Analysis of Organizing Distance Learning in Public Institutions*

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Abstract. Increasing the role of information technologies in society, digital transformation in public institutions need to accelerate the improvement of professional skills and the level of IT competence of specialists and employees. The article presents the results of research of the current situation with the learning of employees of state institutions. The organization of distance learning is considered as a complex socio-economic system, on the one hand, simplifying the process of learning the necessary knowledge, on the other, giving rise to new problems. In the research, a grouping of users of state information systems was carried out, problems of their distance learning were identified, and recommendations were made on the development of the process of organizing distance learning. Considering the need for psychological analysis of different classes of users, assessments of their competent level, the issues of improving technological tools for systematizing improving the reliability of the received data from users, and improving the objectivity of the final results on training are highlighted. An example of a typical organization of an e-learning platform for a government organization is given.

Keywords: Human Capital, Digital Transformation, Distance Learning Technologies, Socio-Economic System, State Information Systems.

1 Introduction

Currently, the state is undergoing a process of "digital" renewal of all areas of life. The legal framework is actively developing, creating the necessary conditions and new opportunities for the development and satisfaction of social, humanitarian, and information needs of the population and the economy as a whole. Such actions are inherent in the "Digital Economy of the Russian Federation", Decree of the RF Government dated 24.05.2010 № 365 "About coordination of actions for use is information-communication technologies in the activity of state bodies". In 2017, the decree of the President of the Russian Federation dated May 9 approved a new strategy for the develop-

ment of the information society in Russia for 2017-2030, which prioritizes the development of human resources and the creation and application of Russian information and communication technologies to ensure the national interests of the digital economy [1]. Attention is drawn to the sharp updating of the available information resources of state bodies at all levels of government, and promising information technology complexes of tools are planned to expand their functionality.

These processes have created demands for updating the principles of professional training, as well as the need for mass professional development, retraining of various specialists and employees, especially those working in state organizations. Thus, the number of students enrolled in various additional programs began to increase sharply, which naturally leads to the need to use digital e-learning technology (DET) and quite large material, financial, and infrastructure investments. The existing set of interrelated and interacting components allows us to consider the process of organizing distance learning as a socio-economic system [6], characterized by a high degree of management complexity, aimed at improving the efficiency of staff performance and developing the human capital of the state organizations.

Distance learning programs and technologies are closely related to the specifics of the student population (schoolchildren, students, specialists). However, some common problems can dramatically reduce the overall effectiveness of training if ignored. We will consider these issues concerning the contingent of specialists working in government agencies, which are currently undergoing the process of "digital transformation" (DT). The identification of structural and functional relationships within the staff that are the subject of educational activities, due to changes in the state of objects, will allow us to move to model support processes that contribute to the improvement of the considered socio-economic system.

2   Generalities

The development and modernization of specialized state information systems (SIS), Internet portals, and means of providing certain electronic information services by the state, which are different in scope and purpose, leads to the complication of their functionality, which must be mastered by the personnel of state bodies and the population. According to the Federal state information system for coordination of Informatization, in Russia until 2019, the number of SIS only at the Federal level was about 1000 units. Besides, subjects and municipalities of the Russian Federation have such systems, and their number is much higher. As an example, Table 1 shows data on important departments for DET development.

Note that according to ROSSTAT, the vast majority of both civil servants and citizens, in general, have the skills to use standard tools for working on a computer [3]. This is also confirmed in the report "Digital transformation of public administration: myths and reality" on a report conducted at the higher school of Economics [4], using the example of age categories from 30 to 59 years (Figure 1).

However, most of the personnel available in state bodies are not ready for a large-scale digital transformation of public administration, due to the insufficient level of development of regulations and the practice of using specialized information tools.

As can be seen from the statistics provided in table 1, the designated government agencies are operators of a large number of GIS, which also require specialists with appropriate information and communication skills. To date, it is not possible to obtain such knowledge without the use of DET.

Table 1. Sample from the summary table with the total number of GIS in Russia [2].

| Executive branch	The Register of Roskomnadzor		Federal state information system for coordination of Informatization, 2019		
	2015	2019	in general	original	duplications
Ministry of Labour and Social Protection Russia	8	7	85	49	36
Ministry of Digital Development, Communications and Mass Media of the RF	16	13	53	39	14
Ministry of Education of Russia	0	0	32	24	8
ROSOBRNADZOR	12	12	31	20	11
Ministry of science and higher education of the RF	0	0	28	20	8
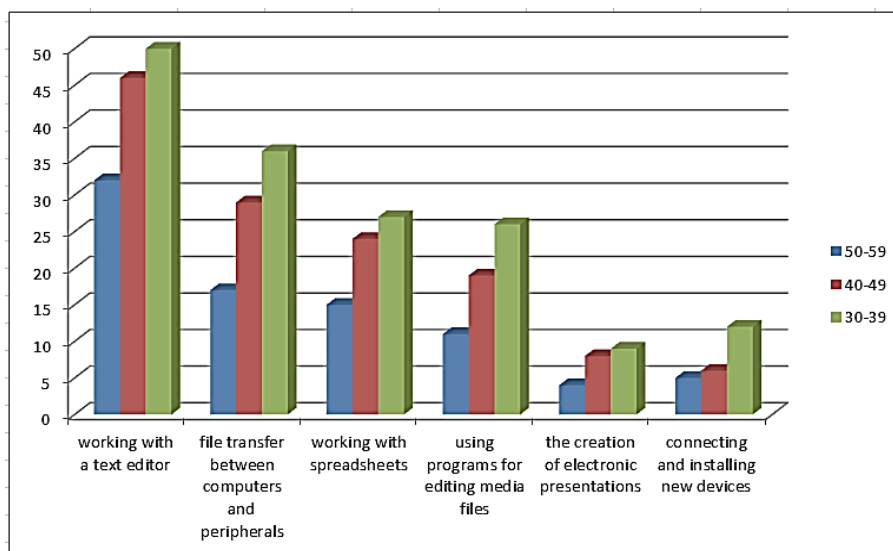
Fig. 1. Knowledge of information technology skills for civil servants aged 30 to 59 years

To assess the current situation with the training of employees of state organizations, their readiness for the digital transformation of public administration, due attention should be paid to the effectiveness and efficiency of the system of professional development and retraining. According to [4] standards, the established terms of additional professional training of civil servants are three years. **According to the Decree of the Government of the Russian Federation of May 6, 2008, No. 362 "on approval of state requirements for professional retraining and advanced training of civil servants of the Russian Federation", the established terms of additional professional training of civil servants are three years. Research by the higher school of Economics [4], conducted in 2019, notes that "the share of students enrolled in it training programs each year is 12-15% of the total number of students in priority areas, which means that the share of civil servants involved in the digitization of government bodies increases annually from 0.02 to 0.45%, depending on the group of positions."**

Table 2. The percentage of civil servants from Federal and regional Executive authorities who have completed professional development or retraining, % [4].

Positions	Senior	Major	Leading	Senior	Junior
Federal Managers	30.7	34.2	29.9		
Regional Managers	29.9	34.3	29.9		
Federal assistants (advisers)	11.0	17.8	19.1		
Regional Assistants (advisors)	10.7	17.1	19.1		
Federal Specialists	17.5	29.5	31.0	20.7	
Regional specialist	20.4	28.8	31.5	20.2	
Federal Support specialists		30.2	24.9	16.3	22.0
Federal Support specialists regional Support specialists		30.5	26.1	15.7	22.1

Considering organizational issues related to the support of distance technologies in education (and not only), but we also note that over the past few months they have become particularly relevant. If earlier this issue raised serious doubts on the part of adherents of traditional methods of education, the events related to the response to the COVID-19 pandemic led to the fact that all Universities were forced to implement "online technologies" in the process of training and final certification. Organizations that deal with both school and continuing professional education, regardless of the number of students, have faced almost the same problem.

3   Analysis of problems

The current situation of self-isolation of the population has allowed us to identify additional problems in the field of distance learning, which have not yet been so obvious. This is primarily due to the huge expansion of both the contingent of students and the contingent of "training", which includes not only the teaching staff but also all those

who provided the very process of "online learning". The overall scale of the newly identified problems allows us to focus on some additional aspects that were not previously taken into account due to the insufficient scale of application of new educational methods.

One of the important tasks of digital transformation is to ensure that people are ready to learn and use it. the results obtained in practice and getting benefits from it. Divide potential participants into several groups.

The first group is those who should use the results of digital transformation in their practical work (entrepreneurs, officials)

The second group consists of individuals who are directly involved in the implementation and implementation of digital transformation processes. These are it specialists-developers, programmers, and technical staff.

The third group consists of business analysts and experts who evaluate the planned effects that will be obtained (possibly) from the implementation of digital transformation in the analyzed areas of activity.

The fourth group is direct users who may be affected by the introduction of digital transformation in various fields of activity. In other words, it is the population.

We will analyze the problems associated with digital transformation based on this grouping.

Problem 1. Assessment of the impact of digital transformation on the practical activities of each group.

Group 1-the result of digital transformation should be an increase in the efficiency of the structure (enterprise or institution) due to the effects that are formulated by the third group and implemented by the second group.

Group 2-expanding the scope of work on the implementation of digital transformation processes and their transfer to the field of practical development (information systems, digitalization of processes, modernization, or redesign of existing systems). Additional work means additional income. At the same time, it is not clear how the results of digital transformation will affect the direct activities of representatives of the group under consideration.

Group 3-expanding the scope of work on the analysis of "best practice" based on the analysis of information sources about the experience of successful implementation (usually online and foreign publications, since this process is in the initial stage in our country). The advantages are the same as for the second group.

Group 4-representatives of this group need to rebuild the principles of their interaction with structures (organizations, departments, enterprises) that have undergone digital transformation. About power structures-the transition from interaction with" humanoid "representatives of structures to interaction with" virtual "representatives, including"artificial intelligence (AI)". The assessment of the impact of digital transformation on activities for this group cannot be assessed by purely economic factors. It is necessary to take into account the social, psychological, legal, and other aspects associated with the active implementation of AI in real life. It is necessary to take into account not only the "advantages" of digital transformation but also the "disadvantages" that exist but are often not taken into account by representatives of the third group, because they are multidimensional and their impact on the final result is not obvious.

Standard methods of assessing the economic impact do not apply to them, but these factors can greatly affect the success of implementing digital transformation processes in various areas of society.

Problem 2. Different understanding of the final goals and current tasks of digital transformation in different groups.

If we talk about the ultimate goal of digital transformation with a specific structure, there is no particular disagreement. Improving business efficiency, increasing profitability, reducing labor costs, improving time characteristics, etc. These goals remain unchanged for all work carried out in the field of implementing its elements in the production and organizational spheres of activity. However, the ways to achieve these goals and the list of current tasks are subjective for each group. Moreover, current tasks are formulated and implemented differently in each group.

1 group. Understanding the current tasks in this group depends very much on the degree of" immersion " of the group's representatives in the problems of implementing its tools in practice. There is a big gap between representatives of government bodies (officials) and businessmen. If the latter cannot successfully carry out their production activities without modern systems, then in the case of officials (especially at high and medium levels), the situation is more ambiguous [8]. This is due to many factors, including the level of readiness of state organizations ' personnel to implement it in their activities. At the same time, we should talk not so much about the practice of using office systems (e-mail, text editors, electronic document management systems), but about the practice of using "business Analytics" tools, "analytical and expert systems" and other modern intellectual methods and methodologies. They need to understand how their activities will change at each stage of digital transformation and see the benefits of its implementation. Lack of understanding of this, which may be due to a lack of awareness about the processes of digital transformation, as well as some "functional illiteracy", which does not allow you to effectively use the results of digital transformation in your work.

There is a psychological aspect associated with the fact that a person perceives any event based on previous experience, which is why the conclusions that he makes and the actions that he performs may be incorrect [6]. There is a psychological aspect associated with the fact that any event a person perceives is based on previous experience, which is why the conclusions that he makes, and the actions that he performs, may be incorrect. It is necessary not so much to abandon "traditional" or "standard" solutions but to put into practice the methodology of "critical view", which allows us to assess not only the "obvious" advantages of decisions, but also potential risks, including in related areas of activity, and to consider other alternative solutions, based on a comprehensive assessment of interrelated factors of effectiveness.

2 group. Developers often do not think about the final goals and focus on the current tasks, which is due to restrictions on the development time and resources available to them. We use tools and methods that were well established in early projects. From the point of view of programmers-developers – digital transformation is a new "fashionable" synonym for the concepts of "automation", "Informatization" or "digitalization". What are the specifics of digital transformation work and how does it differ from their

usual activities? Most programmers ask this question. Without understanding the specifics of the tasks that they must solve, without understanding the new functions that must be implemented in the process of digital transformation, it is impossible to ensure an increase in the efficiency of both the development process and the effectiveness of the implemented product.

Group 3. Business analysts and experts who are directly involved in justifying specific tasks that need to be solved to achieve the final goal often formulate them based on their own previous experience and based on the experience of foreign companies, which can lead to incorrect values of the selected coefficients for indicators used in evaluating the effectiveness of a digital transformation project. These criteria often do not take into account specific restrictions specific to domestic systems, such as information security requirements, import substitution requirements, and requirements related to regional (legislative, national, climate, etc.) specifics. Another issue is related to the assessment of the level of "competence" of the analysts involved as experts in a specific area of digital transformation. At the same time, if incorrect decisions of the first and second groups bear some responsibility for the decisions made, then experts and analysts are not responsible for their forecasts (as a rule). This makes it necessary to create a "database of experts" that allows us to evaluate the effectiveness of their forecasts with subsequent assessments of their "competence" in this area. At the same time, we are not talking about a General assessment of the level of experts who may be brilliant specialists in other fields.

Group 4. Direct users do not care about the processes of digital transformation. They need a specific result that they will get at each stage. These results should be considered in the analysis of digital transformation processes carried out by group 3 experts since the overall effectiveness applied to a particular field of activity depends on the success of the perception of the results of digital transformation at the end-user level.

Problem 3. Educational level for digital transformation. Human capital.

The result of using the results of digital transformation depends largely on the people involved in the digital transformation process itself. It should be noted that the educational level (in its sphere) differs not only for different structures but also for different regions. Let's not repeat the well-known theses about "digital inequality" in the universal sense, let's talk about this problem about power structures in different regions. Long-term experience of interaction with various regional authorities that are users of state information systems has confirmed the thesis about the "telecommunications inequality" of regions, which is related not only to economic issues of economic activity in the regions but also to problems of geographical and climatic nature (transport connectivity, "Northern delivery", etc.). This leads to the fact that the level of "it competence" among representatives of all four groups is very different. This raises the question of the need for differentiated specialized training for all groups of users on specific issues related to the implementation of digital transformation processes in specific regions for specific areas of activity.

4   Conclusions

The identified problems become particularly relevant in conditions when all training processes are conducted using DET.

1. Digital transformation of government agencies involves the introduction of a large number of information systems, their integration within super services. This leads to the need to integrate educational information systems, which are currently used by different authorities and are not coordinated in any way. At the same time, individual elements of these systems, such as electronic document management, accounting, and financial subsystems, and personnel subsystems are often based on the same software and information products. However, educational programs are implemented completely independently in various departments and state organizations. This is due, among other things, to the fact that the Ministry of education and science does not have real capabilities to manage educational technologies at the level of state structures.

2. There is a large disparity of approaches in educational processes related to the processes of digital transformation for public authorities and public institutions. As a result, there are additional costs due to duplication of individual solutions and possible selection of inefficient options.

3. Limited use of domestic software for "online learning". Most of the technologies used in recent months to provide remote interaction between students and teachers were based on various imported technologies. However, some of them were used in test mode due to the lack of appropriate licenses for full versions of software products. Almost every organization chose its options for solving these tasks, based on the available resources and experience of the "supporting" contingent. The decision to use a particular technology was left to system administrators without taking into account specific requirements that could be formulated based on the specifics of the educational process. This was partly due to the lack of experience of the teachers themselves, who were forced to use exactly the tools that were provided to them.

4. Educational products created by market participants in the field of distance learning for representatives of government agencies, even in cases where they are common basic subsystems that do not affect the specifics of individual departments, cannot be reused due to their proprietary nature, discrepancies in data models, methods and methods of processing them, and the tools used.

5. The lack of agreed requirements for technological tools used in the processes of distance education leads to the emergence of "national" solutions based on foreign prototypes based on freeware software, but without working out the issues of their further maintenance and modernization.

6. There is no single technological platform that would allow reducing the costs of both the state apparatus and business to implement DET and in a safe and state-controlled mode.

7. There are practically no General approaches to the preservation of documents confirming the fact of passing real training and the results of real certification. In terms of distance learning, the problem may only be difficult since the question is about the reliability of the stored digital data on the actual compliance of individual students and reporting on technology and the period of storage of such documents.

To describe the creation of such an aggregated tool, we introduce the term e-learning platform. Accordingly, its design and development require updating the methodological and legal regulation. The existing normative and methodological materials are insufficient since they only address certain aspects of the above-mentioned problems.

Platform properties should ensure information security, reliability, and import independence in the future. To promote the innovative development of the state, the platform should provide an ecosystem for creating educational technologies for the digital transformation of public authorities. When considering the social and economic aspects of creating such a platform, it is necessary to take into account the psychological reaction of various groups of users to changes in the processes of mastering new competencies. This can be facilitated by the developed services of electronic testing and evaluation of specific competencies for the development of human resources in the organization. As a complex socio-economic system, the e-learning platform should consist of management, methodological, content, and evaluation e-services. Today, the market for its tools has a sufficient number of proprietary software and freeware software [7,9,10]. Based on the above, the result of designing such a platform is shown in Fig. 2.
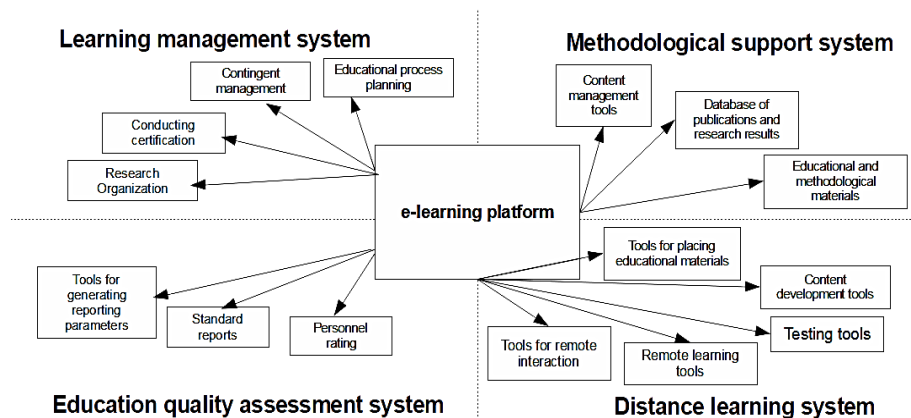

Fig. 2. The proposed component structure of a typical e-learning platform for government organizations.

As a recommendation, we present the following: it is necessary to develop a system of standards similar to state educational standards, which should provide, among other things, the unification of technological solutions for identifying participants in the educational process, for fixing both the learning process and the results of final certification, for developing unified solutions for storing current and final documents on education (certificates, certificates, diplomas, etc.). Also, some of them do not pass certification for the absence of undeclared opportunities, which creates prerequisites for subsequent abuse.

It is impossible to solve these tasks only by organizations subordinate to the Ministry of education and science. It is necessary to involve both departmental state scientific organizations and commercial structures that have long been working in the field of

providing educational services. To do this, however, it is necessary to interest these structures in the need to coordinate joint efforts to create a unified domestic technology platform DET.

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