Modern Digital Educational Environment and Media Education – Platforms for Transforming Education System

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Abstract

The modern information society makes new demands on education. It should provide social mobility of citizens, their activity, the ability to make decisions, to extract knowledge independently, using distributed systems of digital educational content, in particular on the basis of educational platforms. In this context, media education is becoming an important component in the formation of competencies required by a member of the digital economy society. Theoretical and methodological approaches formed within the framework of media education are a necessary component of an updated education system created on the basis of a digital educational environment. The creation and implementation of the Digital Education Environment (DEE) model, as a platform for organizing and supporting various forms of training and full-fledged training activities of an educational organization for the digital economy, is a unique process simulation that should take into account many factors, such as scientific and technological achievements, socio-economic conditions, modern information and methodological and didactic and educational tools based on digital technologies.

The article was written on the basis of the RANEPA state assignment research programme.

Keywords: digital technologies, digital educational environment, transformation, mass communications, media education.

1. Introduction

A Digital Education Environment is usually understood to be an open distributed set of information systems designed to provide a variety of educational process organization tasks. The most important purpose of the digital educational environment is to ensure interaction of all participants of the educational process among themselves, as well as their interaction with digital educational resources. To date, there is some empirical evidence in determining the composition and structure of the digital educational environment, but the generally accepted invariant structures of this environment have not yet been identified. As part of this work, an attempt has been made to highlight such structures and build on them a model of a digital educational environment that meets the realities of the digital economy.

2. Materials and methods

The sources of the analysis carried out in the article were the materials of Internet reviews, electronic and journal publications. It is possible to solve the problem of improving the integrated

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system of ensuring the educational process based on the digital educational environment by relying on empirical methodology, methods and technologies based on integrated scientific theory of design and modeling of information systems,

In order to solve this problem, it is necessary to fully study the existing systems of organization of personnel training using educational platforms and information and educational environments in the world and Russia.

The main tool for identifying effective practices and building on them an integrated model of information and education is the study of existing systems of organization of vocational education.

Based on this model, a set of measures is defined to determine the structure of the digital educational environment, describe the relationships between data flows and component composition, organizational and methodological tasks. The organization of the vocational training system in educational organizations should be sensitive to positive foreign experience as well, determine integration opportunities in terms of exchange of practices, rework of courses, student and teacher mobility.

3. Discussion

Analysis of publications of recent years shows that the discussion of problems of the digital educational environment takes place, as a rule, within the framework of a specific discipline, a specific university, less often – a specific direction. At the same time, there are works dedicated to discussing the general structure of the digital educational environment of the university. The general structure of the digital educational environment under the conditions of the beginning of the process of intensive informatization of education was given by I.G. Zararova (Zakharova, 2003) and A.G. Abrosimov (Abrosimov, 2005). In the works of S. L. Atanasyan, the model of the digital educational environment of the pedagogical university was built and analyzed (Atanasyan, 2009). The work of D.A. Gagarin considers the highly developed digital educational environment of the university as a means of forming a humanitarian component of higher education (Gagarina, 2009). At the same time, the term "highly developed DEE" means filling the educational environment with qualitatively new educational resources created on the basis of new information technologies. A number of works explore the relationship between the digital educational environment and the media education system. For example, in work A.G. Bodalova, V.A. Bondarenko and other authors investigate the role of media education in the development of the digital educational system in the context of the formation of a digital economy society (Badalov et al., 2017). The article by I.V. Fotiev and K.A. Kirilina considers media education in the context of digital education from General philosophical positions (Fotiev, 2019).

In recent years, studies have appeared in which the digital educational environment is considered simultaneously as a technical, pedagogical and social system.

In the works of S. Black (Black, 2018), A. Silverblatt (Silverblatt, 2016), various aspects of information literacy are investigated as an extension and deepening of the concept of computer literacy. The necessity of mastering information literacy for specialists from various fields is emphasized. In the work of A.Y.L. Lee (Lee, 2016) examines the possibilities of mobile devices for the formation of media literacy using the specific example of China. The author emphasizes the fundamental importance of the emergence of Web 2.0 technologies, which make it possible to organize interactive interaction between teachers and students.

Specific pedagogical problems lead to broader generalizations: the prospects for the formation of media literacy in the dynamic digital world M. Bulger, R. Davison (Bulger, Davison, 2018) and the influence of the characteristics of modern cyberspace on education S. Gálik (Galik, 2017). These are, of course, the key problems of modern education. One of the most important features of the modern information society is the emergence of the "Big Data" phenomenon. Its influence on the educational environment is diverse and little studied, which, in particular, was emphasized by V. Williamson (Wiliamson, 2018). The presence of Big Data makes it difficult to find the necessary information and communicate. These aspects are touched upon in the work of A. Folk (Folk, 2018).

A fundamental direction of research in recent years is the analysis of the use of "smart technologies" in the process of learning and communication: M.T. Cole, L.B. Swartz (Cole, Swartz, 2020). In particular, reliance on such technologies makes it possible to organize training in a multilingual classroom, which is emphasized by the work of D. Rutkauskiene et al. (Rutkauskiene, 2020). In the same vein, the possibilities of the digital educational environment are being explored

to personalize learning by choosing individual learning paths. This aspect was considered in the work of S. Benhamdi et al (Benhamdi et al., 2017).

In general, a wide range of studies related to the digital educational environment, the formation of media grammar on its basis and the organization of the educational process can be noted.

4. Results

In addition to information and communications technology development processes, the transition in all life-supporting areas to digital technologies (DT), the education system will not only have to transform, but also build paths to overcome issues related to public dissatisfaction with the educational results of the modern generation training system, flexible design and modeling of educational and processing models in the context of the world globalization of economic, technological, educational spaces and objective rapid development of technical solutions, which systemically determine changes in labor markets.

Digital technologies are rapidly distributed and updated, providing unlimited access to electronic resources, tools and services. The pace of development of the new technological (digital) revolution is so rapid that it offers students and teachers unprecedented expansion of opportunities for self-control and mutual control, for formation of interest in learning on the basis of a single information space and its sharing, development of cognitive abilities using virtual reality (VR) technologies and artificial intelligence (AI) (Shutikova, 2019). But methodological developments on the application of modern technologies in the educational process are progressing very slowly. Therefore, it is necessary to develop new approaches and methodological solutions that will use new information and pedagogical implementations (Beshenkov et al., 2019). These solutions should be based on the independent work of trainees, their joint work in small groups, collaborative interaction, training based on digital technologies. All this requires both changing the role of the teacher, and formation of appropriate abilities in the trainees, and updated discipline of educational work, and allocation of space for such work in the structure of educational process.

New priorities of the state (Putin, 2018) in the field of innovative development based on the use of DT give rise to the third wave of information and communication technologies (ICT) use in training. The digital transformation of enterprises in the industrial and social spheres is initiated by the National Program "Digital Economy" (Passport of the national program, 2018), which should also support the corresponding changes in education.

Transformational processes in education systems take place all over the world and are certainly necessary in domestic education. The requirements of the digital economy in the field of education are, first of all, the acquisition by each student of the competences of the XXI century (critical thinking, ability to self-study, "knowledge extraction," ability to fully use digital tools and services in their daily activities), as well as the creative approach to applying existing knowledge in a rapidly developing digital environment.

The digital transformation of education is an update of planned educational outcomes, the content of education, methods and organizational forms of learning, and an assessment of the results achieved in a rapidly evolving digital environment to dramatically improve the educational outcomes of each student. The challenge is to harmonize in a single educational process:

- Acquisition of pre-selected content by students (it is socially defined);
- Achievement by trainees of externally formed and independently selected targets;
- Support and development of students 'ability to teach, formation of their educational autonomy, generation and development of their personal identity in the process of mastering both socially specified and independently selected content.

Digital technologies create conditions and offer solutions to this problem through improvement of information means of planning and organization of educational process, wide use of active methods of training and transition to personalized, using the possibilities of the digital educational environment (DEE).

The digital transformation of education requires the consolidated efforts of all participants in the educational process: students, teachers, the administration of the educational institution, as well as parents, employers, representatives of various social structures, etc. In this work, there are three key directions:

- Creation of an integral infrastructure of digital education;
- Development of digital educational and methodological tools, resources and services, including electronic evaluation of educational results;
- Development and dissemination of new models of management and organization of educational and educational activities based on the Next Generation Network (NGN), ensuring high quality communication services and high-speed access to information resources and data of the world civilization.

Implementation of these directions requires qualitatively new approaches in existing pedagogical practice, change of tools and platforms for scientific and methodological research and development in the field of educational content.

Development of digital technologies and tools used for educational process management, expansion of access to unlimited amounts of various electronic, educational and methodological materials, application of adaptive mechanisms and information and educational resources, expanding educational and creative capabilities - all this makes it possible to speak about transition of educational organizations to complex use of DT in the model of educational process organization (Beshenkov et al., 2016). At the same time, access to libraries of ready-made digital educational materials focused on specific educational tasks does not prevent the teacher from selecting, structuring, developing and editing educational materials for effective use in certain subject areas. The above-mentioned directions in the organization of the educational process can be implemented in a comprehensive manner only on the basis of the DEE.
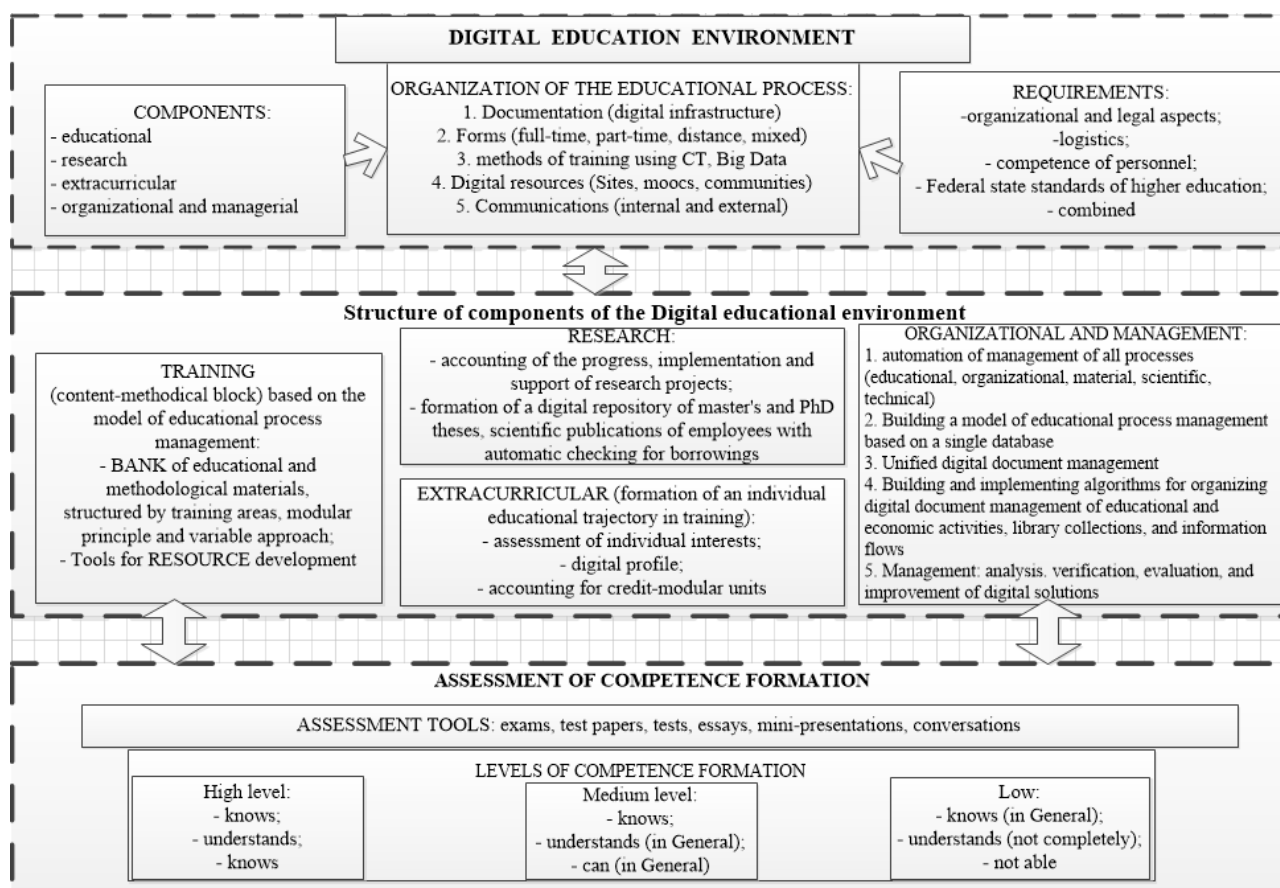
Digital Education Environment is a complex concept, which is not limited to information technology support of the educational process, but combines the system of educational institutions, management mechanisms, databases of educational materials and computer programs, local and global information networks, various libraries, hardware and software, methodological guides on their use in educational activities. Within the framework of the digital educational environment, the learning process is as follows: the development of standards of achievement of students required for each level of training or competence, followed by the comparison of the obtained results of certification with the standard for admission to the certification of the next level; Evaluation, review of written works with presentation of the assessment and with information support of current monitoring of the student 's academic performance, with preparation of an electronic report for its registration and sending to the corresponding division of the university; Support for moderation of classes and certification, accumulation, analysis of training achievement statistics, possibility of re-recording of student achievements; Standardization of educational content while ensuring access of the trainee to information resources and adaptation of content to its individual features; Providing the minimum required amount of educational content adequately to the student 's personal capabilities.

The Digital Education Environment (DEE) allows to organize effectively personalized training and control, monitoring the success of the student (including independent training activities). The DEE tool expands the capabilities of the trainee without limiting the time of access to educational content in the means, location, but at the same time the responsibility for the performance of the educational process increases. Wide use of multimedia educational materials, virtual/augmented reality technologies, gameplay developed in accordance with the requirements of pedagogical design, significantly contributes to adaptive perception of educational materials, motivation of students to study, creation of conditions of successful organizational, pedagogical and educational work (Beshenkov et al., 2017).

This approach involves the consistent consideration, development and subsequent integration of components and digital resources for information and communication support of Digital Education Environment – based educational activities. The processes of operation of the electronic information and educational environment shall be provided by appropriate information and communication technology tools and qualification competence of employees using it and supporting it in accordance with the legislation of the Russian Federation (Federal..., 2012, Letter..., 2014).

The enlarged structure of the model of the Digital Education Environment, the relationships of the basic components in the organization of the educational process is shown in Figure 1.

Fig. 1. Expanded structure of the Digital Education Environment model

The organization of the educational process based on the digital educational environment is supported and defined by the relationships of the following components:

- Educational (organization of educational process, including monitoring and measurement of educational results, and methodological activity),

- Extracurricular (formation of individual educational trajectory, individual interests of students, participation in digital communities and other types of extracurricular activities);

- Research (maintenance of design-research and scientific works, development of new methodological and instrumental solutions in training, improvement of skills Faculty and teaching staff),

- Organizational and management (modeling of information flows by organization of management, economic and economic activity).

Along with the same components, the functioning of the digital education environment in the higher education system directly or indirectly determines the requirements according to the specified scheme (model) in Figure 1:

- Organizational and legal requirements include recommendations on formation of digital educational environment and requirements to structure and component composition of digital infrastructure (Order…, 2019);

- Material and technical requirements are defined by the system capabilities and model of information flows necessary for the organization of the educational process in various forms and methods, ensuring document circulation, economic and financial activities, ensuring information security;

- Requirements in terms of personnel competences consist of descriptions of tools, approaches and possible advantages, prospects for development and use of the general educational environment in all types of activities of employees and Faculty and teaching staff (FTS);

- Requirements for ensuring the educational process in accordance with federal state educational standards (FSES);

- The combined requirements reflect the structure and rules of operation of the educational organization's official website, digital educational content in accordance with FSES requirements

and other open digital resources, including interactions with digital communities of educators, students, schoolchildren, parents and other interested persons (stakeholders).

The effectiveness of each activity of the educational organization should be improved by the use of digital technologies and it is necessary to provide for key forms of application of digital resources and technologies for the organization of the educational process, control and measurement of educational results, out-of-school activities, scientific and methodological activities, organization, management and economic activities, using such resources as comprehensively as possible, jointly and uniformly.

When considering the design of the digital education environment model, it is necessary to describe the functional tasks of each structural component of the digital education environment in accordance with the model shown in Figure 1.

Educational a component includes:

- Creation of a bank of teaching and methodical materials structured in the areas of training on the basis of a credit-modular system of training;

- Development and integration of educational services of information system, educational video portal;

- Development of online courses for all educational programs;

- Development and placement on national and international open education platforms of mass open online courses (MOOC's);

- Adaptation and introduction of promising technologies in education (artificial intelligence, virtual reality, blockchain, cloud technologies);

- Development of remote system and introduction of technologies of mixed and inverted education (video sections, webinars, podcasts, forums, etc.);

- Implementation of the subsystem of credit units based on the results of the training modules with the possibility of rewriting educational achievements in other educational areas and as a result of educational mobility;

- Development of tools for personalization of education and formation of an electronic repository of educational and methodological works for students with checking for borrowing (antiplagiate).

The component of extracurricular activity includes:

- Development, attraction of internal and external digital resources in the out-of-school activities of the educational organization;

- Establishment of digital correspondence between training and out-of-school resources

- Integration of digital facilities and special equipment for cultural and mass activities, including digital information on out-of-school activities.

Development of subsystems and tools for interpersonal extracurricular communication;

- Development of means of digitalization of teachers 'work in cooperation with curators on out-of-school activities;

- Digitalization of stakeholder surveys on the quality of the educational process.

Research activity assumes:

- Automation of determination of rating scientific indicators of employees;

- Taking into account progress, execution and support of research projects;

- Formation of a digital repository of master's and PhD-dissertations, scientific publications of employees with automatic check for borrowing.

Introduction of a system for the preparation and conduct of electronic conferences;

- Preparation, review and publication of digital versions of scientific journals, digital collection of articles;

- Access to international knowledge-based databases;

- Automation of scientific work management of educational organization subdivisions;

- Formation of reporting on the basis of access to indicators of scientific and research activity;

- Access to cloud-based data tools to conduct research and link research to learning resources for learners.

Main directions of organizational and management activity components:

- Automation of management of all organizational, technical, economic and educational processes;

- Management of educational processes (formation of educational plans, programs, load distribution, accounting and analysis of training quality).

- Formation of a digital catalogue of library collections as part of an electric library;
- Creation and maintenance of a single database for digital document turnover (students, employees, PPP, counterparties and subsystems of economic and economic activity).

Evaluation of competence formation as a result of training includes control, measurement, monitoring and storage processes based on:
- Development, implementation and automation of test tasks of various forms and their inspection systems based on the division of test materials into diagnostic, measuring and controlling ones;
- Development of a unified database of tasks in disciplines and areas of training;
- Linking of control-measuring and training materials with further implementation of adaptive system of training results monitoring (Shutikova, 2014), including development of proctoring system (online test monitoring).

The requirements of the Ministry of Science and Higher Education define the mandatory inclusion of remote educational methods in the educational process, And when conducting accreditation examination of educational programs implemented through e-learning and remote educational technologies, It is mandatory to have local normative acts regulating the procedure for identifying participants in the educational process and documenting their actions, Conditions and means of conducting online consultations within the framework of e-learning, access of students to educational and methodological materials of the educational program, Regulations of group and individual interaction of participants of educational process, as well as methodological recommendations, Instructions of work in the electronic information and educational environment of the university are mandatory (Nikulina, 2015). Accordingly, in the conditions of digital transformation, the university needs to develop and implement an information model of the functioning of the educational environment of the university, "Regulation on the electronic educational and methodological complex," Regulation on the functioning of the DEE".

5. Conclusion

The use of the digital education environment for the organization of the educational process implies the use of developed tools of information and communication technologies, a high level of ICT-competence of teachers and a systematic approach in the design and development of the digital education environment.

Integration of methods and technologies of media education in the digital educational environment based on the achievements of the fourth industrial revolution allows expanding its educational opportunities.

The completeness and complexity of digital transformation of educational processes can be achieved through the formation of a single digital educational environment of the educational organization and the large-scale introduction of achievements in the field of digital technologies (DT).

The modern digital educational environment bases its "life in number" on the basis of educational platforms, single databases, high-speed communication lines and, thanks to the integrated application of these technologies, a distributed organizational and educational environment is created, in which future specialists are formed, acquiring professional and non-professional competencies in working with digital technologies and skills of independent "knowledge extraction" for successful life activity in the information society.

Digital Transformation relies on developing DT, their overall impact on societal development in all areas where information is mechanized and automated. Digital transformation processes take into account current and future technological changes, affect practically all spheres of human activity.

The availability in the university of such advanced technological solutions as online education, mixed and mobile training, in fact implemented holistically only in a single digital educational environment, is a key factor in the success of the educational organization.

6. Acknowlegements

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