

# INNOVATIVE DEVELOPMENT

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## Generation of talented youth's knowledge for the benefit of intellectualization of human capital: methods and forms of implementation

*It is typical of modern Russia to have not only decline in population size but also its quality loss. The author actualizes the problem of preservation and increasing of human capital quality through creating of a governmental and public system of long-term complex support for gifted children from the first talent expression to professional self-determination. This article deals with theoretical and methodological foundations to solve this problem; it presents methods and forms of government, scientific and educational institutions activity in this area.*

*The author emphasizes analysis of operational experience with talented youth of regional Research and Education Center of Economics and Information Technology under Institute of Socio-Economic Development of Territories of RAS. The author examines methods of operation of the REC in generation of talented youth's knowledge through involvement them in research activities and using of other forms contributing to intellectualization of human capital of students.*

*Human capital, generation of knowledge, talented youth, intellectualization.*



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The President of the Russian Federation D.A. Medvedev, the Russian Prime Minister V.V. Putin and the Concept of Social and Economic Development of the Russian Federation till 2020 marked transition to innovative economy as a target key point of development of the country. The implementation of this

general problem is largely dependent on the availability of highly skilled personnel possessing not only the educational attainment but enterprise, innovative and creative ambitions and motives; who can acquire new knowledge and manage actively the innovative process. According to foreign and domestic experts,

human capital is more important resource than natural resources or cumulative wealth: they estimated that increasing of education by 1% leads to acceleration in the rates of GDP per capita by 3%<sup>1</sup>.

Growth of the process of informing of society and economy, rise in the volume of high-tech industry improve the quality of an intellectual component of human capital, i.e. its intellectualization.

Studying of the problem of human capital intellectualization primordially assumes researching of initial prerequisites for active work with gifted children and talented young people. It is an important condition to form the foundation of innovative economy. At the same time the public consciousness is required to adopt the following idea: in the demographic crisis gifted children provide a unique opportunity for Russian society to optimize the cost of reproduction expansion of the intellectual potential of the country. Looking for talented people is an objective need for achievement of the national progress. The flights of Soviet satellites served as incentive to search (by testing) and create the conditions for the maximum development of 35,000 talented senior high school students in the USA: at that time the Americans “put on the conveyor”, allocating annually about 1.5 billion dollars to develop talented persons<sup>2</sup>.

They established research centers under the universities to identify and educate gifted children, organized issue of special interest magazines (“Gifted Child Today”, “Educational Researcher”) and adopted the state program in 1990’s, particularly, “America – 2000. Learning strategy” (Goals 2000: Educate America Act)<sup>3</sup>.

<sup>1</sup> For example, a detailed review of studies of human capital, which is appreciated by the standard of education, is cited in: Sianesi B., Van Reenen J. The returns to education, *Journal of Economic Surveys*. – 2003. – Vol. 17. – № 2. – Pp. 157-200.

<sup>2</sup> Efroimson V.P. *Genius and genetics*. – M.: Russian World, 1998. – 544 p.

<sup>3</sup> Lunyakova L.G. Gifted children are resources of human potential of modern Russia [Electronic resource]. – Access mode: <http://www.ecsocman.edu.ru/db/msg/334679.htm>

Such government programs to identify and support gifted children and young people in their country and to attract the same people from other countries were developed in 1970s in all developed countries. The following international organizations were established: the World Council for gifted and talented children, which coordinates the work of their studying, training and education, organizes international conferences, as well as the European (“Eurotalant”, Russia is a member of this organization) and Asian Associations, which implement national programs, coordinate national projects, conduct international meetings, summer schools and competitions for gifted and talented pupils.

The Federal target program “Russian Children” and its subprogram “Gifted Children” have been implemented step-by-step since 1996 in Russia (*fig. 1*).

Subjects of the Russian Federation use a variety of forms to support gifted and talented young people within the bounds of the subprogram: bonus funds, scholarships, competitions, festivals, conferences, etc.

These and other forms to support talented young people involve more than 3 thousand Russian schoolchildren from 8 – 11 grades; more than 5,000 pupils are trained in various areas of complementary education.

Normative legal base of working with gifted children has been developed and improved; financing of these purposes has been increased though it was too modest (*fig. 2*). The program of State grants by the President of the Russian Federation is being implemented. However, there are many unsolved problems, particularly problems of use of transparent and competitive mechanisms for expenditures and identification of talented persons.

The following problems were being solved at the final fifth stage of the subprogram “Gifted Children” (2007 – 2010):

- creation of the state system of identification and development of gifted children and targeted support for children in accordance with their abilities also on the base of innova-

Figure 1. Implementation phases of the subprogram "Gifted Children" (Component part of the Federal target program "Russian Children")

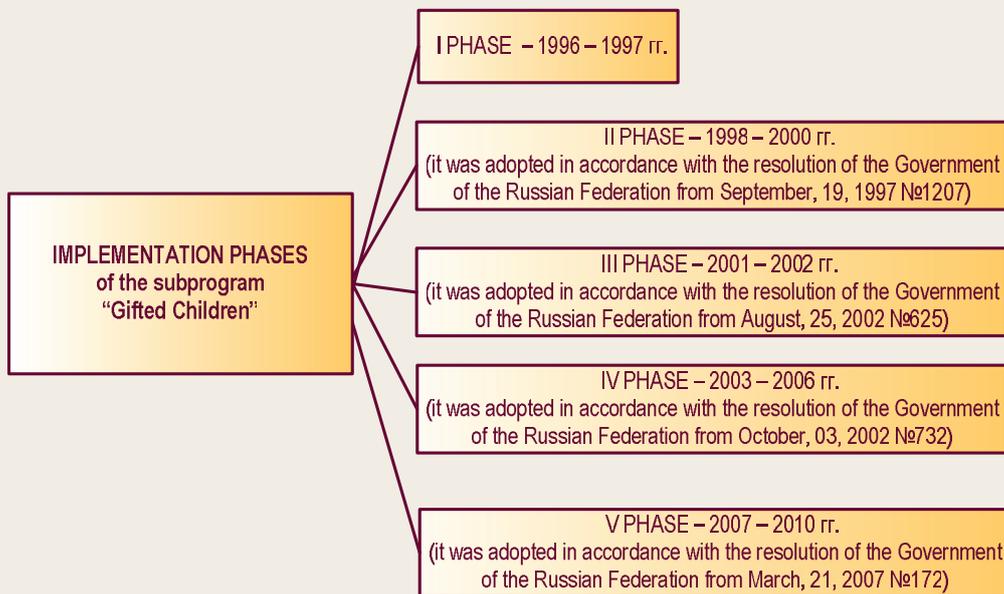
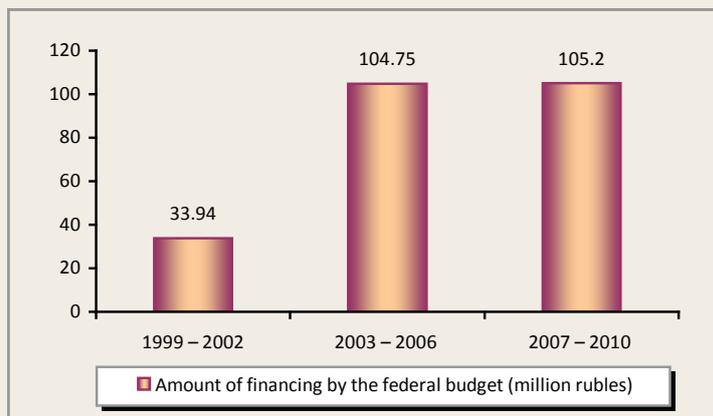


Figure 2. Financing of the subprogram "Gifted Children" by the federal budget, million rubles



Source: Sinyagina N.J., Kalish I.V., Zaitseva N.V. The implementation results of the subprogram "Gifted Children" of the Federal target program "Russian Children" in 2003 – 2006. – M., 2007. – 41 p.; Passport of the subprogram: "Gifted children". – Resolution of the Government of the RF from January, 26, 2007№, 79 p.

tive technologies to identify and support gifted children living in the countryside and in the place which are situated far from the major centers of culture, education and science;

- coordination of activities of the basic centers working with gifted children and their support;

- consultant services for parents and teachers working with gifted children.

We will have to do a lot in all these areas. According to estimates of the Commission for the national intellectual potential of the Public Chamber of the RF it is necessary to renew our work with gifted children<sup>4</sup> and to accelerate the creation of "giftedness infrastructure".

Thereupon, it is crucial to know the difference between a gifted, talented child and other

<sup>4</sup> Is Russia ready to invest its future? Report of the Public Chamber of the Russian Federation. – M., 2007.

children. According to the most scholars, the gifted child usually has bright, obvious and sometimes outstanding achievements in different activities (or he has the internal prerequisites for such achievements)<sup>5</sup>. Giftedness is a quality which is developed systematically during our life, indicating the possibility of reaching by a person higher result in one or more types of activities.

Many psychologists recognize that the giftedness level, qualitative singularity and developmental character of giftedness are always the results of complex interaction of heredity (natural instincts) and social and cultural environment, that is mediated by the activities of a child (play activity, learning activity and labor activity). Giftedness can be recognized by a degree of the child's advance in mental development as compared with his peers at other equal status.

Giftedness is regarded as a state of talent or a degree of talent intensity. When we spoke about ability we mean the possibility of a person to do something, but when we use a word "talent" we emphasize the innate nature of the quality (ability). At the same time both ability and talent become apparent in the successful activity.

One of the most important characteristics of giftedness is creativity. Tendency to creativity is the highest manifestation of human activity, the ability to create something new and original. This quality is of particular mindset, characterized by flexibility (the ability to move easily from one class of phenomena to other phenomena, whose content is often too different) and originality (the ability to suggest new and unexpected ideas which are differed from the conventional ideas).

Qualitative state monitoring of labor potential of the population in the region has been carried out by Institute of Socio-Economic Development of Territories of RAS in the Vologda Oblast since 1997. Its results show that the creativity index, calculated by the

<sup>5</sup> Draft concept of giftedness / ed. D.B. Bogoyavlensky. — M., 1998.

original methods<sup>6</sup> (according to quotients of person's relation to creative activity and his actual participation in creative activity), is the lowest among eight basic indices of social capacity (quality of labor potential). Moreover, its overall trend (in the dynamics from 1997 to 2009) is decreasing (*tab. 1*).

Low index of creative potential of the population is conditioned by the fact that only few people in the region are actively engaged in creative activity: about 8% of people always invent, write, compose, etc. and 45% of people do nothing<sup>7</sup>.

The survey of students and senior pupils of different professional educational institutions<sup>8</sup>, which was conducted in Vologda in 2010, confirmed this regularity: only 10% of respondents were going to "realize themselves creatively" during their learning. The poll results also show that there are not enough conditions to develop creative potential of pupils and students. Thus, only 16% of senior pupils think that elective classes and study groups in their schools help them in learning good results and only 14% of pupils say about availability of in-depth subject programs. However, it should be noted that almost all high school students (97%) believe that it's important for a modern man to develop creative and intellectual potential and they developed such qualities. Family influences greatly over pupils' attitude to develop their creative abilities: parents of pupils, who seek to develop their creative and intellectual abilities (58%), have higher education or academic degree.

<sup>6</sup> The system of components of labor potential quality is represented as a "tree" of qualities. Top of the tree is the most common quality, social capacity. According to the methods based on monitoring such structural components of labor potential as physical and mental health, creative abilities, sociability, cultural and moral standards, need for achievement are measured. Integral index of individual quality as well as private indices cannot acquire zero or negative value (such as zero health can't exist). This positive value is always more than zero. Its maximum value is equal to unity.

<sup>7</sup> Labor potential of the region: The final report of research / A.A. Shabunova, G.V. Leonidova, E.A. Chekmarova. — Vologda, ISEDT RAS, 2009. — P. 52. — № of official registration 02201051756.

<sup>8</sup> The survey was conducted within the scope of research "Forming of scientific and educational space of Vologda" in April and May in 2010. The sample consists of schools and various institutions of vocational education. The volume of sample is 550 people. The sample's error is 3%.

Table 1. Quality rating of labor potential of the population in Vologda oblast

Measurable indicators	Index value		Rank	Trend line (from 1997 to 2009)
	1997	2009		
Moral level	0.775	0.757	1	\ decreasing
Mental health	0.699	0.739	2	/ increasing
Sociability	0.733	0.736	3	– parallel to time axis
Physical health	0.682	0.728	4	/ increasing
Standard of culture	0.609	0.674	5	/ increasing
Need for achievement	0.612	0.643	6	/ increasing
Cognitive potential	0.630	0.614	7	\ decreasing
Creative potential	0.593	0.572	8	\ decreasing
Integral index of labor potential quality	0.655	0.674		/ increasing

Source: Labor potential of the region: The final report of research / A.A. Shabunova, G.V. Leonidova, E.A. Chekmareva. – Vologda, ISEDТ RAS, 2009. – 117 p. – № of official registration 02201051756.

Table 2. Distribution of the answers to the question: “What qualities does your current business require from you?” (Response category “Very important”, in % of respondents)

Qualities	Year					
	2004	2005	2006	2007	2008	2009
To be sociable, be able to be on good terms with other people	36.8	40.2	42.2	38.6	39.4	37.6
To enjoy good physical health and to feel well	38.7	34.7	37.0	37.9	41.7	36.9
To be hard to mental load	27.8	30.1	38.1	34.7	35.4	36.6
To be a highly cultured person (to be a well-brought-up, polite, self-restrained and good-looking person)	29.9	30.5	32.0	31.4	33.1	32.2
To have high moral standards (honesty, truthfulness, sense of duty, decency, etc.)	31.0	29.9	33.6	32.4	35.1	31.7
To have all-round knowledge, to be a man of great erudition, to be a highly skilled specialist	23.4	27.9	28.7	26.3	28.1	25.9
To strive for promotion, to improve personal skills, to take the initiative and enterprise	23.9	22.3	23.8	24.7	27.0	24.6
Have creative abilities (to invent, create the new, to solve previously unknown tasks, etc.)	19.7	19.0	18.3	19.4	21.3	20.3

Source: Monitoring of labor potential quality of the population in Vologda oblast (total sample – 1500 people).

Creativity is a strategically important resource for innovative “smart” economy. However, according to the results of monitoring of labor potential quality, it is the least important quality for employers: only 20% of residents say that their creative abilities are demanded at their jobs (*tab. 2*).

Development of people creative activity and the ability to resist social inertia takes place not only in schools but also in extracurricular supplementary education. According to the results of students' opinion poll<sup>9</sup>, they regard the studies in the institutions of extracurricular education as one of the main sources of knowledge (*tab. 3*).

The Soviet system of supplementary educational facilities for children and youth con-

sisted of pioneer organizations, young technician's stations, junior sports schools, etc. That system was an important component of Soviet education. It is significant that there were no such infrastructure in the Western countries earlier. That's why Soviet education had competitive advantages. The crisis of 90's affected the nursery and junior secondary education: the number of supplementary educational institutions was declined and as a result the total qualifying potential of the young Russians was decreased<sup>10</sup>. The number of supplementary educational institutions was increased only in the early 2000's, including the Vologda oblast. They provide the formation of creative personality which is necessary for the knowledge-oriented economy.

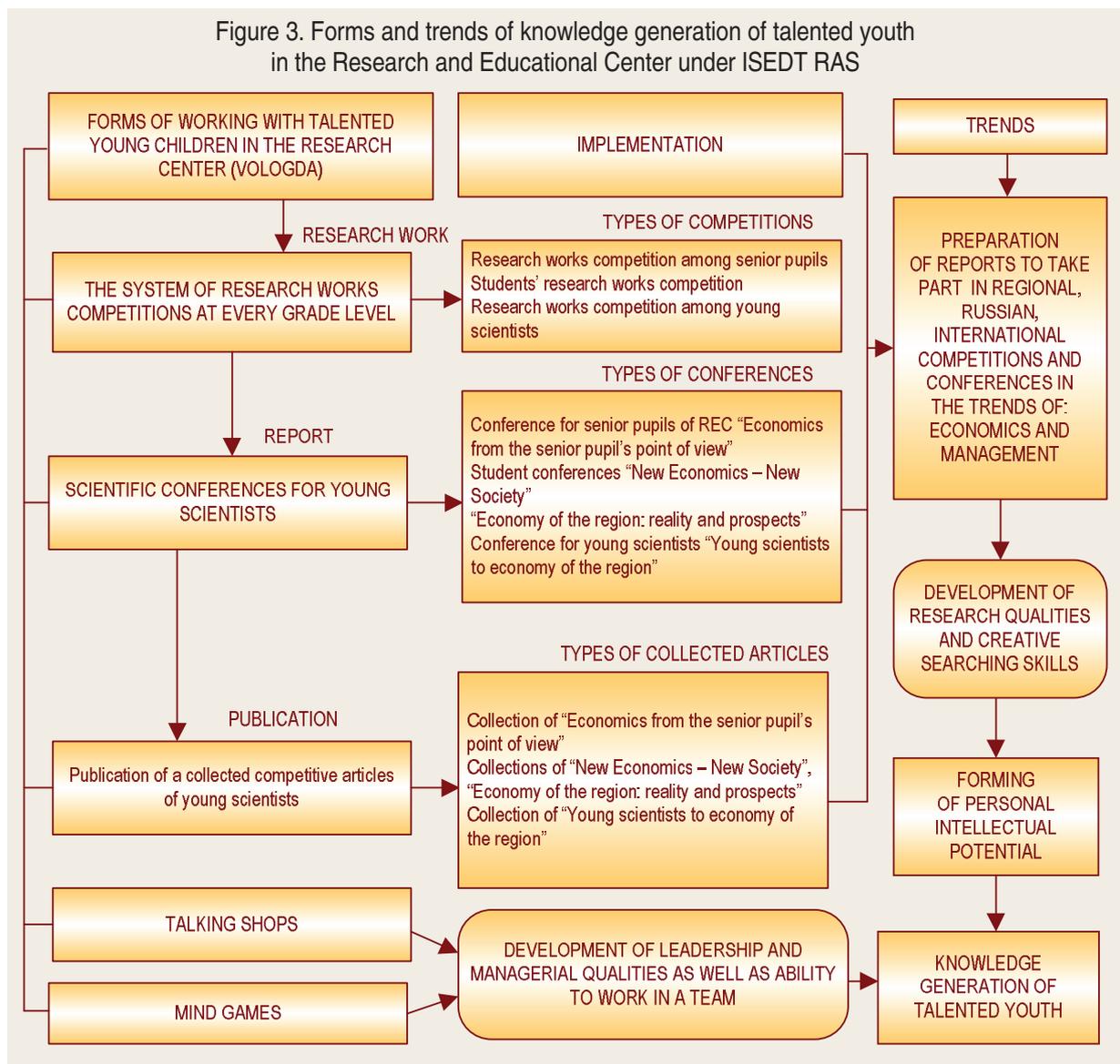
<sup>9</sup> The investigation is carried out by ISEDТ RAS within the scope of research “Forming of scientific and educational space of the territory” in 2010.

<sup>10</sup> Education as a Factor of Economic Development / V.I. Yakunin, S.S. Sulakshin, V.E. Bagdasarian, M.S. Netesova. – M.: Scientific Expert, 2008. – P. 17.

Table 3. Distribution of the answers to the question: “How often do you use the following opportunities to enrich school knowledge?” (in %)

Opportunities	Often and very often
Using of Internet resources	90.4
Reading of educational literature	37.2
Study and hobby groups attendance in the institutions of extracurricular education	34.0
Study and hobby groups attendance in school	27.3
Visits to the libraries, museums, archive	24.4

Source: Survey of students of comprehensive secondary schools in Vologda, the second quarter of 2010 (total sample – 156 people).



Research and Education Center of Economics and Information Technology under ISEDТ RAS (it was established in 2003) creates

such conditions for training and education as early detection, training and education of gifted and talented children. The Center represents a

Table 4. The activity indicators of the REC under ISEDT RAS in 2002 – 2010

Subsystems	2002	2003	2004	2005	2006	2007	2008	2009	2010
<i>Schooling subsystem</i>									
Number of pupils from 5 – 11 grades	34	94	160	250	290	290	310	370	390
<i>Subsystem of higher education</i>									
Number of students interacting with the Research and Educational Center	46	97	164	354	540	600	650	800	900
including the branch of SPbSIEU in Vologda	25	55	89	239	350	542	557	700	800
<i>Subsystem of postgraduate education</i>									
Number of postgraduate students	37	33	31	40	39	39	46	44	46

multistage system of training and retraining of highly skilled specialists for science, business and regional authorities.

Creating of the Research and Education Center under the basis of academic research institution in Vologda organizers thought that its main mission would be creating of conditions for detection of talented young people in the region, development of their abilities and involvement them into scientific sphere, reconstruction of the scientific inquiry environment.

Activity of the Research and Education Center is built in such a way that it is possible to use those forms that are the most productive ways to work with talented youth. Their specific structure is shown in *figure 3*.

The priority direction of selection and identifying of talented young people by force of the Research and Education Center is involvement each of them in research activity. Moreover, it is considered, on the one hand, as a way to improve efficiency of digestion of knowledge and skills of relevant educational standards and further generation, i.e. increment of knowledge, on the other – as a way to initial professional training. Just that very context sets the goal of selecting of talented and motivated children with subsequent profiling of their education and orientation to work in high-tech industries.

Realization of the REC's goal is based on the contemporary theoretical and methodological approaches; the main of them are continuing education (learning throughout life), connection between theory and practice (knowledge, gained in the REC, are used in specific scientific researches, research results of

scientists are used in teaching special subjects, in preparation of teaching aids, etc.), continuity of educational programs, etc.

The feature of the educational process in the Research and Educational Center is using of diverse techniques, active training forms and methods based on the following principle: knowledge (in-depth study of economical foundations) and ability to apply them (applying of the skills by the use of approved research results, research efforts competitions, presentations at school conferences, participation in the discussions, etc.).

In addition to traditional forms promoting all-round development of trainee's skills the REC also uses the following forms to work with the young people:

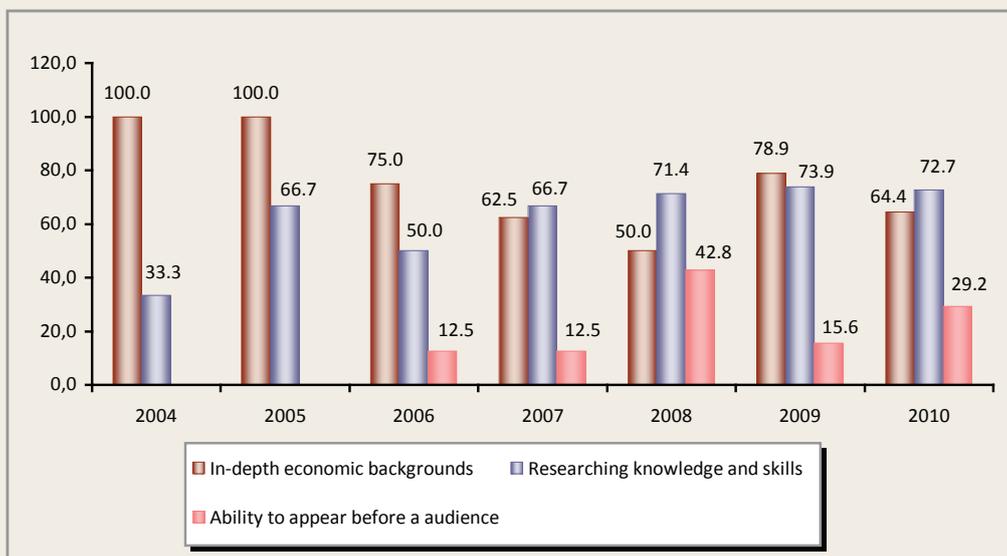
- talking shops;
- mind and business games;
- profile health camps (summer research schools) on holidays, etc.

The main quantitative indicators of the REC activity are represented in the *table 4*.

But quantitative parameters are only the first side in the evaluation of the REC's activity. The annual studies of intellectual and professional abilities of students have significant practical importance for understanding of the Research and Education Center's role in knowledge generation of talented young people<sup>11</sup>. Testing results show that the values of

<sup>11</sup> The complex of diagnostic methods in psychological testing includes: the methods of V.V. Sinyavsky and B.A. Fedorishin "Communication and organizational tendencies"; test of intellectual and professional abilities "TIPA-5" by R. Amthauer; test to determine a tolerance degree by V.V. Boiko and others.

Figure 4. The dynamics of answers to the question: “What are the main benefits of your training in the REC?” (in% of respondents)



the intellectual sphere<sup>12</sup> (erudition, vocabulary, abstract logic, attention<sup>13</sup>) increase by the end of training (from the 5<sup>th</sup> to 11<sup>th</sup> grade) as compared with the beginning of training in the REC by 2 or 3 points on ten-point scale (for example, mean value in the 11<sup>th</sup> city-wide grade was 5.6 points in 2008, it was 6.3 points in 2009 and 7.1 points in 2010). Consequently, there is a marked increase in intellectual capacity of the students who attend classes at the REC.

The REC’s staff uses V.M. Rusalova techniques as a tool to identify the skills, qualities and properties required to form a research position. According to the techniques you can judge about personality’s expression by such indicators as subject ergicness (a flair for intense mental labor), social ergicness (a desire to explore the world through communication)

<sup>12</sup> The methods “TIPA” – test of intellectual and professional abilities.

<sup>13</sup> Vocabulary – standard of active vocabulary development, ability to speak correctly; abstract logic – ability to reason conceptually, unconventional thinking; attention – high concentration at the certain activity; erudition – wide reading, profound knowledge in any field of research knowledge (understanding of science, art, history, literature, etc.). Level of abilities: 1.0 – 3.4 points – low; 3.5 – 7.5 points – average; 7.6 – 10 points – high.

and flexibility (a desire to diversify the forms of subject activities). Survey results show that all students have the positive dynamics of the flair for intense mental labor (for example, the senior students from the Lyce №32 who attend the REC had a mean value of “subject ergicness”, i.e. the flair for intense mental labor, amounted to 6.9 points in 2008, 7.1 points in 2009 and 8,4 points in 2010). It is evidence of the fact that studies in the Research and Educational Center under ISEDT RAS increase the interest of students to research activity. According to students’ opinions the main advantages of education in the REC are getting of in-depth economic backgrounds and learning of researching skills (*fig. 4*).

The REC’s project is aimed to create conditions for personal and vocational realization of talented youth, it should improve the system of training and retraining of scientific, managerial and engineering personnel. The REC provides continuity of educational process in the chain of “school – university – postgraduate education”. The best pupils of the REC can join the student groups by economic specialties in the branch of St. Petersburg State Engineering and

Table 5. The results of entering the universities of graduating seniors from the full-time elective class in the REC under ISEDТ RAS

Indicators	2008/09 ac. year		2009/10 ac. year	
	Total	%	total	%
Number of graduating seniors, total	41	100	42	100
Number of graduating seniors who entered the universities	41	100	42	100
Number of graduating seniors who entered the universities of Vologda	31	76	36	86
Of them:				
Vologda State Technical University	11	27	15	36
Vologda State Teacher's Training University	3	7	8	19
St. Petersburg State Engineering and Economic University, a branch in Vologda	6	15	3	7
Vologda State Milk and Economical Academy named after N.V. Vereshchagin	3	7	8	19
Moscow State Law Academy, a branch in Vologda	6	15	0	0
Vologda Institute of Economics and Law FSEP RF	1	2	2	5
Educational institutions in St. Petersburg	5	12	5	12
Educational institutions in Moscow	2	4	1	2

Economic University in Vologda (one of the participants of the Research and Education Center; *tab. 5*).

This table shows that most of graduating seniors from the Research and Educational Center remain in the region, they prefer the regional universities that prevents "brain drain". This situation is good for the region where level of scientific and technological capacity is low.

The project shows a high degree of effectiveness. Young scientists, postgraduate students, students and pupils often become winners and laureates of the regional, national and international competitions. The project has a great social significance: it has created favorable environment for display of creativity and personal development of gifted and talented youth. The project is supported by the Russian Academy of Sciences, regional and local authorities, the Ministry of Education and Science of the RF. The project got approval and support of the President of the Russian Federation in 2003.

Such work is possible thanks to the activities aimed to identify and support talented researchers and promote their creative growth. They are organized by the Russian Academy of Sciences<sup>14</sup> in the framework of the Supporting program for young scientists.

<sup>14</sup> Russian Academy of Sciences Regulations. – Section 2, paragraph 11, subparagraph g.

Pedagogical literature<sup>15</sup> demonstrates convincingly that talented people are often in the shade wrongly. And there will be a negative selection in the society if we do not create a system that draws talent from the shadows. Therefore, it is highly important to create a competitive environment in science, business and art<sup>16</sup>. Various modern sponsoring funds correspond to these goals. It is necessary to extend the experience of innovative schools: physics and mathematics schools (for example, gymnasium "Harmony" in Vologda), schools of Olympic reserve, special music schools, business schools, etc.

However, the task of supporting of talented children assumes the construction of the state-public system of long-term complex support for gifted children from the first display of talent to the professional self-determination. The concept of the national educational initiative "Our New School", voiced at the summit in 2010, is a base to create a complex system of supporting and looking for gifted children, as well as their support during the period of making up of personality. State support for talented children and youth is the only reliable method of reproduction of the national intellectual elite and the most important intellectualization factor of the human capital in the country.

<sup>15</sup> Efroimson V.P. Pedagogical genetics // Genius and genetics. – M., 1998. – Pp. 291-434.

<sup>16</sup> With German thoroughness // Tabloid of "The Komersant". – 2007. – № 18 (3594). – February, 7.

Thus, the regional Research and Education Center helps to solve the problem of search and development of gifted children in the country. Its effectiveness can be increased by passing the regional laws, subordinate acts and target programs, by making interdepartmental con-

tracts, industry-wide agreements and other documents. It is also necessary to report the problem of gifted children development by mass media within the scope of action consolidation of the regional educational system and research institutions.

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