

**ON THE EDUCATION INFORMATIZATION IN RUSSIA****Liudmila Guseva**

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**Abstract:** the article outlines the history of education informatization in the Soviet Union and later in Russian Federation.

**Keywords:** education, PC, computer, the history of informatization.

**Resumo:** Este artigo busca traçar os contornos de uma historiografia da informatização da educação na União Soviética mais especificamente na Rússia.

Palavras-chave: educação, PC, Computador, a historia da informatização.

At the age when computers are omnipresent and used in various situations for solving numerous tasks, it is not a surprise that a special term “education informatization” has appeared. This term is well known everywhere today, and the Russian Federation is only one of the countries that undergo the process of education informatization nowadays. It began several decades ago and it is still to continue for many years. However, before we dwell on the history of education informatization in Russia, let us first define the meaning of this term.

There are different definitions of this term that can be classified according to the nationalities of authors, the time of appearance and many other factors, but as soon as we consider the education informatization in Russian Federation it is natural to provide a short comparison of this term’s definitions given by Russian and foreign researchers. According to some education experts the term of education informatization means the process directed to the efficient use of the information processing equipment in the secondary education (the primary level of education or primary school in Russia is for

children from 6-7 to 11 years old; secondary school is for children from 11 to 18 years old) with the help of the computer<sup>1</sup>.

Another point of view says that the education informatization is the area of scientific and practical activities directed towards the application of technologies, which capture, store, process and distribute information that provides the classification of existing knowledge and the generation of new knowledge in the education area in order to reach psychological and pedagogical aims of education and training. Having analyzed these definitions we conclude that in general this term may be determined as a complex means directed to the transformation of pedagogical processes based on the implementation of information processing and the use of computer technologies in public education.

In most western countries, except France, where the term *informatique* is used, which is very similar in the meaning to the notion of informatics in Russia, they use in school the terms of computing science and ICT (Information and Communication Technology). This fact complicates understanding of the entire view of the present status and development prospects of the computer science as a whole. The scope of informatics nowadays is wide. It includes, among others, the theory of algorithms, databases, artificial intelligence, robotics, computational linguistics, numerical and symbolic computation, computer networks, bionics, intelligent control, etc. Modern society should be able to live and work in the computerized environment, therefore, basic education in this field as well as informatization of education itself is compulsory. In the last decade of the twentieth century the idea that the ICT use in education is the process connected with deep changes of modern school (that is called education informatization in Russia) finally is accepted in the literature worldwide. The problems of the ICT use in education used to be traditionally connected to educational technologies. Today the meaning of education informatization implies not only technological problems but also pedagogical problems that are connected with the content, organizational forms and methods of education<sup>2</sup>.

Having considered the meanings of the education informatization term we can see that it is a global process that changes the established educational system according to contemporary requirements of the emerging information society and create UNESCO, Criciúma, v. 5, n°1, Julho/Novembro 2015. Criar Educação – PPGE – UNESC.

a new modern school. Education informatization is not a substitution of books and notebooks with computers and the Internet, it introduces systematic changes to the whole system of education and transforms the younger generation.

After we have defined the education informatization, let us describe the history of this process in Russia. In fact, it has begun already in the Soviet Union, and the first step was made in 1985 when the computing science became one of the school subjects “The basics of the informatics and computational techniques”. Still it was not yet the education informatization. The first tasks were to provide the education system with prepared teachers and proper equipment. At that very time it was already planned that providing the schools with computers would change them thoroughly in the future. For instance, it was expected that all school teachers would be able to work with the computer, all schools would be supplied with the sufficient number of computers, and the computers would be connected in the local, regional and global networks. Some of these events were planned<sup>3</sup> to be realized by the year 2000.

We can say that the Soviet Union experts were almost prophets since many of their ideas and plans became true. It is not a surprise, because the process of the education informatization was initiated and went under control of the great mathematicians and engineers such as V. M. Glushkov, A. P. Ershov etc. Moreover, it was planned to enable the study of informatics not only for senior pupils but for the students of secondary and primary school as well (it means that pupils of 7-15 would be able to study informatics). Still, all these steps primarily reflect only the provision of the schools with needed equipment, software and study materials. However, while discussing the education informatization we should note that further foresights made in the Soviet Union times were as follows: the study of computer science in secondary and primary schools would cause the appearance of many new possibilities related to study of other school subjects from the “computerized” point of view. This in turn would require additional training of the teachers. These new possibilities provided by PC’s would enable new methods of teaching that should be adopted by teachers. The final step of the education informatization plan implied the development and implementation of the integrated automatic informational system intended to solve various management tasks of the education organization.

The history of *cybernetics*, born out of the pioneering book by N. Wiener, in Soviet Union was difficult. Initially, it was branded as the ‘idealistic pseudoscience’, but the practical needs of the growing science and technology, supported by influential scientists<sup>4</sup>, made it possible in 1955 to begin fundamental and applied research in what would become eventually the informatics or computing science<sup>5</sup>. The term of cybernetics was used for a decade before the field grew larger and then the new word combination became common. *Applied mathematics* name (some times, computational mathematics, which is the Faculty of Moscow State University) is still in the names of some research institutes, university faculties and teaching courses throughout the former Soviet Union countries.

The first Electronic Computing Machine (ECM) in the USSR (and the first in continental Europe) was created by a team of S.A. Lebedev in Kiev, Ukraine, in 1951. This fact reflects geography of the points of growth of this new science, another center was at Novosibirsk. The first common use ECM ‘Ural’ was produced in 1954. The industrial and military applications of computing machines were a primary concern of the scientific community and the government, therefore, the education use of computers and the start of the education informatization was delayed. It is not surprise because even the first monograph on the theory of ECM was classified and not available for public use. “The Council for Cybernetics” of the Academy of Sciences, the large research center comprised of many departments and institutes, played the leading role in the development of informatics. When the first results of its work were summarized in 1967, engineering psychology and the use of computers in education were already noted.

The publication of the first journal “Cybernetics” began in 1966 in Kiev, but education in informatics, perhaps, began with the series of books (41 in total) “The problems of cybernetics” supervised by A. A. Lyapunov, the first volume appeared in 1958. At later time, the great interest of adults and children in the new technology and the new mathematical science was satisfied with many books and journal publications<sup>6</sup>. Advanced and hands-on knowledge was disseminated through the network of specialized schools and extracurricular activities. As we can see many points of this plan have been achieved. Let us now divide the whole process of education

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informatization in Russia into several steps<sup>7</sup> considering the breakup of the Soviet Union and appearance of a new country with new economic and politic conditions.

The first step began in 1985 and it relates to the Soviet Union period and it was primarily concerned with supplying the schools with proper equipment. Because in the late 1980's even many universities and institutes had a few if any PCs (the first mass-produced personal computers delivered to the higher education institutions was the 16-bit "Elektronika-BK0010"), many secondary schools taught informatics in the "computer-less" mode. Therefore, the content and the structure of the informatics course were focused on the logics and the algorithms. Nevertheless, it was quite clear that the area of applications of ECMs, how the computer used to be called those days, was very large and the positive and negative sides of these uses were evaluated<sup>8</sup>. The final solution of the equipment supply was done with the special federal program that mandated at least one computer per any rural school. The second step of the informatization began in the soviet times and it still lasts. It implies the integration of ICT into the education process in order to make it more efficient with the help of informational technologies. Third step is starting nowadays. It is related to the use of ICT for the achievement of educational results that are stated in the new Federal State Educational Standards (FSES) and it requires the consecutive solution of the task of making the education process individual-oriented.

According to the FSES there are various requirements to the teaching informatics in schools and holding the final test before graduating the school. It is quite natural that both these matters mostly coincide with each other in the requirements.

At school it is a pre-request for every teacher to have a written Working Program for the subject he/she teaches. It is one of the basics documents that school teacher is guided by. The program is developed by the teacher itself and it describes the whole process of teaching particular school subject.

The teaching informatics requirements are shown in the Working Program. In each program there are such points mentioned as:

the subject' textbook;

methodical recommendations for the teacher;

the sections of the subject where various topics are combined in certain categories according to the difficulty, importance and time of studying;

the requirements to the amount of knowledge and skills each student must have by the end of the study course;

and finally the subject scheduling that implies the division of all lessons throughout the school year and the amount of academic hours provided for teaching this or that topic.

As for the final test it is known in Russia as Unified State Exam (USE, or EGE in Russian spelling). The USE in informatics<sup>9</sup> is not an obligatory one as the subject studied in school. However in case the school graduate is going to enter university or institute for the specialty related to computer science then he or she has to hold the USE in informatics. The exam is made as a test covering all the topics been studied in the school throughout the whole course of informatics subject. Moreover the questions are made so to comply with the requirements meant in the Working Program and the Federal State Educational Standard (FSSES). The questions vary from really easy to difficult ones in order to get the better understanding of the student knowledge level. Each graduate has an access to the training version of USE which contains the questions quite similar to those that will be included in the real USE. The documents provided with the USE demo version describe the requirements to the exam itself and the knowledge and skills of the student.

We should also say a few words about the categories of topics been questioned within the informatics USE test. All the questions are divided into two parts according to the difficulty. The first part includes questions on such topics as information coding; algebra of logic; electronic worksheets (like MS Excel, OpenOffice Calc, LibreOffice Calc, etc; programming languages; the amount of information; computer networks; formal executors (robots); and algorithms. The second part commonly cover only two topics like electronic worksheets and programming, but the difficulty level of these questions (or tasks) is quite high and requires deep fundamental knowledge of the subject.

At present, the informatics is a compulsory subject of secondary school education. The special contests (olympiads), standard in the core subjects such as UNESC, Criciúma, v. 5, n<sup>o</sup>1, Julho/Novembro 2015. Criar Educação – PPGE – UNESC.

mathematics, physics, chemistry etc. became organized at this stage. School students can take by selection the state test required for enrollment to some technical universities. The content and problems of this test<sup>10</sup> were mainly worked out during two decades of the education informatization<sup>11</sup>. There is an urgent need to develop the system of distant education that only became possible after the computarization of not only schools but also the whole society. For the geographically vast country like Russia, this is the only solution to deliver education to its remote regions, in the modern demographic situation when many schools are being closed as the population gather to large cities. The similar conditions experienced by a similar country in the Western hemisphere, Canada, have already brought up the extensive and comprehensive distance education system<sup>12</sup>.

Another feature of the education informatization is the new requirement to all educational institutions (school including) to provide complete information about itself and be transparent for anyone. In other words any person interested in process of education of this or that school should be freely provided with it at the school's website.

Due to this requirement there were some problems for the school in the area of website development as the schools are mostly state organizations that cannot provide any chargeable services. However computer science teachers found the most appropriate solution – to develop website with the help of one of the freely distributed Content Management Systems (CMS) like WordPress, Drupal, Nano-CMS and etc. Many of them shared their personal experience in site building through online-communities, professional magazines. There is easy to use manual – providing the basic knowledge of the CMS and the easiest way to build a website<sup>13</sup>.

Finally we can state that the process of education informatization in Russia is not new for the country but its completion is still very far. There is a lot to be done in order to change the whole system of education according to the requirements of the information age and it is up to us and our followers how soon it will be completed and what results it will bring.

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<sup>3</sup> A.P. Ershov, *The concept of the use of computer technology in education*. – Novosibirsk: Archive of Academician Ershov, Siberian Division of the Academy of Sciences of the USSR, 1988.

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<sup>4</sup> A.G. Marchuk and Yu.I. Naberukhin (eds.), *The history of informatics in Russia: The scientists and their schools*. – Moscow: Nauka, 2003.

<sup>5</sup> D.A. Pospelov, *The beginning of informatics in Russia*. In “The essays on the history of informatics in Russia”. – Novosibirsk: OIGGM, 1997.

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<sup>7</sup> A.Yu. Uvarov, *Informatization of school: Yesterday, Today, Tomorrow*. – Moscow: BINOM, 2013.

<sup>8</sup> G.V. Frolova, *Pedagogical abilities of ECM*. – Novosibirsk: Nauka, 1988.

<sup>9</sup> The Unified State Exam in informatics -

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<sup>10</sup> Federal Institute of Pedagogical Evaluation. Informatics and ICT Open Tests.

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