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International Conference «Humanity in the Era of Uncertainty»**DIGITAL TOOLS IN THE ORGANIZATION OF THE REGIONAL  
TRACK PROJECTS CONTEST**

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**Abstract**

Modern reality is an example of the active development of digital technologies and their implementation into all spheres of social life. Such concepts as “digital platforms”, “infocommunication technologies”, “digitalization of knowledge” are a significant feature of today’s society. The system of education is not an exception; on the opposite, it was one of the first to undergo digital modernization. This paper is concerned with a promising direction, which is digital tools of organizing, monitoring and managing the research work of the students of educational institutions. It is well-known that the work with gifted youth is one of the most important and topical agendas at all the levels of authority. Every year a great number of different contests for identifying, development and support of talented young people are organized and held in the Russian Federation. The authors describe the experience, analyze the results and reveal the problems of holding the Samara regional track of the all-Russian scientific-technological projects contest “Great Challenges” for the last three years. The main achievement is the application of the specially developed information system for the support of project activity of the students of educational institutions. The practical result of the efforts of a big team of people is the undeniable success of the students from the Samara region at the all-Russian scientific-technological projects contest “Great Challenges”.

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## 1. Introduction

In 2016 the president of Russia, Vladimir Putin, suggested the strategy of development of Russia as an information society with the corresponding national programs according to which education is one of the basic spheres of the realization of these projects (Decree of the President of the Russian Federation..., 2016). Up to 2030 the idea of modernization of primary, secondary and higher professional education through joining the digital educational environment is the part of the framework of the national project of federal scale “Education” (hereafter the Project).

The objectives of the Project logically correspond to the content of a strategically important governmental task at the present stage of development – finding, supporting and accompanying talented and gifted young people as scientific and creative potential of our country. Thus, combining efforts in the digitalization of education, in creating modern digital platforms for promotion in development and support of gifted students is the most important task of today’s educational environment.

The achieving of the defined objectives and the solving of the set tasks is impossible without creating a technology based on the application of modern digital tools. At the same time digital tools should promote finding, developing and supporting the gifted youth. By saying “gifted” we mean systematic, developing over a lifetime quality of human psyche that defines the opportunities of a person to reach higher (more unusual, more remarkable) results in one or several activities in comparison with other people (Bogoyavlenskaya et al., 2003). Talented students, among others, are characterized by such traits as faster mastering of an activity, using and discovery of new methods of operation in the circumstances of looking for a solution of a given situation. Setting new activity goals due to the deeper knowledge of the subject, higher structure of knowledge, the ability to see subject of study in a system, to immediately capture the main point and to go from details to the whole are also important. We believe that digital platforms not only correspond to the tasks of accompanying, keeping and further application of scientific and research projects suggested by the talented students, but also meet the requirements of building the trajectory of their individual development.

## 2. Problem Statement

Digital tools are designed for scientific and scientific-technological interactions so that with their help it was possible to gain comprehensive data about young scientists, their projects at the federal and regional levels. These tools provide students with the opportunity to test themselves in solving applied scientific-technological and research tasks and in creating scientifically- and technically-meaningful result of the project work of students. The obligatory requirement is the engagement of scientists and practitioners from the relevant areas in the work with gifted youth, professional orientation of talented schoolchildren through doing projects together with the representatives of scientific, technological and university environment. The opinion of some authors regards the relevance of the problem of high-quality monitoring of scientific and technological research carried out by talented youth for the purpose of information systematization and its further interpretation (Polshakova et al., 2020).

However, there is a number of difficulties hindering the usage of digital tools in the scientific and technological work with gifted youth. These are the problem of lack of awareness among the wide range of

those concerned (children, educators, consultants) about existing infocommunication systems and their capabilities. There is the problem of low motivation of the executives who are responsible for coordinating and controlling the process at the initial stage of infocommunication system functioning. These include difficulties in the access to scientific database and modern technological developments; the problem of looking for ideas that are adequate for the demands of the region; the problem of making decisions etc. Apart from objectively existing issues, we have to note the difficulties of the subjective matter. It will be wrong to assume that the existence of the information system and the target audience will serve as a basis for the functioning of the developed digital tools. For automated work it is necessary to form a resource team, capable not only of technical assistance, but also of help, support, communication and motivating the members of research teams.

### **3. Research Questions**

We believe that an illustrative example of using digital tools in the organization of the research work of students is the all-Russian scientific-technological projects contest “Great Challenges” (hereafter “Great Challenges” contest). “Great Challenges” contest (Bol’shiye vysovy...) has been organized by the Educational fund “Talent and Success” (hereafter the Educational Fund) since 2016. It includes a regional track (on-site, takes place in regions-participants) and a distant one (for the regions without a regional track or for cases when not all the directions of the “Great Challenges” contest are represented in it). “Great Challenges” contest is based on the infocommunication technology allowing participants to register, upload their research or applied project for it to be assessed by the contest experts.

Uploaded projects are available to experts in the system, at the regional stage – to the regional experts, at the All-Russian level – to the experts of the Educational fund. The winners and prize-winners of regional and distant tracks take part in the final stage. According to the results, the composition of winners and prize-winners, participants of the scientific and technological educational program “Great Challenges” which is held annually in the Educational centre “Sirius”, is formed. In total, there are twelve directions in the “Great Challenges” contest, all of which correspond to the “Strategy of scientific and technological development of the Russian Federation” (Decree of the President of the Russian Federation..., 2016; Great Challenges..., 2021), and each region is entitled, while forming the regional Regulations, to independently specify which of the directions are realized in the regional tracks. Moreover, regions define the stages of holding their regional tracks and the format of the event.

### **4. Purpose of the Study**

The regional track of “Great Challenges” contest in the Samara region was first held in the academic year of 2018/2019 within the framework of the regional contest of research projects of educational institutions students in the Samara region “Vzlet” (hereafter “Vzlet” contest). It is necessary to emphasize that “Vzlet” contest in the Samara region in 2018/2019 was held for the fourth time already (Astra: unified regional system ..., 2021). The technology of organization of virtual environment for interaction between university scientists and students is described in the articles of one of the authors (Kamaldinova et al., 2018). The organizer of the contest is the Ministry of Education and Science of the Samara region (The

Order of the Ministry of Education and Science of the Samara region..., 2019); the operator of the “Vzlet” contest is “Samara State Technical University”. Technologically the contest “Vzlet” is held with the help of specially developed Internet-platform, where university scientists of the Samara region offer students topical themes for research. The students choose the topic themselves with their teacher, project supervisor, and get the contacts of university project advisors for collaboration. The contest organizer provides monitoring, control and educational events aimed at development at all the stages of completing the project. Several times a year the most active students, who are registered in the information system, are invited to scientific sessions. The lectures by major scientists about the modern state of science, about research are held in the form of sessions, and then the experts of scientific directions give individual consultations on the projects. Such system of work promotes the increase in the quality of the completed projects, and also it provides high percentage of the number of finished projects from those who started work and sent it to the contest (Kamaldinova & Kulikova, 2019).

Since 2019 in the Samara region, the State budget non-typical educational institution of the Samara region “Samara regional centre for gifted children” (hereafter “SRCGCh”) has been the organizer of the regional track of the all-Russian scientific-technological projects contest “Great Challenges” (hereafter the Regional contest) (The Samara regional centre..., 2021). Taking into account the high scientific potential of the region, it was decided to hold the Regional contest in all twelve directions of “Great Challenges” contest. Leading experts for each direction were identified – the representatives of science and higher education of the region; thus, the necessary pool of experts was formed. We would like to point out that the Educational fund in 2019 held, so to speak, a “competition” among experts. Ten best experts from 50 regions were identified and they were invited to the shift “Big Challenges - 2019”. This “ten” had two experts from the Samara region in the directions “Space technologies” and “Nanotechnologies”.

The regional contest had two stages: distant and final on-site. For the informational support of the Regional contest the specially developed support page for the Regional contest was organized on the official web-site of “SRCGCh”. This page contains regulatory and methodological documentation; besides, the participant can apply for the Regional contest, read the news, announcements and other relevant information.

## **5. Research Methods**

Let us analyze the organizational model of the Regional contest. One of the main principles is the openness and availability of participation in the Regional contest. Administratively the Samara region is divided into thirteen territorial administrations (TA) and two departments. In every TA and department responsible coordinators for working with gifted young people in the sphere of science, engineering and technology are assigned. The information letters with information and regulatory documentation were sent to all TA and departments by the organizers of the Regional contest. In this way the information and organization support, based on the principles of openness and accessibility of the information for all potential participants, was provided. The participants’ registration itself took place on the specially developed platform “Sirius. Online”. The participants submitted their projects as the material for expert assessment.

The modern national and foreign experience demonstrates that projects can be widely used in different academic courses in order to provide students with practical experience of using gained knowledge for problem solving and also to implement it as research work into different infocommunication systems (Belova, 2008). Foreign experience has the example of project activity that is recorded in a centralized way by, for instance, a special Wiki-site that consists of wiki-pages created by both teacher and students. Wiki-framework of the project supports all kinds of project activity and provides flexible and multidimensional models of interaction for a teacher, an individual student and the whole class (Xu, 2007). In the Russian system of education, the digital adaptive platforms are also used for forming, for example, team building skills in the learning process (Popkov, 2021).

## 6. Findings

Here are some quantitative characteristics of holding the Regional contest for three academic years (Table 1).

**Table 1.** Quantitative characteristics of the Regional contest held for three years

The year of holding the contest	The number of the registered participants of the Regional contest	The number of projects sent to the Regional contest	The number of those admitted to the final on-site stage	The number of winners and prize-winners of the Regional contest	The number of winners and prize-winners of the all-Russian contest
2019	118	110	72	41	15
2020	183	166	144	45	20
2021	239	207	93	50	23

As we can see from the table, the number of participants of the Regional contest in absolute terms has doubled. In 2020 the maximum possible number of participants were admitted but it did not lead to the fundamental changes in the number of winners and prize-winners at the regional stage. At the same time, it allowed a considerable number of participants to be selected for the all-Russian stage, that helped the Samara region in 2020 to reach the third place among the regions of the Russian Federation (except for Moscow) in the number of participants invited to the project shift “Great Challenges” in the Educational centre “Sirius” (Table 2).

**Table 2.** The top list of regions-participants of the educational shift “Great Challenges”

The year of holding the contest	The number of winners and prize-winners of the all-Russian contest from the Samara region	The position of the Samara region among the regions of the Russian Federation without Moscow
2019	15	V
2020	20	III
2021	23	I

It is interesting to study the structure of the contest according to the directions. The statistics divided into directions is represented in Table 3. Some of the directions can be considered consistently successful for the Samara region: “Big data, artificial intelligence, financial technologies and machine learning”,

“Cognitive studies”, “Space technologies” and “New materials”. In 2021 the direction “Nanotechnologies” turned out to be a “failure”. There are no successful ideas and projects in the direction “Smart city and security”.

**Table 3.** The statistics on the participants according to the Contest directions for three years

No.	The direction of the contest	2019			The number of projects sent to the Regional contest	2020			2021	
		The number of regional projects	The winners and prize-winners of the region	Reached Sirius		The number of winners and prize-winners of the Regional contest	The number of regional projects	The winners and prize-winners of the region	Reached Sirius	The number of winners and prize-winners of the Sirius contest
1.	Agro-industrial and biotechnologies	25	6	1	31	5	0	31	5	1
2.	Unmanned transport and logistics systems	5	4	0	6	4	2	13	3	2
3.	Big data, artificial intelligence, financial technologies and machine learning	14	4	3	13	5	3	21	4	2
4.	Genetics, personalized and predictive medicine	9	4	1	18	4	2	15	4	1
5.	Cognitive studies	8	4	2	16	4	2	23	6	2
6.	Space technologies	9	5	1	23	6	2	22	6	4
7.	Nanotechnologies	10	3	3	11	4	2	10	3	1
8.	Neurotechnologies and nature-like technologies	4	2	1	6	2	2	4	2	4
9.	New materials	5	3	2	14	2	2	22	4	3
10.	The exploration of the Arctic and the World Ocean	-	-	-	4	2	1	6	2	1
11.	Modern energy	9	3	0	15	3	2	20	6	2
12.	Smart city and security	12	3	1	26	4	0	20	5	0
TOTAL:		110	41	15	183	45	20	207	50	23

The number of registered participants makes it possible to conclude that the most “popular” directions in the Samara region are “Agro-industrial and biotechnologies”, “Smart city and security”, “Space technologies”.

Also, the analysis of the submitted projects according to the age has been carried out. The participants of the contest were the students of the educational institutions of Samara from 7<sup>th</sup> to 11<sup>th</sup> grade. It is predictable that the largest number of participants study in the 10<sup>th</sup> grade, but the highest percentage of the contest laureates is still among the students of the 11<sup>th</sup> grade.

As for the problems of the Regional contest organization, it is necessary to point out that not all of the participants coped with the two-stage registration system on the “Sirius. Online” web-site, because after receiving the first message from the system, they believed the registration had been successfully completed. The organizers of the Regional contest were not able to “track” this issue because the fact that not all those

wishing to register could do it was discovered already after the registration had been closed and the list of registered participants had been published.

Another problem faced by the organizers of the Regional contest was the fact that not all participants and, above all, not all scientific project-supervisors clearly understand the content of work in some directions of the Regional contest. The description of all the contest directions as well as the examples of the works from previous years are placed on the web-site: <https://konkurs.sochisirius.ru>. (Great Challenges:..., 2021). However, not all project-supervisors “immerse” and study the terms of the contest and the directions of work carefully. Because of that a large number of projects (approximately 10% of the total) that did not match the contest directions were submitted for the Regional contest. Experts have no opportunity to assess these works correctly. As a result, there is a situation in which a work that can deserve attention and is well done does not match any of the twelve contest directions. Among the assessment criteria, there is no such criterion as the compliance of the completed work with the topics or the content of the direction.

What is more, the directions of the contest do not strictly match the generally accepted school subjects (mathematics, physics, chemistry, biology, ICT etc.). All the directions are connected to the leading and priority problems of the modern science and practice, thus, the knowledge gained in the process of studying traditional school subjects has to be systematized and summarized in order to do a scientific-technological project. It presents a particular difficulty and the need for a broad competence of a research supervisor at the stage of setting and solving regional tasks. Here a school teacher can be supported by an academic advisor from university or scientific organization. The Samara region has gained a significant experience in engaging academic advisors from higher education institutions to managing the projects of students (Kamaldinova & Kulikova, 2019). In this regard, it should be noted that one third of the Regional contest projects was completed with the academic consultations of scientists and practitioners from regional universities.

## **7. Conclusion**

All in all, the results of holding the Regional competition make it possible to speak about its success. The projects submitted to the contest are sent not only from the regional centre, but from all over the Samara region. The Regional contest has been held in all of the twelve directions, the winners and prize-winners have been selected. The special page in the Internet has been created for informing the contest participants, the local work has been organized through TA and departments, the Ministry of Education and Science of the Samara region has actively taken part in the work. Almost all of the regional universities were engaged in the work of expert commissions.

The success of the Regional contest confirmed at the all-Russian level is the result of the work of a large team of scientific and pedagogical specialists that is aimed at identification, development and support of talented children. The pool of experts, involved scientific supervisors – teachers and academic advisors - has been created in the region. An organizational and methodological team that includes specialists from the Ministry, TA and departments of education, “SRCGCh”, representatives of the leading universities in the region has been formed.

## References

- Astra: unified regional system of measures of identification and development of creative youth in the spheres of science, engineering and technology and of innovative development of the Samara region. (2021). <http://www.creative-youth.ru>
- Belova, T. G. (2008). Research and project activity of students in modern education. *Izvestia: Herzen University Journal (The Herzen State Pedagogical University of Russia)*, 76-2.
- Bogoyavlenskaya, D. B., Shadrikov, V. D., Babaeva, Yu. D., Brushlinsky, A.V., Druzhinin, V. N., Ilyasov, I. I., Kalish, I. V., Leites, N. S., Matyushkin, A.M., Melikpashaev, A. A., Panov, V. I., Ushakov, V. D., Kholodnaya, M. A., Shumakova, N. B., & Yurkevich, V. S. (2003). *The working concept of giftedness*. Moscow.
- Decree of the President of the Russian Federation of 01/12/2016 No. 642. (2016). “On the strategy of scientific and technological development of the Russian Federation”.
- Great Challenges: all-Russian scientific-technological projects contest. (2021). *The project of the Educational centre Sirius*. Retrieved from: <https://konkurs.sochisirius.ru/>
- Kamaldinova, Z. F., & Kulikova, N. K. (2019). Results analysis of the regional research competition for secondary school students using information and communications technology. *Samara State Technical University Bulletin. Bulletin of Samara State Technical University. Psychological and Pedagogical Sciences*, 1(41), 49-61.
- Kamaldinova, Z. F., Piyavskiy, S. A., & Elunin, M. N. (2018). Technology of interaction of scientists and creatively gifted schoolchildren in a virtual scientific and educational environment. *Izvestiya of the Samara Science Centre of the Russian Academy of Sciences*, 20(6-2), (86), 328-334.
- Polshakova, N. V., Kolomeychenko, A. S., & Yakovlev, A. S. (2020). Digitalization of the research work as the basic instrument of monitoring activities of the scientific and technical work of the university. *Bulletin of Agrarian Science*, 1(82), 122-130.
- Popkov, S. I. (2021). *Application of the digital adaptive platform for learning programming with the teamwork skills forming function*. <https://psyjournals.ru/mad/2021/n1/Popkov.shtml>
- Samara regional centre for gifted children. (2021). <https://codsamara.ru/olimpiady-i-konkursy/bolshie-vyzovy/>
- The order of the Ministry of education and science of the Samara region of 30/09/2019 No. 310-од. (2019). “On approval of the regulations of the regional contest of research projects of the students of the Samara region educational institutions “Vzlet””.
- The Samara region: the Regional track of the all-Russian scientific-technological projects contest “Great Challenges”. (2021). <https://sochikonkurs.tilda.ws/>
- Xu, L. (2007). Project the wiki way: using wiki for computer science course project management. *Journal of Computing Sciences in Colleges*, 22(6), 109-116. <https://dl.acm.org/doi/10.5555/1231091.1231110>