

Economic Modernization, Human Capital and Smart-Learning Technology

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Abstract. The article explores the correlation between the educational component of human capital and the processes of economic modernization. It reveals the essence of the modernization process and its importance in global development; demonstrates the role of human capital in the process of modernization. The calculations were carried out using the patented Informational and Analytical System “Modernization” developed at ISED T RAS. The system is based on the technique of measuring the modernization development by He Chuanzi and N.I. Lapin. The calculations proved that, all other things being equal, an increase in the number of the employed with tertiary education increases the likelihood of the implementation of the modernization processes. The authors mention the need to stimulate the formation of cognitive and social skills, creative behavioral characteristics starting from school and present ISED T RAS experience in the formation and development of human capital from school age on the basis of using smart-learning technology at the Economic Internet School.

Keywords: modernization, human capital, educational component, smart learning, economic Internet School

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1 Introduction

At present, profound changes take place in the system of world economic relations: world leading countries (the United States, Japan, and the European Union) try to maintain dominance at any cost, and China and the so-called East Asian Tigers aspiring to take their place increasingly expand their spheres of influence of individual actions and processes at the international level. It is quite obvious that in this race, rapid development of products of a new technological paradigm will be of critical importance. And Russia may rank second in this race without a purposeful effort to coordinate socio-

economic programs, concentrate resources to address the pressing issues, primarily technological and economic progress (Shabunova and Lastochkina, 2013).

In this regard, it is extremely important for Russia to actively implement the modernization of the economy and society. Global modernization is part of civilizational development of man. In its essence, modernization is a process of deep, civilizational change driven by the new needs of society and individuals in a changing environment (natural and socio-cultural); the function of this process is to improve the abilities of society and individuals to satisfy their needs (Lapin, 2015). The materialistic nature of the transformations implies transition to a new technological mode. The humanistic component of modernization – the socio-cultural modernization – involves development and establishment of the values that focus on man and his development as an integral personality (Lastochkina, 2016.).

Indeed, global experience shows that the leading role in modernization processes belongs to human resources and the main value of society is human capital as a combination of knowledge, skills and competences of an employee (Tsapenko, 2014). This thesis is confirmed in the work by A. Krueger and M. Lindahl “Education for Growth: Why and for Whom?”, where they demonstrate that improving human capital among population with higher education ensures high technological and economic levels of the national economy (Krueger and Lindahl, 2001). The importance of human capital in economic development is reflected in several other foreign works (Lucas, 1988; Barro and Sala-i-Martin, 1992; Mankiw, Romer, and Weil, 1992; Manuelli and Seshadri, 2014).

In other words, the “increasing role of human capital as the main driving force of economic and social development” (Kliucharev, Savenkov and Baklanov, 2016) as a key resource for modernization has become one of the long-term comprehensive challenges that many developed and developing countries are facing in the new millennium. Highly-skilled personnel possessing educational background, entrepreneurial spirit, innovative and creative aspirations and able to acquire new knowledge and take an active part in managing innovation process is critical to the success and sustainability of any country (Leonidova, 2011). Foreign and domestic studies show that human capital is a more important resource than natural or accumulated wealth: an increase in the level of education by 1% leads to the faster growth of GDP per capita by 3%¹.

However, one should bear in mind that the success of modernization “is determined mostly by the quality of human capital rather than by a formally high level of people’s education”. First of all, this quality depends on the level of development of competences that are in demand in innovation economy, as well as the level of people’s labour potential implementation, i.e. “the effective use of competencies as a result of employment within one’s specialty, and the compliance of one’s qualification with job requirements” (Leonidova and etc., 2016). In addition, accelerating the rate of informatization in society, expanding high-tech production and disseminating “knowledge economy” make it necessary to improve the quality of an intellectual component of human capital (Leonidova, 2011), i.e. man’s creative abilities.

Accordingly, education is a driver of social and economic modernization, it provides training for future “generators and implementers of innovation ideas” (Leonidova and etc., 2016).

Recognizing the importance of accumulating high-quality human capital, in the early 2000s, Russia launched national programs for scientific and technological development aimed to support promising and advanced innovation and promote socially-oriented research and development. However, the coverage of quality education necessary to create initial opportunities for career promotion and

¹ For example, a detailed review of research on the impact of human capital measured by the level of education is given in Sianesi, B., and J. Van Reenen. 2003. “The Returns to Education.” *Journal of Economic Surveys* 17, no. 2:157–200.

personal growth of specialists still remains, on the one hand, insufficient, and on the other hand, excessively differentiated with regard to socio-economic conditions in different constituent entities of the Russian Federation (Kliucharev, Savenkov and Baklanov, 2016). These problems affect not only secondary vocational and higher education, but also primary and secondary general education. At the same time, efficient modernization development requires creative, purpose-driven people with innovative abilities (Lastochkina, 2016). Therefore, the state and society should pay special attention to systematic work with schoolchildren in order to identify gifted adolescents and prepare them for creative activity.

In this article we would like to highlight two points. First, we would like to show the correlation between human capital (its educational and intellectual/creative components), the processes of modernization going on in the economy and society, and labour potential. Second, we will review the experience that ISEDT RAS REC has accumulated in the sphere of formation and development of human capital of schoolchildren based on smart learning technology at the Economic Online School.

2 Literature review and research methods

The scientific community has not yet got a generally accepted definition for the term “modernization”. In English it means “updating”. Its modern interpretation was fully formulated in the 1950-s and is reflected in the works of American and European sociologists, economists and political scientists. Modernization is most often referred to as a process which increases the economic and political opportunities of the society: economic opportunities through industrialization and political through bureaucratization. Modernization is widely attractive because it helps the society move from poverty towards wealth. Economic growth becomes the dominant social goal and the motivation for achievements becomes the dominant goal at the individual level (Inglehart and Welzel, 2005; Inglehart, 1997).

The ISEDT RAS study of modernization changes contains the definition proposed by head of the Center for Studying Socio-Cultural Changes at the RAS Institute of Philosophy, RAS Corresponding Member N.I. Lapin, namely: modernization is a process of profound, civilizational changes which is conditioned by new needs of the society and an individual in a changing environment (natural and sociocultural), and its function is to enhance the abilities of the society and an individual to meet their needs (Lapin, 2015).

The mandatory conditions for the implementation of modernization in any country, in addition to the national program and modernization projects resulting from it, include adequate economic conditions, developed civil society, imposed active interaction of the government, society and business units; it is necessary to have a “social layer – a carrier of public modernization energy” (Ermolenko, 2010). “The country’s modernization implies the transition to a higher stage of civilization implemented not by coercive methods but also by revealing the cognitive potential of an individual, bringing together the interests of an individual, society and the state” (Lastochkina, 2016). The leading “force” of transformation of the society and economy is “people with a high educational level, working on the basis of knowledge and through them, able to create new knowledge, a new product, a new method, etc.” (Vil’khovchenko, 2010).

Modern researchers agree that population with a higher educational level has better adaptive abilities. In general, graduates successfully adapt to unforeseen changes in the economic, institutional and technological environment, which means they are indispensable to developing an innovative economy. However, such results are achieved mainly in conditions of compliance of the accumulated potential with the requirements of economic development. If the situation is reversed, it will arise a number of issues related to inefficient use or underutilization of human capital, which impedes economic

modernization. At the individual level, these include underemployment, the need for additional investment in retraining and raising the educational level, unemployment.

It is believed that the increase in discrepancies between the educational system and the labor market can be caused not only by inefficient implementation of the accumulated capital in labor activity, but also by the declining quality of educational training. Despite the formally high educational level of the population (the share of adult population with tertiary education in Russia reached 53% in 2012, in the OECD countries the average is 32%, in the G-20 countries – 27%), the issue of lower quality education has become increasingly relevant. According to the monitoring of industrial functioning in the Vologda Oblast in 2014, one third of employers claim that production modernization is hampered by lack of qualified personnel. None of the employers characterized the level of graduates' education as high (Leonidova and etc., 2016).

Complex ambiguous dependencies between modernization, human resources and realization of the accumulated labor potential necessitates their constant research in order to reveal new aspects, patterns, and impacts and trace the development trends of their interaction.

To solve this problem, we have compared the indicators of professional education development with the integrated index of modernization of Russian regions (Leonidova and etc., 2016).

Researchers from the Institute of Socio-Economic Development of Territories of the Russian Academy of Sciences (ISEDT RAS) calculate the level of modernization development of the territory on the basis of methodological developments by He Chuanqi, China Centre for Modernization Research, Chinese Academy of Sciences (Chuanqi, 2010b; Martinelli and Chuanqi, 2014; Zongsheng, Shuyao and Chuanqi, 2006) and N.A. Lapin, Centre for the Study of Social and Cultural Change at RAS Institute of Philosophy (Lapin, 2016). The patented information-analytical system "Modernization" (<http://mod.vsc.ac.ru/>) designed at ISEDT RAS is used in the research. Modernization consists of two stages (Lapin, 2016; Lastochkina and Shabunova, 2013):

1. primary modernization PM (measures three spheres of life in industrial society: economic, social, and cognitive (knowledge sphere));
2. secondary modernization SM (applies to the information society and measures four areas: innovation in knowledge, knowledge dissemination, quality of life, quality of economy).

Integrated modernization (IM) measures the aggregate level of these stages, recording the nature of their mutual coordination in a particular country (region) and difference from the advanced world level (Lapin, 2016; Lastochkina and Shabunova, 2013).

Indicators that are used for calculating PM, SM and IM indices and that characterize the educational and creative components of human capital are shown in *Table 1*.

Table 1: Indicators that are used for calculating PM, SM and IM indices and that characterize the educational and creative components of human capital

No.	Indicator	PM	SM	IM
1	Literacy level in adults, %	+		
2	Proportion of college students in the population 18–22 years of age, %	+	+	+
3	Proportion of R&D expenditures in GRP (GDP), %		+	+
4	Number of scientists and engineers per 10 thousand people		+	
5	Number of people who filed patent applications, per 1 million people		+	+
6	Proportion of students of vocational education institutions in the population 12–17 years of age, %		+	

Legend: + – indicator is used in calculating the index.

Compiled with the use of the following source: Lastochkina M.A., Shabunova A.A. Opportunities for and constraints in the modernization development of the regions of the Northwestern Federal District. *Economic and Social Changes: Facts, Trends, Forecast*, 2013, no. 5, pp. 39-52.

Here we should clarify one small point. We understand that education reflects human capital only partially; cognitive and non-cognitive skills, for example, remain unaccounted for. In addition, some foreign researchers generally believe the quality of education to be an unobservable feature of human capital, a feature that cannot be measured properly (see, for example, Manuelli and Seshadri, 2014; Hanushek and Woessmann, 2011; Schoellman, 2012). In some cases it is noted that the level of education is an indirect indicator to measure the skills used in work.

3 Results and discussion

The results of the analysis show that in Russia’s constituent entities where the values of modernization index are high the employment rate of workers with professional education is also high (*Table 2*). One such example is the city of Moscow: its modernization level is high (IMI = 88), as well as the number of employed people with tertiary education² (7,690 persons per 10 thousand population). Such a pattern is typical of several territories where modernization level is median and above median: Saint Petersburg, the Moscow, Samara, and Chelyabinsk oblasts, and Yamalo-Nenets Autonomous Okrug (Leonidova and etc., 2016).

In some cases, for example, in Russia’s Far East (the Magadan and Sakhalin oblasts), the above dependence is not observed. Given the median level of modernization in these territories, the number of employees with tertiary education does not reach the national average (5,318 persons per 10 thousand employed population). The reason for this situation lies in significant migration outflow.

On average, *ceteris paribus*, an increase in the number of employees with tertiary education increases the probability of implementation of modernization processes (Leonidova and etc., 2016).

² Tertiary education includes what is commonly understood as academic education, but “tertiary education” is a broader concept because it also includes advanced vocational or professional education. It covers vocational secondary, (higher) technical education, bachelor’s and master’s programs or their equivalents, and doctoral studies.

Table 2: Education development indicators and the index of integrated modernization broken down by Russia's constituent entities (2012)

Constituent entity	1*	2*	3*	4*	ML*	Constituent entity	1*	2*	3*	4*	ML*
Moscow	891.7	790.6	7690	88	H	Kursk Oblast	1090	165.3	5350	59	BM
Saint Petersburg	234.1	209.0	6740	81	AM	Kirov Oblast	776	128.1	4790	59	
Moscow Oblast	434	62.1	6600	75	M	Novgorod Oblast	637	87.9	5180	59	
Tomsk Oblast	1455	176.7	5170	71		Saratov Oblast	986	132.2	5570	59	
Tyumen Oblast	857	114.5	5520	70		Republic of Bashkortostan	881	130.5	5160	59	
Novosibirsk Oblast	1088	138	5390	70		Omsk Oblast	1121	143.4	5100	59	
Nizhny Novgorod Oblast	925	146.2	5450	69		Amur Oblast	778	102.8	5700	58	
Samara Oblast	979	138.2	6430	69		Udmurt Republic	916	142.3	4780	58	
Khanty-Mansi Autonomous Okrug – Yugra	591	65.0	5500	68		Krasnodar Krai	696	110.5	5370	58	
Ulyanovsk Oblast	901	127.2	5540	68		Astrakhan Oblast	934	116.4	5710	58	
Yamalo-Nenets Autonomous Okrug	352	44.3	6150	68		Stavropol Krai	894	140.1	5560	57	
Magadan Oblast	1043	151.3	4860	67		Republic of Dagestan	701	89.6	4860	57	
Sakhalin Oblast	591	85	4880	66		Vologda Oblast	726	107	4780	57	
Sverdlovsk Oblast	923	137.4	5040	66		Kemerovo Oblast	746	97	5120	57	
Murmansk Oblast	695	111.5	4910	66		Chuvash Republic	986	139.1	4920	57	
Kaluga Oblast	646	101.4	5510	65		Oryol Oblast	1150	140.5	5220	57	
Chelyabinsk Oblast	984	134.6	6340	65		Pskov Oblast	711	89.1	5410	57	
Khabarovsk Krai	1232	161	5610	65		Jewish Autonomous Oblast	878	104	4140	57	
Krasnoyarsk Krai	894	112	5360	65		Bryansk Oblast	840	118	4860	56	
Primorsky Krai	936	114.5	5380	65		Belgorod Oblast	941	132.4	5410	56	
Kamchatka Krai	884	128.1	5620	65		Kurgan Oblast	799	123	5070	56	
Republic of Tatarstan	1039	151	5060	64		Republic of North Ossetia-Alania	949	124.6	6380	56	
Perm Krai	794	113.1	4970	64		Zabaykalsky Krai	834	104.1	4710	56	
Republic of Sakha (Yakutia)	920	127.6	5270	64		Republic of Mari El	817	120.3	5370	56	
Yaroslavl Oblast	803	108.5	5450	64		Kostroma Oblast	689	95.6	5650	56	
Ivanovo Oblast	886	131.6	4850	64		Republic of Tuva	554	83.9	6030	55	
Nenets Autonomous Okrug	190	46.5	4810	64		Republic of Khakassia	636	114.4	5030	55	
Republic of Komi	818	102.3	4610	63		Republic of Buryatia	1079	140.9	5160	55	
Chukotka Autonomous Okrug	129	19.6	5260	63		Ryazan Oblast	958	142.5	5630	55	
Voronezh Oblast	1084	152.8	5310	63		Smolensk Oblast	901	129.2	6060	55	
Rostov Oblast	1017	131.6	5650	62		Orenburg Oblast	876	121	5170	54	
Republic of Karelia	728	106.8	5260	62	Lipetsk Oblast	680	105	5210	54		
Arkhangelsk Oblast	638	101.5	5490	62	Republic of Mordovia	1011	140.4	5150	54		
Leningrad Oblast	220	24	5090	60	Altai Krai	761	103.4	4370	54		
Irkutsk Oblast	995	137.1	4860	60	Republic of Adygea	829	107.9	5500	53		
Tver Oblast	675	96.7	5370	60	Tambov Oblast	788	115.2	5520	53		
Kaliningrad Oblast	820	114.1	6370	60	Kabardino-Balkar Republic	585	88.5	4820	52		
Tula Oblast	622	99.2	5630	60	Republic of Kalmykia	921	130.3	5640	51		
Penza Oblast	838	108.8	5580	60	Altai Republic	691	95.2	5370	50		
Vladimir Oblast	729	109.7	4900	60	Karachay-Cherkess Republic	674	93.2	5370	49		
Volgograd Oblast	851	135.9	5700	59	Republic of Ingushetia	609	61.1	6050	48		
					Chechen Republic	610	70.2	3780	46	L	

Legend: 1* – number of students per 10 thousand population, people; 2* – number of graduates per 10 thousand population, people; 3* – number of employed people with secondary vocational and higher education per 10 thousand employed persons; 4* – integrated index of modernization. Ranked by the integrated index of modernization.

ML* – modernization level; H – high. AM – above median; M – median, BM – below median, L – low.

Sources: Federal State Statistics Service (2013).

Calculations are made by ISEDT RAS with the use of the information-analytical system for monitoring modernization parameters of Russian regions (IS “Modernization”, patent No. 2012661285. 2012) in line with the methodological developments of the Centre for the Study of Social and Cultural Change. RAS Institute of Philosophy. The tables contain detailed data and those obtained from China Centre for Modernization Research, Chinese Academy of Sciences.

However, when the study takes into account the indicators characterizing education as such, a different situation arises. Thus, correlation analysis of the number of students in colleges and universities and the level of modernization of territories has shown an absence of direct connection between them. This is confirmed by the values of the Pearson correlation coefficient (*Table 3*).

Table 3: Correlation ratio between IM and separate indicators of tertiary education

Indicator	Pearson correlation coefficient	Correlation ratio
Number of students per 10 thousand population	-0.001	Absent
Number of employed people with secondary vocational and higher professional education per 10 thousand employed persons, including	0.457	Weak
- with secondary vocational education	0.058	Absent
- with higher professional education	0.460	Weak

These calculations show that often the level of development of the skills (innovative thinking, communication skills, initiative, entrepreneurship, etc.) that are most sought after by employers is low, and a slowdown in modernization processes has more to do with the cognitive and creative aspects. Accordingly, in the sphere of human capital development it is required to promote the formation of cognitive and social skills, and creative and behavioural features. This must be started from school age. Therefore, to form human capital, it is necessary to create specialized schools for general and supplementary education, including the possibility of training gifted high school students from small provincial towns and rural areas, the revival of the network of scientific societies of students, the formation of an extensive system of competitions for scientific projects, academic competitions at all levels, regular organization of popular scientific lectures of leading scientists for schoolchildren.

This approach is implemented in the ISEDT RAS Research-Education Centre in the form of smart learning technology at the Economic Internet School, which helps solve the problem of formation and development of human capital from school age.

The choice of such a form of organization of work with schoolchildren is conditioned by the following circumstance. The development of cognitive abilities and creative activity among school students as an important component of human capital takes place not only in the school environment, but also through additional education. According to the results of the students' survey, classes in establishments providing supplementary education are considered by them as one of the main sources of knowledge (*Table 4*).

Table 4: Distribution of answers to the question: “How often do you use the following opportunities for school knowledge acquisition?” (%)

Opportunities	Often and very often
Internet resources	90.4
Reading academic and non-fiction literature	37.2
Attending workshops and classes at establishments providing supplementary education	34.0
Attending workshops and classes at school	27.3
Visiting libraries, museums, archives	24.4

Source: Survey of students from regular schools in Vologda, 2nd quarter of 2010 (sampling – 156 people).

In order to address the issues of supplementary economic education and creation of the “human resource” for innovation economy, in 2003, ISEDT RAS established the Research-Education Centre for IT and Economics.

The Research-Education Centre of ISEDT RAS (ISEDT RAS REC) is a multi-stage system for training and retraining highly qualified specialists for science, business entities and regional authorities (Leonidova, 2011). The main goal is to create conditions for identifying and developing abilities of the region’s talented youth and involving them in science. The implementation of the goal is provided by recreating the scientific research environment – through integration of scientific research and practical innovation into the learning process. Such a learning process, on the one hand, increases the efficiency of acquisition of knowledge, abilities and skills compliant with educational standards, as well as their future generation, on the other hand – it is a type of initial vocational training of young scientists (Ilyin, Leonidova and Popova, 2013) which develops students’ intellect and creativity.

In most large cities, economic disciplines are widely available; however, it is rather difficult for students from remote communities to acquire economic education. Considering the need for training skilled competent professionals in economics, it seems important to work on ensuring affordable economic education, which is one of the objectives of ISET RAS REC. Addressing this issue is ensured through smart technology learning and is implemented in the form of ISEDT RAS REC Economic Online School³.

Smart learning is based on using information and communication technologies and implements “the benefits of global information society for providing education services of a fundamentally new quality” (Dneprovskaya, Yankovskaya and Shevtsova, 2015). Smart learning combines the advantages of public education and social learning (Kim, Cho and Lee, 2013), it is mostly focused on an individual student and educational content (Gwak, 2010). It differs from traditional forms of training in being more person-specific, adaptable, information-rich, IT-focused.

Smart learning within ISEDT RAS REC Economic Online School is based on the following principles:

1. using relevant information for addressing educational issues in educational programs. The existing educational content is constantly supplemented with new relevant information;
2. organizing independent educational, research, and project activities;
3. implementing the educational process in a distributed learning environment. The educational environment is not limited to the REC territory or one region;
4. flexible educational trajectories and interactive educational environment;

³ Available at: <http://e-learning.vsc.ac.ru/>

5. evaluating the changes in competences – the effectiveness of the educational process is measured as both the acquired knowledge and the ability to apply them in practice (participation in ISED T RAS REC research essays competition, participation in competitions on a national level, etc.).

ISED T RAS REC Economic Online School acts in accordance with the Economic Online School Regulations and provides distance economic learning for 8–11 form students from primary and secondary educational institutions. The main research areas of ISED T RAS REC Economic Online School are presented in *Figure 1*. The main is the management of the learning process in the online school. Its effectiveness influences the effectiveness of the research area – students’ participation in academic competitions in Economics. The third research area serves as a way of on-line counselling.

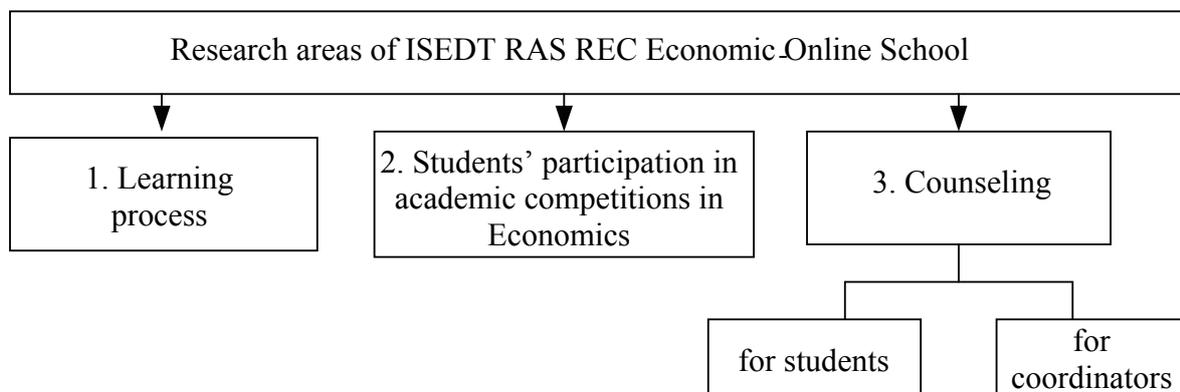


Figure 1. ISED T RAS REC Economic Online School research areas

The first ISED T RAS REC Economic Online School research area – the learning process. It is based on the interaction of students, tutors and the REC coordinator.

Each training course includes an explanatory note, a news forum, a dictionary of economic terms, a forum on “Questions to a teacher”, Instructions on inserting figures in tests and tasks, and a Learning program.

The offered learning material is arranged in eight thematic sections at ISED T RAS REC Economic Online School, each consisting of lectures, presentations, examples of problem solution, and tests. The study of each topic takes 1 month, 15 days – completion of final tests.

The students’ location is extensive – 10 regions of the Russian Federation and the Republic of Belarus (*Figure 2*). In the 2015-2016 academic year, the number of students at the Economic Online School has increased compared to 2010-2011 by 163% (118 people) amounting to 190 students. The greatest number of students is taken in in the 10th form (about 40% of the total number of students).

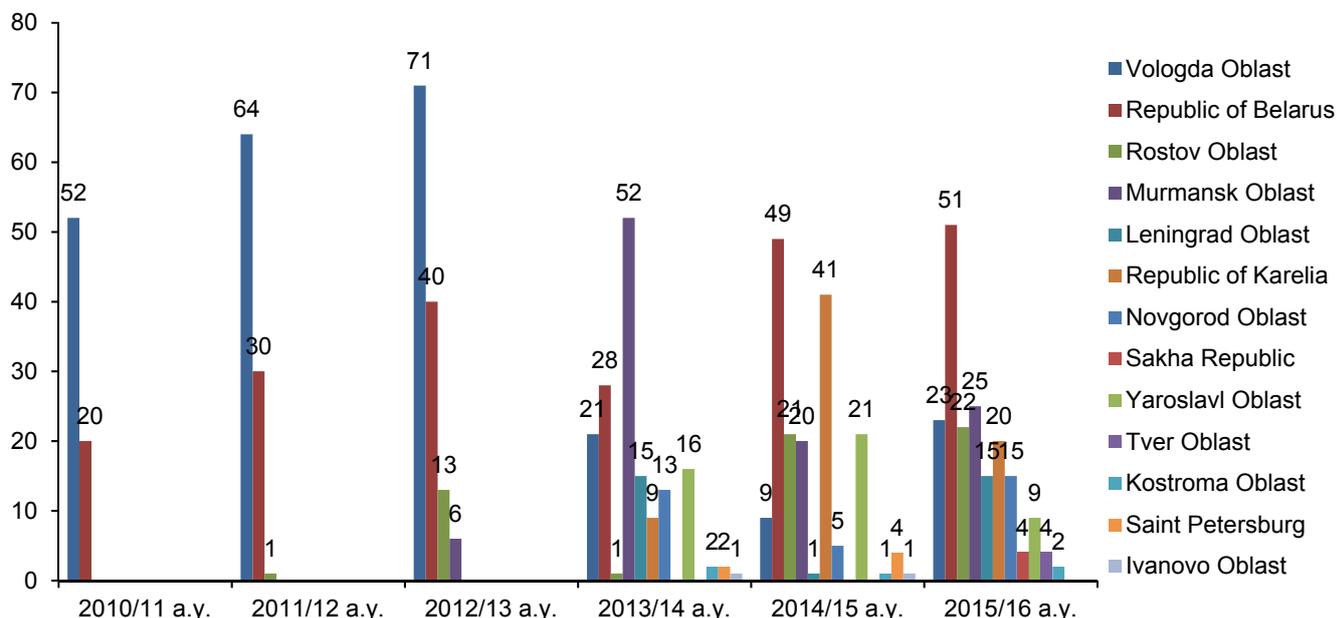


Figure 2. Location of students at the Economic Online School in 2010/11 – 2015/16 academic years, people

By the end of 2015–2016 academic year, the Economic Online School comprised 49% (94 students) of successful students and 51% (96 students) of students in need of regular support (*Figure 3*).

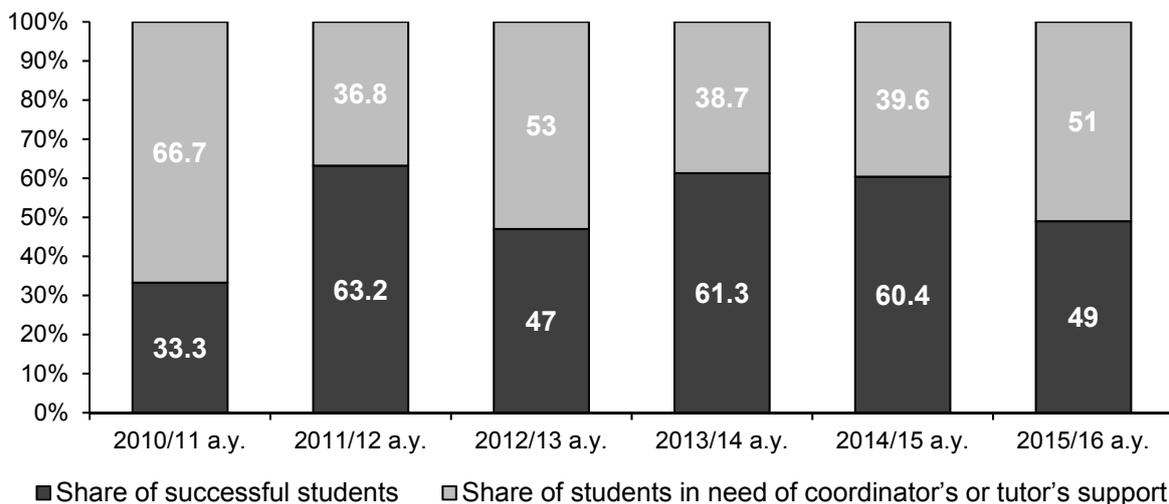


Figure 3. Structure of students at the Economic Online School by performance in 2010/11 – 2015/16 academic years, %

It should be noted that in 2015–2016 academic year, the share of successful tenth form students increased (*Table 5*). This suggests the relevance of expanding the geographic reach of the online school by taking in the most interested students.

Table 5: Distribution of students at the Economic Online School by performance (based on the students' performance ranking) in 2010/11 – 2015/16 academic years, %

Indicator	2013/14				2014/15				2015/16			
	8 form	9 form	10 form	11 form	8 form	9 form	10 form	11 form	8 form	9 form	10 form	11 form
Share of successful students	60	55.8	67.4	62.5	62	51.0	63.7	64.9	50	12.8	83.6	28
Share of students in need of coordinator's support	40	44.2	32.6	37.5	38	49.0	36.3	35.1	50	87.2	16.4	72

The second research area – students' participation in academic competitions in Economics. The news forum of the Economic Online School contains posts on events held in ISEDT RAS REC and other educational institutions; the coordinators distribute information materials.

The effectiveness of these activities depends primarily on the coordinators' and tutors' quality counseling for the students as they regularly have an opportunity to personally interact with students and influence their performance at the website.

As a result, in 2015–2016, the participants and winners of academic competitions in Economics among the students of the Economic Online School amounts to 16 and 3 respectively (for reference: in 2010–2011, 18 students took part in academic competitions in Economics, 2 of them became winners and runners-up; in 2011–2012,– 36 students, 9 of them became runners-up; in 2012–2013 – 48 students and 15 prize-winners, in 2013–2014 – 50 students and 15 prize-winners; in 2014–2015 – 51 students and 7 prize-winners). The decline in the indicators in 2015–2016 compared to the previous year is explained by the fact that in the current year the results of the summer online academic competition have not been yet summarized, thus, these data has not yet been taken into account.

The number of events in which students took parts in this academic year increased in three times compared to the year when the Economic Online School was established; however, the situation has been stable for the past five years. The level of competitions, contests, conferences and students' achievement has increased significantly. Thus, students were involved in N.D. Kondratiev Interregional Academic competitions in Economics and one student became a winner of an academic contest included in the List of Academic Competitions for Schoolchildren.

The third research area of the Economic Online School is online counseling of students and their supervisors. During such consultations, organizational issues are resolved (registration, website operation), recommendations on implementing standard tasks are provided (*Figure 4*). This research area may help get feedback from the participants of the educational process. Students and supervisors give feedback and recommendations on the School's operation, which helps improve remote distance cooperation and learning process.

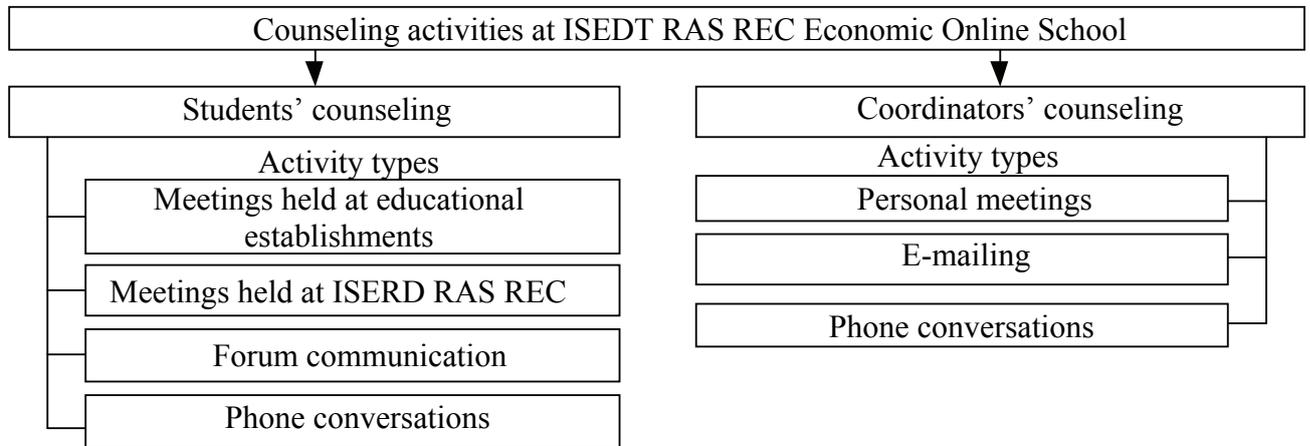


Figure 4. Counseling activities at the Economic Online School

All these research areas of cooperation are of great importance for all participants in the learning process, improving students' performance, coordinators' performance indicators.

Learning at ISED T RAS REC Economic Online School promotes the formation of students' ability to solve non-standard tasks, including the tasks from the Economics block of questions at the Unified State Examination in Social Studies; generates interest in research activity and develops research skills and creative thinking.

Thus, with the help of smart learning, students from remote areas have an opportunity to get acquainted with best practices in studying Economics. Smart learning through rich content, IT access and person-specific learning encourages students to engage in their self-education, develop their cognitive and creative abilities, thereby increasing their human capital.

4 Conclusions and suggestions

Modernization as a process of civilizational change has now become a worldwide phenomenon. In the 21st century, the unevenness of modernization in the countries will be increasing, cross-country competition will be extremely tough (Chuanqi, 2010a). In the struggle for world leadership, developed countries need to constantly defend their positions, the countries of catching up development are to accelerate the pace of modernization reforms. The effectiveness of activities carried out within these transformations is inextricably linked to the availability of high quality human capital.

Individuals as carriers of such capital become a key resource for the transformation of primary modernization into its subsequent higher stage. Thus, the permanent renewal of their professional and personal competencies must meet the requirements of the modern environment. The most relevant are cognitive and creative abilities of an individual, which make it possible to find non-standard solutions in the process of labor activity which go beyond existing stereotypes.

The process of accumulation and development of human capital is primarily ensured by the system of general, professional and supplementary education with the use of educational technology appropriate to the modern era.

The ISED T RAS Research-Education Centre promotes the activities of its Economic Internet School based on smart learning technology.

The appeal to smart technology in the school's educational process is explained by the "smart" properties to meet the expectations and needs of the society, respond quickly to the changes in the environment, economy, science and production.

The combination of advantages of public education, social training and modern IT within the framework of the Economic Internet School helps overcome the territorial disunity of schoolchildren, stimulates the development of their cognitive abilities and creative activity. Ultimately, this is an investment in human capital as schoolchildren form their ability for social transformations, thereby ensuring their future readiness to participate in modernization processes.

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