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**DIGITAL TRANSFORMATION OF THE EDUCATIONAL
PROGRAM FOR STATE AND MUNICIPAL STAFF TRAINING**

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Abstract

The competitiveness of the university in the eyes of the population, regional authorities, youth, business community, scientific and educational community is largely determined by whether the university can offer modern education technologies that meet international standards, requirements and expectations. Digital education technologies have now become the agenda of forums and conferences, inevitability of this progress has prompted researchers to predict the future of universities. The article summarizes the experience of Samara Technical University on digital transformation of the educational program for state and municipal staff training, applies the author's approach to its assessment. It is shown that digital transformation is in all areas of the external and internal environment of the university. The modular curriculum that creates the conditions for self-education, the variability of training, forming digital competencies, the presence of conditions for the electronic interaction of all participants in the educational process, the expansion of manufacturability due to the development of the digital environment. It is necessary to expand the horizon of integration into the learning process of online courses. At the same time, the question of the priority of the quality of education in the digital environment remains debatable. Cognitive studies, the use of an analytical database, and experts will be required to form and implement unique technologies that would fully comply with the principles of education of the 21st century.

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Keywords: Digital technologies, digital competencies, civil servants.



1. Introduction

The relevance of this article is due to the fact that in recent years the traditional system of lecture and seminar classes has been replaced by digital technologies focused on computers and mobile gadgets, the Internet (Pontes, Silva, Guelfi, & Kofuji, 2012), global online content available, and independent choice of training paths. The approach to training in terms of flexibility and staffization is changing, the latest results of applied and fundamental research on the problems of state and municipal administration are taken into account, (Drozhzhinov, Kupriyanovsky, Evtushenko, & Namiot, 2017) and it ensures the maximum compliance of graduates' competencies with the requirements of civil servants (Popov & Semyachkov, 2018). The purpose of this article is to consider the mechanisms of formation of the digital development model of the educational program for state and municipal staff training at a technical university from the point of view of new competencies of students. According to the authors, the main platforms for digitalization in higher education are variability of the curriculum; availability of computers, information networks and systems, gadgets for mobile education; online environment for interaction between participants of the educational process; staff offices of students; access to online library content; online training (Linn, Davis, & Bell 2004); teacher competence; university participation in ratings; cooperation with the employer (Dirks, Keeling, & Dencik, 2009; Kanter & Litow, 2009). According to the results of the study, the authors proposed a model based on which it is possible to develop and implement management decisions in the field of digitalization and digital transformation of the educational program.

2. Problem Statement

The pedagogical problem can be solved through network relations, the widespread use of mass open online courses from leading universities (National Research University, Higher School of Economics, 2018). At the same time, pedagogical science uses the concept of pedagogical interaction, communication in a broad sense, and includes communication as an exchange of information and knowledge. Knowledge is a systematic, deep view of the world, so deep that it becomes possible to predict new facts. Problems of content and meaning should be necessary components of the digitalization process. It is hardly possible to gain knowledge only with the help of a “digit”, a teacher, a mentor is necessary, and digital information will be an assistant to a teacher (Beshenkov, 2018). The study examines new forms of implementation of the educational program, while identifying their advantages and disadvantages in relation to analog forms. Judgments are based on achievability of goals of education and training, acquisition of a set of knowledge, skills, values, experience and competence.

3. Research Questions

In the existing Russian studies, models of digitalization of education are based on indicators of the use of digital copies of textbooks, digitization of high school workflow, and access to the Internet. Representations of digitalization relate to computers and interactive panels equipping, relate to the retraining of teachers. Researchers took into account variability of educational programs, the use of competencies and capital of private companies for the development of the educational infrastructure (Novikov, 2018).

Online functions are used as a basis for exchanging information, for enhancing the level of teaching, e-learning allows remotely teaching or learning, without necessarily requiring face-to-face meetings, but using data exchange instead, mainly through online resources, such as communication networks - usually the Internet (Pontes et al., 2012).

Staff of the University of North Carolina (Christensen & Knezek, 1999) believes that the introduction of digital technology goes through six stages: information, training, understanding of the process, familiarity and confidence, adaptation to other contexts and creative applications to new contexts.

A feature of the study is that digital transformation is assessed in relation to the educational program. The study made it possible to formulate a general idea of the state of digitalization of the educational program, to reveal the competitive advantages of using numbers in areas important from the point of view of the quality of education and the formation of necessary competencies.

Breakthrough digital technologies in education remained behind the analysis, which represents an independent research topic.

4. Purpose of the Study

Purpose of the study:

- Disclose internal mechanisms for the formation of a digital university development model.
- Assess the current state of digitalization of educational programs in the specialty “State and Municipal Administration”.

5. Research Methods

The systematic approach is the basis for the study of digitalization of the educational program, so the university was considered as a system, each of the elements of the system (sphere) has its specific goals of digitalization.

In order to form a model and formulate strategic measures for the development of digitalization, the authors reviewed state and municipal staff training at leading universities in the world.

The study examines the impact of the civil service, as the main employer for university graduates, on adaptability of the educational process. The authors used point cumulative data.

Then the assessment of digitization by spheres was carried out on the basis of qualitative information obtained from practical projects of Samara Technical University on digitization of the scientific technical library, computerization of the university, digital development of academic teaching staff, digitalization of the interactive environment of participants in the educational process.

The competence analysis was carried out on the basis of competencies from the curriculum and from the educational program. It was supported by the competencies of state and municipal staff from the regulatory framework controlling qualifications.

At the final stage, the results were analyzed and strategic recommendations for digital capacity development were formed. The theoretical and methodological base of digitalization of education is insufficient, and the authors used expert opinions, considered various alternatives, research hypotheses, discussions.

6. Findings

6.1. Studies of International Experience of State and Municipal Staff Training

The University of Birmingham, UK offers a masters degree program in Public Administration in the following specialties: Finance, Human Resource Management, Public Administration, etc. They study issues of public policy, service and administration from an intercultural, interprofessional and interorganizational point of view. There are two forms of education: onsite and online education with totally 180 credits. The main disciplines: Strategic Public Administration and Effective Change, Comparative State Policy and State and Public Administration. Elective disciplines: Modern Security in International Relations: Suppliers and Challenges; From Security to Risk: European International Relations in the 21st Century; Nation and Identity; Negotiations and Lobbying in the EU: a Game Simulator. Training includes lectures, seminars, textbooks, student presentations, virtual speakers and visits to public sector organizations. Educational assessment tools: exercises, essays, exams, presentations, reports, thesis.

University of Public Administration (Tsinhua, China) is one of the world's leading universities in public administration offers the following educational programs: Public Policy, Public Administration, Philanthropy, Global Management, Development Planning, Sustainable Development (international dual degree MPA-SDG), Big Data Management (international double degree MPA-BDG). Duration of training: 2.5-4 years. The programs offer courses in Public Administration, National Medium-term and Long-term Planning Strategies, Public Crisis Management, Improving the Quality of Competence in Personnel and Leadership in Urban Management, Public Service in Reforming New Urbanization, Social Development Management, Cultural Reform, Education, Public Health Systems, Global Economic Models and National Economic Security, International Politics and Political Systems, Sustainable Economic Development, etc.

John F. Kennedy School of Government (USA) offers mid-level master degree programs in Public Administration (one-year) to choose several courses and develop their own curriculum. The volume is 32 credits, with one course or 4 credits from the mandatory list of subjects:

- Economics and Quantitative Analysis;
- Management and Leadership;
- Public Ethics and Political Institutions.

The courses "Management of Operations", "Digital Government", "Persuasion: Science and the Art of Effective Impact" are recommended for studying.

The Master of Public Administration curriculum (two-year course, 64 credits) combines academic subjects and staff and professional development disciplines. It is supplemented by two mandatory electives in the field of Concentration Policy, as well as four credits in each of the mandatory list of subjects. The following courses are recommended: Leadership from the Inside, Game Theory and Strategic Decisions, Office Work and Company Management.

Professor David Avis and other expert practitioners prepared the program "Digital Transformation in Government: Innovative Government Policy and Services". The program provides students with a deeper understanding of the growth of digital platforms and the opportunities and tasks they create, managing large IT projects, understanding how digital space will inform about the future of public policy,

understanding the ability of solving the political and ethical aspects of management in the digital age technology in the best way, understanding how the use of social networks affects government institutions from both an internal and external point of view, and a brief description of how to help organizations become digital. Educational programs should influence the development of critical thinking and self-searching capabilities.

6.2. Digitalization of the External Application Environment of Graduates' Labor

The digital environment (space) in the enterprise management system is an open set of information resources intended to support various management tasks (Potokina, 2018). Local ecosystems are considered as key factors affecting the functioning of universities (Unger & Polt, 2017). The reason for the development of the digital economy program (Digital Economy Program of the Russian Federation, 2017) is digitalization of the public sector. Staff should not act as a deterrent but should correspond to the goal.

Regional authorities are open in relation to the population, on the websites of the Government of the Samara region there are sections on working with citizens, a register of services, consultations within the framework of “you ask, we answer”, legal information, current targeted programs, it is possible to conduct a survey of citizens, applicants were given the opportunity to use an enhanced qualification electronic signature, including a universal electronic card. Technology and availability of services affect the cohesion of society and the achievement of European goals set by the Lisbon Declaration (Popper & Miles, 2008).

The city is considered as a “system of systems”, where the interaction of individual subsystems serves to harmonious development (Dirks et al., 2009; Kanter & Litow, 2009).

Government infrastructure: information systems and subsystems, public access centers, telephone service centers, information security systems, information and telecommunication networks, including a data network, a data center network, and Internet resources. The development of digital technologies in the public sector makes it possible to improve the quality of public administration (Popov & Semyachkov, 2018). At the same time, support for management decisions and their implementation is developed in the “e-government” paradigm, and not in the “digital government” paradigm (Dobrolyubova, 2018).

The maturity stages of the “digital government” by Gartner:

1. Online government
2. Open government
3. Data-centric government
4. Fully digital government
5. Smart government (Drozhzhinov et al., 2017)

The development of public sector technologies is now moving towards the use of big data and cloud technologies.

University graduates work in state and municipal government organizations, and knowledge of the law, possession of social technologies, and skills in organizing scientific research allow graduates to work successfully with enterprises setting up relationships with public authority (Roy, 2009).

6.3. Digitalization of the Internal Environment

The key role of educational institutions in the development of innovation ecosystems is primarily expressed in the formation of human capital (Benneworth & Hospers, 2007).

Samara Technical University - one of the leading universities of the Middle Volga region implements multi-level training (bachelor and master degree programs) in the specialty “State and Municipal Administration” onsite and online training. The university’s strategic plan for digitalization covers a number of key aspects, including digital technology, management changes and teacher development.

Modular curricula (Table 01), based on interactive training using modern information technologies, create conditions for independent training, training variability, adaptation of the educational process to individual opportunities and students’ needs.

Table 01. Structure of curriculum modules for state and municipal personnel training, 2018

| Modules | Bachelor degree program/ onsite training | | Master degree program/ online training | |
|------------------------|--|------|--|------|
| | Credits | % | Credits | % |
| Basic part | 90 | 37,5 | 18 | 15 |
| Variable part | 123 | 51,2 | 63 | 52,5 |
| Undergraduate training | 18 | 7,5 | 30 | 25 |
| State qualifying exam | 9 | 3,8 | 9 | 7,5 |
| Total | 240 | 100 | 120 | 100 |

Note: Source: compiled by the authors.

Learning the bachelor degree program (4 years of onsite training, 4.5 years of online training) forms, along with others, the basic competences in information technology:

- Ability to use information technology to solve various research and administrative tasks.

Learning supports the competence of learning courses from the curriculum:

- Computer Science;
- Information Technology in the Economy;
- Business Communications;
- Innovations in Social and Cultural Activities;
- State Innovation Policy;
- Innovative Management.

The master degree program (2 years of onsite training, 2.4 years of online training) for consulting and information and analytical activities helps the student form information and communication competences:

- Ability to verify and structure information obtained from various sources;
- Ability to use information technology to solve various research and administrative tasks.

Learning supports the competence of learning courses from the curriculum:

- Information and Analytical Technologies of State and Municipal Government;
- Technology Management of State and Municipal Property;

▪ **Informational Competence of State and Municipal Staff.**

There are certain contradictions between the indicators of the program (Digital Economy Program of the Russian Federation, 2017), focused on the digital model and indicators of the socially oriented educational program in the specialty “State and Municipal Administration”, however, with a flexible approach, the department implementing the educational program is able to combine models, taking advantages by increasing digitalization in other disciplines, in independent work, in practices.

The vision of the future of training technology is the following: compulsory school comes to an end. Artificial intelligence will make a significant part of school regulations meaningful. The future lesson should be based on the genuine interest of schoolchildren, their constant motivation to participate in the educational process.

The assistant to students in self-learning the discipline, which allows them to learn the content qualitatively, is an educational and methodological complex in online form for each course of the curriculum (Table 02).

Table 02. Educational and methodical complex of the discipline

| Structure | Availability |
|---|---------------------|
| Training program in the discipline | Online |
| Manual, textbook, course of lectures (materials for theoretical learning) | Online |
| Practical guidance for individual tasks of students (task book with examples of problem solving, computational works, a guide to the formation of online presentations) | Online |
| Guidelines for tasks and guidelines for course projects | Online |
| Questions and tasks for each topic / section for self-control | Online |
| Study materials for control and self-control (questions, test questions on topics / sections of the discipline, training and control tests, questions for preparing for the exam, a list of approximate topics of essays, instructions for working with literature, etc.) | Online |
| Lists of recommended textbooks | Online |
| Supplemental material | |
| Presentations on each topic; video lectures; additional multimedia accompaniment for audio and video materials, educational films; additional tests for training testing, in-depth study; links to network resources in the public domain | |

Note: Source: compiled by the authors.

The graduate department closely cooperates with the Institute of Mathematics and Computer Science, whose professors give lectures on Computer Science and Information Technologies, and leading professors from other Russian and foreign universities are invited. The main component of such cooperation is the digital preparation of students, the creation of the basis for research skills and continuous learning throughout their careers (Linn et al. 2004).

All students (100%) have staff devices (mobile phone, tablet, laptop) for mobile learning in the classroom, both at home and on the street. All 100% of students use mobile devices in the classroom and prefer to use them in mathematical calculations than a stationary computer (Table 03).

Table 03. University policy regarding information systems and information and telecommunication networks

| Computers, systems, networks | Availability |
|---|--|
| Online information and educational environment | Automated information data system “University” |
| Total number of computers with access to the information and telecommunications network “Internet”, which students have access to | 4011 |
| Ratio student / computer | 4 |
| Total number of online library systems that students have access to | 5 |
| Availability of own online educational and information resources | + |
| Availability of third-party online educational and information resources | + |
| Availability of online catalog database | + |
| Audience for teaching disciplines in the specialty “State and Municipal Administration”: Multimedia learning tools: SMART BOARD Dual Touch wide board with built-in ultra short-focus DLP Unifi UX60 projector, SMART Audio 240 audio system with 4 wall speakers, document camera AVerVision CP 135 NEW. Computers included Pentium 463 \ 3.0 GHz64bit2M with LG Flatron L 1752S-SF-17 Monitor | |

Note: Source: compiled by the authors.

Students are provided with individual unrestricted access to online library systems containing all editions of the main literature listed in educational programs, from anywhere with access to the Internet, both within and outside the university.

The university has the services of “Internet sites”, “E-mail”, “Catalog of online educational resources”, and “Training pathways” - a service that provides the possibility of compiling educational pathways from several online-educational modules.

In a single collection of digital educational resources, there is a section on the specialty “State and Municipal Administration”, and to support teachers there are training courses in certain programs, newsletters, almanacs, articles, and curricula. Online courses are provided by open online courses of the national open educational platform. It is at the initial stage of formation.

Identified risks: there are some lectures and textbooks of low quality in the Internet; access to content after payment; closeness of the textbook and the obsolescence of content, open for access only after 5 years from the date of publication.

The online environment of the university provides: interaction between participants of the educational process, including synchronous and asynchronous interaction through the Internet, access to the curricula, educational programs of disciplines, practices, recording of the educational process, results of learning; classes and exam procedures provided for using e-learning (Table 04).

Table 04. University informational and educational environment (teacher’s staff office)

| |
|-----------------------|
| Structure: |
| Rating |
| Questioning |
| Additional education |
| Individual curriculum |

| |
|---|
| Regulatory and methodological documentation |
| Reports |
| Staff documents |
| Student Portfolio |
| Messages |
| Performance and attendance |
| Information on educational programs |
| Classified Internet resources |
| Open education |
| Accumulation system |
| Corporate Email |
| Antiplagiat University system |
| Academic teaching staff |

Note: Source: compiled by the authors.

There is a student portfolio; this online student portfolio is formed throughout the entire educational program, including papers, reviews and grades for these papers from any participants in the educational process, scientific works, and participation in competitions and contests.

When the educational program is accredited, availability of licensed automated information systems is one of the most important positive outcome factors. At the university, the provision of programs is entrusted to the information and computing center, the center staff prepares a list of available systems (and this should be a decent volume), the auditors fit the list in with what is shown in the reports of the educational program. The cost of digital equipment, the cost of upgrading equipment and software is covered both by private investment, by the research work of the department, by the budget. It is possible to relieve the pressure on the budget through cooperation with regional distributors in several ways: free of charge, on the basis of discounts for educational institutions, using demo versions. Distributors take an active position in the training environment: annual contests of students of designers and students-users of automated systems, diploma theses, master classes, career days, conferences about innovations that have already come out and about the planned updates.

Staff. Qualifications of academic teaching staff are strictly formalized (Table 05).

Table 05. Normative grounds for admitting a teacher to educational activities

| Type of educational activity | Position | Education and training | Experience | Digital competences |
|--|---|---|--|---|
| Teaching bachelor degree programs and advanced professional programs | Senior Lecturer Teacher Assistant | Higher education - specialty or master degree programs. Additional vocational education. Professional retraining: 1 time in 3 years | Assistant: not required. Teacher: 1 year Senior teacher: 3 years | Modern educational technology of professional education |

| | | | | |
|--|---------------------|--|---------------------------------------|--|
| | Associate Professor | Higher education - specialty, master degree programs, postgraduate programs. Additional vocational education. Professional retraining: 1 time in 3 years | 3 years | Online educational and informational resources on a readable course. Online educational and information resources for organization of educational and professional, research, project activities of students and for writing final qualifying works. Measures to modernize the material and technical base of the educational office (laboratory, other educational premises). |
| Teaching postgraduate programs, internships and additional professional programs | Professor | Higher education - specialty, master degree programs Training in additional professional programs: 1 time in 3 years | 5 years and for internship - 10 years | E-learning, use of distance learning technologies information and communication technologies, online educational and information resources. |

Note: Source: compiled by the authors.

The work of the university in terms of the quality of staff: personnel reserve, criteria assessment, rating system: publication activity, links, Hirsch index, research, participation in expert councils, scientific councils, etc. The university has created a course for continuous professional development of academic teaching staff (240 hours) to further deepen the application of modern information technology skills. The course is funded by the state.

The presence of inconsistency (Beshenkov, 2018; Kuzminov, 2018) in the views on lecturers participation in the educational process and educational mission of the institution: universal access to higher education due to the Internet will lead to the loss of the educational mission, the lecturer ceases to be a knowledge reporter, his tasks includes new directions - the development of online educational resources, and the student should independently learn them; world-famous scientists will give lectures to all the educational space, textbooks will be robots, and later robots will check the knowledge deepening of the educational program.

Digital absorption - replacement of the lecturer with digital products.

Samara Technical University participates in foreign and Russian ratings (Table 06).

Table 06. Ratings of Samara Technical University, 2017

| Rating | Place in rating |
|--|--|
| ARES Rating | 55 th place from 173 HEIs of Russia Category BBB |
| Webometrics Ranking of World Universities | 70 th place from 1223 HEIs of Russia |
| World University Ranking 4 International Colleges & Universities | 85 th place from 386 HEIs of Russia |
| QS University Rankings: EECA | 151-200 th place from 200 HEIs in the world |
| Rating of demand for university graduates | 3 rd place from 132 HEIs of Russia |
| Worldwide Professional University Rankings RankPro | 539 th place from 600 HEIs in the world |
| Annual ranking of Russian universities Expert RA | 52 nd place from 100 HEIs of Russia |
| National University Ranking "Interfax" | 65 th place from 238 HEIs of Russia |

Source: compiled by the authors.

Ratings indicate that the university is professional in its field and is included in the global knowledge-sharing networks, its scientists go to international conferences and seminars, its students are invited to postgraduate and doctoral studies at universities-world leaders.

6.4. University and Employer

External consumers of graduates in the specialty "State and Municipal Administration": political organizations, the apparatus of the Duma, the ministries of culture, education, labor and social protection, tax, financial, customs authorities to conduct organizational and regulatory activities. The specialists are supposed to be engaged in, among other things, the development of information and communication technology infrastructure, the development of the Internet, the introduction of information and communication technologies, including e-government technologies.

Basic professional competences - typical, core competencies within the framework of this specialty (Obuschenko, 2017) Competences in information and communication technologies applied to all civil servants and employees of municipalities: the use of interdepartmental and departmental online document management, information and telecommunication networks; user search engines; work in state information systems.

Basic knowledge, skills and knowledge in computer science, information and digital technologies are obtained at school and during the first year of study at the university, then the subjects of informatization and digitalization of these state structures are included in disciplines of direct activities of government bodies (taxation, customs management, etc.); within the framework of familiarization with the automated workplace of a civil servant; after graduation at work - staff training for work in the sectoral automated information system and the continuous deepening of skills in working with online systems in the framework of various courses and trainings through their educational and methodological centers.

The constant increment of state service by new competencies is a kind of signal for the graduate department. The curriculum is structured, the content of lectures is optimized, manufacturability of lectures, practical, laboratory classes and independent work are improving. A new training course to study

technologies of the “smart” city is being introduced, which makes it possible to increase the employee’s adaptation to future changes, the quality and efficiency of urban services. Courses on state and municipal services include e-government issues.

The cooperation between the department and employers is formed and improved on a systematic basis. The heads of regional specialized ministries and local departments are involved in shaping the university’s development strategy, academic teaching staff give lectures, offer innovative research topics, manage final works, and chair the state qualifying commissions. At the final stage – when defending the final qualification work, there is an assessment of the competence declared in the educational program. The chairman of the commission is an expert, an employer, an employee of a public administration system in one person. He expresses a critical assessment of the structure, content, and development of the educational program, which, from our point of view, is explained by interest in the progressive development of human capital through educational programs aimed at developing competencies for working in the high-tech industry of the public sector.

7. Conclusion

Digitalization of education - training based on the replacement of analog technologies with digital technologies, and the development of the latter. Trends in digitalization are set by the state and the external environment in the form of state and municipal government organizations.

The results of the assessment of compliance with the criteria of digital technology for preparing students in the specialty “State and Municipal Administration” confirmed that the educational program contains signs of digitalization, and adaptability is expanding due to the development of the digital environment. The university provides desktops and mobile devices, equipment for lecturing, presentations and online library content. The university operates in the conditions of online interaction of all participants in the educational process. Highly qualified academic teaching staff is undergoing certification, can improve the competence in digitalization in advanced training courses of the university. Student’s portfolio is formed.

High performance in some areas is combined with low performance in others: the integration into the training process of online courses is at an early stage. The declared benefits of digital education are based on availability of world-wide educational content, flexibility of curricula, and education issues remain behind.

Barriers to digitalization: the cost of digital technology, the cost of automated information systems, the speed of technological change (Digital Technologies in Schools 2016-17, 2017). At the same time, the development and use of new digital technologies and control of such technologies by a student is not an obstacle.

The curriculum requires courses on the study of technologies of the “smart” city, which allows increasing the employee’s adaptation to future changes, the quality and performance of urban services. Educational programs include topics covering e-government issues. In the future, it is necessary to develop students’ competencies regarding big data technology, blockchain, artificial intelligence.

The balance between digital and traditional technology contributes to the quality of education, and therefore it enhances the competitiveness of the university’s educational program.

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