System for Personal, Product and Service Certification in Informatization Sphere of Education System

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Abstract[1]

The System for independent certification INFORMIKACERT was created to assure conformity of personnel, products and services in education and scientific sphere to the requirements of actual legislation, national standards, state educational standards, normative documents by the Ministry of Education and Science of the Russian Federation. The main foundations of the System are voluntariness, openness, nondiscriminatory access and participation in certification processes, objectivity of assessment, confidentiality and applicant protection, information availability. The article describes the main directions of the System.

1. Independent certification systems are an integral element of a civilized market-oriented society

The Russian Federation is gradually transitioning from the system of obligatory (state) certification towards confirmation of quality conformity of products and services by professional communities. This tendency also applies to the rapidly developing sphere of education and research informatization.

The Federal Agency for Technical Regulation and Metrology has registered the Independent Certification System "INFORMIKASERT" (further System) in the unified roster of registered voluntary certification systems: register number of the System is РОСС RU.В612.04ИЦ00 of December 17, 2009 (fig. 1).

2. Independent Certification System "INFORMIKASERT"

The System was developed by SIIT&T "Informika" to certify the compliance of staff qualification, products and services in the field of research and education with

requirements of the current legislation, national standards, state educational standards, regulations of the Russian Ministry of Education and Science, provisions of state contracts, agreements, documents adopted in the System.

Fig. 1. Registration certificate of the Independent Certification System "INFORMIKASERT"

The System is based on the principles:

- Voluntariness;
- Openness;
- Non-discriminative access to and participation in certification processes;

- Objective evaluation;
- Confidentiality and protection of applicant's interests;
- Availability of information;
- Certification and inspection control are carried out on a contract basis.

Subjects to certification in the System:

- Computer systems for the quality management in the fields of research and education;
- Staff members at educational and research institutions as well as education and research management bodies;
- Information and telecommunication systems of educational and research institutions;
- Portals and websites of educational and research institutions as well as management bodies in education and research;
- Electronic educational resources and data bases;
- E-learning systems;
- Systems for monitoring of the education and research development at federal and regional levels;
- Systems for education monitoring at regional and municipal levels;
- Electronic documentation systems in science and education;
- Information services in the education system;
- Information services in science;
- Services of data transmission networks;
- Telematic services.

2.1. Rules for carrying out certification of PRODUCTS

The following systems and ICT means in education and science are the products to certify in the System:

- Computer systems for the quality management in the fields of research and education;
- Information and telecommunication systems of educational and research institutions;
- Portals and websites of educational and research institutions as well as management bodies in education and research;
- Electronic educational resources and data bases,
- E-Learning systems;

- Systems for monitoring of the education and research development at federal and regional levels;
- Systems for education monitoring at regional and municipal levels;
- Electronic documentation systems in science and education.

List of PRODUCTS certified in the System is rather extensive but can be divided into three big groups:

- Computing machines, 40 0000[2], including computing networks, systems, complexes and machines; peripheral devices of computing complexes and digital electronic machines; devices for network, system, complexes and computing machines interconnection; devices of computing complexes and analog as well as digital-analog machines; service devices and auxiliary computers, information carriers;
- Programming and technical complexes (PTC) for automated systems, 42 5000, including PTC for automating the management of organizational and economic processes; PTC for automating the management of technological production processes; PTC for automating the project development; PTC for automating research activities; PTC for automating data exchange (in integrated systems); PTC for automating the operation of flexible production systems; PTC for automating information processing in non-industrial sphere; PTC for automating learning processes; PTC for automating control over and performance tests of the products;
- Software and computer information products, 50 0000, including System software; General software; Application software for research purposes; Application software for projecting purposes; Application software for equipment and technological process management; Application software for performing organizational and economic tasks; Application software for learning purposes; Programming and information products; Other software.

Certification procedure for systems and means of ICT includes:

- Considering an application for certification of systems and means of ICT;
- Adopting a decision on the application for certification;
- Submitting systems and means of ICT for identification and certification;

OKP-code is used in the All-Russian Product Classifier

- Analyzing and processing the results obtained in the course of certification;

- Adopting decision of issuing a system's certificate of conformity;

- Issuing, registering and providing the certificate of conformity and permission to use the system's mark of conformity;

- Carrying out inspection control over the certified products (in accordance with the certification procedure applied);

- Corrective measures in case of non-compliance of systems and means of ICT with the requirements and/or misuse of the system's mark of conformity;

- Providing information on certification results to the customer only.

The Product certification is carried out according to the following schemes:

Table 1. Elements of the schemes for certification of ICT systems and means

No	Test of ICT systems and means in the Testing Laboratory	Check of development technology for ICT systems and means	Inspection control for ICT systems and means
3	Test type	-	Test of the type item
3a	Test type	Status analysis of the item development technology	Test of the type item. Status analysis of the item development technology
7	Test of every single item in the output	Status analysis of the item development technology	-
8	Test of the singular item	Status analysis of the item development technology	Test of the singular certified item. Status analysis of the item development technology

) Test of ICT systems and means based on one ore several type installations

As of today, the following institutions are among customers for certification of COMPLEX INFORMATION SYSTEMS in science and education:

- Galaktika corporation;

- 1S company;

- Bauman Moscow State Technical University;

- Volgograd State Technical University;

- Yaroslavl State University.

In July this year products developed in SSC FSUE Keldysh Research Center successfully passed the certification – "Knowledge base on the thematic area of activities of the national nano-technological network "Functional nano-materials for space equipment" for the purposes of analyzing methods ad technologies as well as comparing technical and scientific solutions in this area".

Currently the certification of the System "IBS: Educational Process Management" is the subject of negotiations.

System "IBS: Educational Process Management" was developed for higher educational institutions with various organizational structures. This System comprises the following modules:

- Organizational structure;

- Admission Board;

- Learning plans;

- Learning programs;

- Record of movement among students;

- Planning and record of departments' workload;

- Curriculum;

- Students' midterm academic performance;

- Students' current academic performance and absence rate;

- Students' final state attestation;

- Record of fee-based forms of education;

- Record of movement among participants of additional education programs;

- Record of movement among postgraduate students;

- Branch records.

2.2. Rules for carrying out certification of SERVICES

Services to certify are information services in the research and education system (information services):

- Information services in the field of education;

- Information services in the field of research;

- Services of data transmission networks telematic services.

Certification procedure for information services in the System includes:

- Submitting application for certification of information services;

- Considering the application, adopting a decision on the application for certification of information services (together with the positive response to the application, the System's Central Body sends to the applicant a draft agreement on providing the certification services;

- Assessing of the compliance of the information services and the System's requirements;

- Adopting decision on issuing (denial to issue) a certificate;

- Issuing the System's certificate of conformity;

- Carrying out inspection control over the certified information services;

  The following services can be certified in the System

- Services in the education system (110 000[3]);

- Services in the pre-school education system (111 000);

- Services in the secondary school education system (112 000);

- Services in the higher education system (113 000);

- Services in the technical training system (114 000);

- Other services in the education system (116 000);

- Services of electronic communication (034 000);

- Services of data transmission networks (034 100);

- Telematic services (034 200);

- Services on the work with computers and their maintenance (804 000);

- Software services (804 100);

- Consulting services on systems and software (804 200);

- Services related to system analysis (804 300);

- Services on system projecting (804 400);

- Services on computer programming (804 500);

OKUN-code is used in the All-Russian Service Classifier

- Systems maintenance services (804 600);

- Services on data processing and table drawing (804 700);

- Data input services (804 800);

- Other services related to computer engineering (804 000);

- Services in the field of research (807 100).

The Service certification is carried out according to the following schemes:

Table 2. Elements of the schemes for information service certification

No	Evaluating the performance of information services	Checking (testing) the results of information services	Inspection control over the certified information services
1	Evaluating skills of the information service performer	Checking the information services	Controlling the skills of the information service performer
2	Evaluating the process of information service performance	Checking the information services	Controlling the process of information service performance
3	Analyzing the state of the information services production	Checking the information services	Controlling the production state of the information services
4	Evaluating of information service performer	Checking (testing) the information services	Controlling the compliance with the System's requirement

2.3. Computer and ICT competence certification of PERSONNEL

The certification for computer and ICT competence is a complex system aimed at confirming skills and competences in the area of computer competence and ICT of people involved in education.

The certification system comprises mechanisms and measures allowing an independent evaluation of their knowledge.

The system can be an instrument for teachers attestation and education institutions accreditation.

The system for computer and IT competence certification in the field of education:

- Recognized by the European Center for Quality as a system of voluntary staff certification in the field of quality No. РОСС RU.Ж174.04ПЖ00;

- Recognized as the best solution in the nomination "Teacher training in the field of ICT use in the teaching process" at the Educational Environment forum;

- Has a certificate of state registration of the computer program for the software testing complex;

- Has a certificate of state registration of the test tasks data base.

Centers for Certification. To date, 35 certification centers have been opened in 26 regions of Russia (fig. 2).

About 6 000 people have gone through personal attestation procedures (taking place almost every day).

Fig. 2. Map of regional certification centers

To open a regional center it is necessary to get support of the regional education management authority: the applicant should have a letter containing recommendation to entrust it with functions of a regional center for computer and ICT competence certification; the letter should be written on behalf of the head of the regional education management authority.

Areas of certification. Currently there are five areas of certification in the field of general education:

- Compliance with the computer competence requirements in the education system;

- Compliance with the qualifying requirements in the field of ICT for teachers in natural sciences and mathematics;

- Compliance with the qualifying requirements in the field of ICT for teachers in humanitarian sciences;

- Compliance with the qualification requirements in the field of ICT for administrative staff members of a general education institutions;

- Compliance with the requirements in the field of teacher's ICT competence.

Besides that, there are four areas of certification in the field of secondary vocational education:

- Compliance with the qualifying requirements in the field of ICT for teachers in natural sciences and mathematics at a secondary vocational education institution;

- Compliance with the qualifying requirements in the field of ICT for teachers in humanitarian sciences at a secondary vocational education institution;

- Compliance with the qualification requirements in the field of ICT for administrative staff members of a secondary vocational education institution;

- Compliance with the requirements in the field ICT competence for teachers at secondary vocational education institution.

More areas are planned for the future, including for the higher education.

Certifying document. Certification of PERSONNEL. Certificate is the document certifying a successful result of the test and confirming that the knowledge of its holder meets the respective requirements and the applicant can use ICT products in his/her professional activities (fig. 3).

Fig. 3. Certifying document

In order to be sure in authenticity of the certificates, a data base of certificates was created with numbers of all issued certificates and information about their holders, as well as a service allowing to check the authenticity of a certificate. You can enter information about a certificate on the website of the certification system icttest.edu.ru/check to verify its authenticity (fig. 4).

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Fig. 4. Form for online verification of the certificate genuineness

Codifiers of competence requirements. Certification of PERSONNEL. The requirements to the level of computer and ICT competence are determined by the codifiers which were developed relying on the following documents:

- State educational standards for of basic and complete secondary school in "Information sciences and ICT" (basic level, obligatory for all Russian schools);

- Unified qualification handbook for positions of managers, specialists and office workers, chapter "Qualifying specifications for positions in the field of education", adopted by the Order of the Ministry of Healthcare and Social Development of the Russian Federation No.761н of 26 August 2010.

- State educational standards for training of teachers of various subjects;

- Sanitary and epidemiological rules and norms "Hygienic requirements to personal computers and work organization. SanPiN 2.2.2/2.4.1340-03";

- Exemplary teaching programs for the subject "Information science and ICT" in the school;

- Exemplary programs for disciplines included in the teacher training system;

- Textbooks and learning materials approved by the Ministry of Education and Science of the Russian Federation or (for teacher training purposes) by educational and methodological associations under the Ministry of Education and Science of the Russian Federation.

An original calculation methodology was used to determine the number of test tasks in each area of certification.

Statistics. Certification of PERSONNEL. In most cases participants of certification chose the certification area "the computer competence in the field of education" (fig. 5).
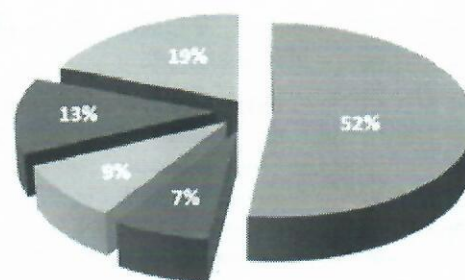
- — computer competence in the field of education
- — qualifying requirements in the field of natural sciences and mathematics
- — qualifying requirements in the field of humanitarian sciences
- — qualification requirements for administrative staff members
- — ICT competence in the field of education

Fig. 5. Distribution among the areas of certification

A significant amount of certification participants are people in the age of 35 to 54 years. They have a total share of 51 per cent (fig. 6).

under 17
17-24
25-34
35-44
45-54
55 and older
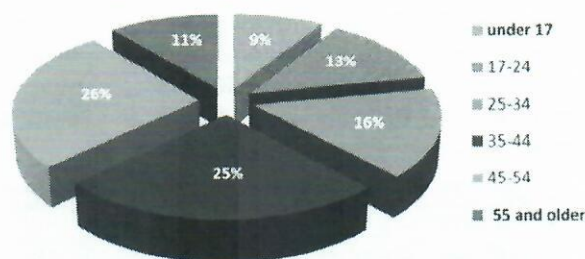
Fig. 6. Age distribution

Cooperation. SIIT&T "Informika is open for cooperation in development of the system of computer and ICT competence certification in the field of education with all interested parties.

The following forms of cooperation are possible at the moment:

- A. Establishment of a regional certification center. We are developing a network of certification centers and propose all interested organizations to open a certification center on the basis of an education institution. The main requirement is a letter from the regional education management body with recommendation to entrust the educational institution with the functions of a regional certification center.

- B. Bonus Certification program. Participation in the Bonus Certification program allows the regional certification centers to get bonuses for developing test tasks on subject matters belonging to the areas of computer and ICT competence certification and to convert them into gratis certificates.

- C. Secure Start program. The Secure Start program was developed for new certification centers and provides a 50 per cent discount for the price of

certificate when the test is taken in a new certification center within one month.

In 2012 FPI SIIT&T "Informika" signed a memorandum of understanding with the UNSCO Institute for Information Technologies in Education stating a determination to seek comprehensive ICT development and their implementation in the global education space, in particular for developing collaboration in ensuring a wide implementation of ICT in the field of education as well as in certifying ICT competence of those involved in the education system with the use of respective UNESCO standards.

Recent information on the certification System is available on the website www.icttest.edu.ru. There you will also find a demo test allowing you to check your computer competence.

2.4 Certification of OFFICIAL WEBSITES of educational institutions

There was developed a methodology to certify on a voluntary basis the compliance of official websites of educational institutions with the Rules for Publishing in the Internet and Updating Information on an Educational Institution in accordance with:
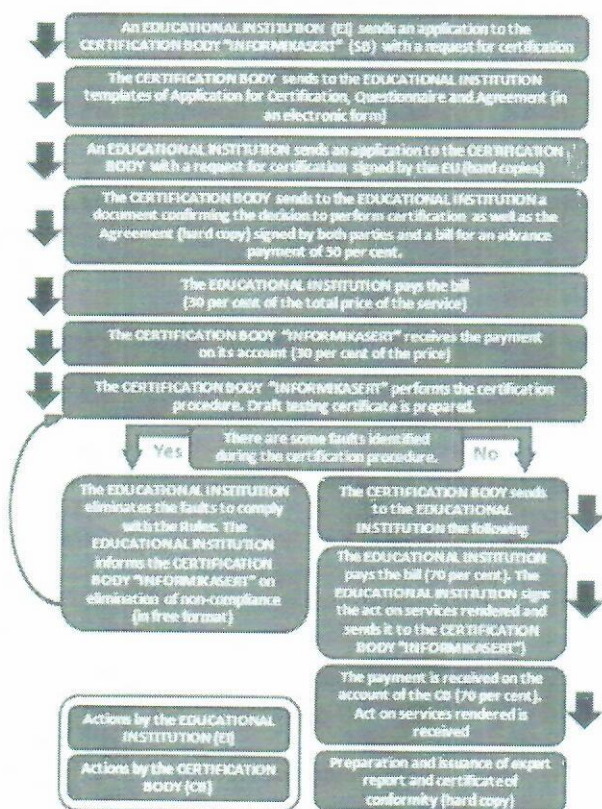

Fig. 7. Algorithm of passing the certification procedure

- Law of the Russian Federation "On Education" No. 3266-1 (art.32) of July 10, 1992;

- Regulation of the Government of the Russian Federation No. 343 of 18 April 2012 "On Approving the Rules for Placing in the Internet and Updating Information on an Educational Institution";

- Federal Law of the Russian Federation No. 436-ФЗ of December 29, 2010 "On Protection of Children from Information Inflicting Damage on Their Health and Development";

- Draft law 89417-6 "On Changes to the Federal Law "On Protection of Children from Information Inflicting Damage on Their Health and Development" and Certain Legislative Acts of the Russian Federation";

- Recommendations proposed by SIIT&T "Informika".

Algorithm of passing the certification procedure is presented on the scheme – fig. 7.

3. Conclusion

There by, the prospect of the project development consists in introduction of independent systeem for personnel certification, certification of program products and information services in sphere of education and science in Russian Federation. The results of certification will allow the educational institutions and the educational system in a whole to determine the best goals of their progress, and form the base effective use of material, technical, personnel, financial resources.

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