caused a surge of rejection of digital technologies as the main source of risks for the educational process. But, despite the massive denial of digital technologies on the part of teachers, they are actively used by students who fairly assess their extensive information potential, opening up global advantages for the educational process: personalized learning, new models of cooperation, new learning strategies (1). The results of this study indicate that this potential and opportunities require its scientific justification, theoretical and methodical correction, filling pedagogized semantic content focused on the formation of the student's interest in learning, to expand the possibilities of self-control and mutual control of learning, the selection of educational materials, taking into account individual characteristics and needs, the differentiation of educational work, to achieve full educational results. Methodological grounds for solving the contradictions between the traditional educational process of the University and the toolkit of digital technologies focused on educational activities are established: the traditional educational process can no longer fully carry out its direct functions without the use of digital technologies, and digital technologies are not yet ready to provide it with scientifically based strategies for student learning. It is proved that the resolution of the established contradiction will remove the risks and increase the benefits of digital technologies in the training of the future specialist of the new generation (2).

3.2 Classification of Risks and Benefits of Digital Technologies in Student Training

The study justified the classification of risks of digital technologies that have a negative impact on the quality of the educational process, on the health and personal development of all who are included in it (7). According to the results of studies in recent years (1, 8), groups of risks of digital technologies in the educational process of the student are in a cascade interaction, layered on each other, create a permanent effect: from the risks of the short-term perspective (as far as the student has the skill of neutralizing everyday problems, conflicts) - to the risks of the medium-term perspective (how minimized the deferred risks) and finally - to the risks of the long-term perspective (how stable the real conditions of the educational process for the full implementation of digital technologies and the development of the student's personality).

Three groups of social and pedagogical risks mediated by digital technologies in the educational process are established: (a) External, due to environmental factors. There are priority risks due to the management and organizational culture of the University, faculty, Department, integrating the interests of the subjects of the educational process through the consolidation of certain rules, behavioral attitudes and stereotypes associated with the implementation of digital tools and compliance with the norms of their implementation. Also, this group may include risks associated with the organization of the educational process: the distribution of the classroom Fund, the organization of the educational process, its provision with digital tools, educational work with students, their psychological support at the stage of adaptation to the University, involvement in research, leisure activities and self-government; (b) Social and psychological risks associated with interpersonal relationships of subjects of the educational process. They are caused by interactions of subjects of educational process: teacher - student, teacher - teacher, student - student and are connected with such factors as quality of pedagogical communication; competence of high school teachers in the choice of tools of digital technologies and methods of training which are adequate to didactic tasks; in possession of communicative and control and evaluation competences, in the correctness of their use in achieving the goals of the educational process; (c) Psychological pedagogical risks determined by individual and personal characteristics of the subjects of the educational process. At the heart of this group of risks are the individual characteristics and the system of relations of the subjects of the educational process. According to the research of S.D. Karakozov, R.S. Suleymanov and A.Yu. Uvarov (2014), such properties of the subjects of the University educational process as the focus on improving the use of digital technologies, the ability to self-development, cognitive
activity, possession of skills of emotional self-regulation of behavior and activity, the ability to establish professional and personal contacts, the development of General cultural skills, determine their success and are factors minimizing professional risks for both among the teachers and the students (11). In the course of the study, the priorities of digital technologies’ advantages, the real importance of which is confirmed by the practical experience of leading universities are established (3, 6, 9): (d) Reformating of the educational environment from a source of knowledge to a full-fledged participant in the creation of new information, which changes the nature of the interaction between the teacher, student and digital technologies; (e) expansion of educational activity types of the student realized on the basis of digital technologies (information activity; network information interaction; modeling of the studied objects, their relations and processes; formalization of information; creation of a digital educational resource; use of instrumental information systems); (f) Changing the ratio of training functions. While maintaining their unchanged set the information function gradually recedes into the background, giving way to the functions of design, construction, programming, planning, forecasting, communication; (g) expansion of hypertext and hypermedia structural forms of presentation of the studied material; alternative types of teaching materials (electronic textbook, electronic tests, tools for modeling educational material, training and monitoring software, etc.); (h) Expanding spatial and temporal boundaries for communication (information exchange, access to electronic libraries and encyclopedias, dictionaries and other information resources); (i) innovative nature of educational tasks’ presentation to students through greater clarity, variability, expansion of the thesaurus, the use of complex situations and tasks of different levels of complexity, increasing the number of information resources to find the necessary knowledge, electronic lecture notes, Bank control tests, technological maps, samples of work, regulatory requirements, multi-level educational and professional tasks, options for the content of the subject page of the teacher on the WEB - site of the Department, University; (j) Constant (online) monitoring of student’s educational work, correction of its course and directions of searches in solving educational and professional tasks; (h) Practical orientation of educational activity based on virtual trainings, laboratory works, workshops.

3.3 Pedagogical Algorithm of Realization of Digital Technologies’ Advantages in Innovative Transformation of Student Training

It is a software package that provides educational, managerial and communicative functionality of the phased implementation of digital technologies’ benefits in student learning.

Educational functionality: organization of training based on cloud technologies, identification, generalization and broadcasting of best practices, remote training and retraining of teachers.

Management functionality: management of the educational process online, customizable reporting on progress (charts, ratings), methodical support, development and examination of digital educational materials and control and evaluation tools.

Communicative functions: network interaction of the University, departments, employers, students, teachers; webinars, video conferences, video broadcasts; internal communications.

First stage of the algorithm. Development of the structure and content of didactic materials in the content of digital technologies. They are determined by the peculiarities of integration of didactic and media content (symbolic information, static, dynamic and sound visual series):

- Symbolic information (text, hypertext, formulas).
- The text of the content is distributed in paragraphs corresponding to one or more classes within the lecture form of training. The text of paragraphs is structured with the help of subheadings, lists, tables. Hyperlinks provide the networked structure of the content;
- Row of static, realistic and synthesized visuals (pictures, 2D panoramas, micrograph, macro filming, charts, diagrams, charts, educational drawings, etc.). A significant number of high-quality images (slideshow, tooltips, interactive maps, time tapes) accompanies the text of the content;
- Dynamic realistic and synthesized visual series (video experiences, video tours, 3D-photopanorama with approximation/removal, 2D-animation, overlay and morphing of objects, animation created by 3D-objects, virtual three-dimensional models of objects, etc.). Immersion of the student in the subject can be achieved by providing tooltips and scalable virtual reality objects (spherical photo and video, interactive three-dimensional models of objects, etc.).
- Sound series (audio fragments) is included in the content of the educational process to play sound objects (sounds of nature, technical devices, music, speech). Multimedia is an important advantage of digital technologies.

Stage two of the algorithm. Modeling of the basic content of educational material. The main principle of this stage - the information is not presented to the student in the finished form; it is set out gradually, assuming the presence of the results of managing actions on the part of the student. Methods of organization of information assimilation by the studied represent a system that contributes to the comprehensive development of the student and contain modeling, fixing and controlling components. Tasks, materials and instructions for independent work and practical training, for observations and experiments, tasks and questions for testing knowledge and feedback, exercises to consolidate knowledge and skills, tasks and links to previously studied material, as well as components aimed at establishing inter-subject and interdisciplinary connections are mandatory. Third stage of the algorithm. Procedural part. The study proves that the implementation of the procedural part of the digital tools is based on the possibility of establishing various forms of interactive student interaction with multimedia educational content: manipulation of screen objects; linear navigation (scrolling within the screen or moving from one slide to another); hierarchical navigation (selection of subsections using the menu, trees); interactive help called by buttons on the navigation bar (context-sensitive help is most effective); feedback (the resource
responds to the user by evaluating the correctness of the completed task). These answers are recorded on the screen. If further progress in educational materials depends on the results of the task, the correction of the educational trajectory; constructive interaction (resource allows you to create and configure display objects, as well as manage them; users can add new nodes and hyperlinks to existing ones, expanding the existing structure of the multimedia application). Based on the received information, the optimal sequence of studying the material within the lesson is created. Forth stage of the algorithm. Implementation of evaluation means of the student’s educational achievements. They ensure the collection of current and effective information about the student's learning activities and provide him/her with information on completion of the work in the form of a Protocol of results. Electronic testing is a formalized type of control. Working with training control tests and self-control systems can give explanations in the case of an incorrect answer and recommendations for the use of a textbook, thesaurus or additional material. In case of placement of an electronic educational resource on the Internet server of educational institution, it can be provided receiving by the teacher of data on results of work of each student through resources of e-mail. Fifth stage of the algorithm. Implementation of student’s activity management tools. It provides the student with the opportunity to freely choose one of the three modes of operation in the educational environment of digital technologies - self-government, differentiated management on the part of the teacher and management by software training. The first two types of management are due to the human factor - the student and the teacher and the level of communication between them. Mode software training provides for the management of the educational process in the course of a student individual learning paths and in this case, the tools of digital technology record all the achievements and mistakes of the student in accordance with a predetermined program. Sixth stage of the algorithm. Implementation of means of communication. It is designed for the organization of electronic interpersonal communication between subjects of training using asynchronous and synchronous communication. The learning process in this case has an active activity – communicative nature.

4 Conclusion

The study confirms the theoretical and practical importance of pedagogical substantiation of approaches to the implementation of digital technologies in the educational process of the University. In the course of the study it proves that digital technology is not only and not so much a toolkit to ensure the development of interactive multimedia educational content, as an innovative educational environment of the University, reflecting the achievements of science and technology of modern civilization. In connection with these trends, the main attention this article gives to the substantiation of theoretical and methodical grounds for the study of the risks and benefits of digital technologies in the training of a University student. The article, taking into account the new trends in the transformation of the educational environment of the University, reveals the pedagogical discourse of digital technologies; the classification of risks and benefits of digital technologies in student training is established. The algorithm of realization of digital technologies’ advantages in innovative transformation of the student training is proved. The effectiveness of the algorithm is proved by the results of monitoring of digital technologies’ implementation in the educational process of the University. The study touches upon a small aspect of the problem, which is of all-encompassing importance for the transformation of higher education. It does not exhaust all aspects of the problem. The primary task of further research is the conceptual justification of strategies for the correction of nomadism syndrome as a risk factor of digital technologies in the personal development of a new generation of specialists.

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