



UNESCO INSTITUTE FOR INFORMATION TECHNOLOGIES IN EDUCATION

No. 1'2001

January-March



Prof. Seymour Papert, internationally recognized as the seminal thinker about ways in which computers can change learning, was a keynote speaker at the training seminar *Programme of ICT Application in Education: Projecting National and Regional Strategies*, IITE UNESCO, Moscow

EDUCATION FOR THE KNOWLEDGE SOCIETY. A RUSSIA-ORIENTED PERSPECTIVE ON TECHNOLOGY AND SCHOOL

By Seymour Papert (Extract from the Lecture)

I was very glad to have the opportunity to speak at the very important meeting held at the UNESCO Institute for Information Technologies in Education. I begin by saying something about why I see this meeting as extremely important and by putting on record some congratulations. UNESCO deserves some congratulation for creating an Institute devoted to digital technology and learning. But what deserves very special congratulation is locating it in Moscow rather than in one of the countries that might appear to be ahead of this region in developing educational uses of computers. For reasons I ex-

plain in my speech I believe that this region is faced with an opportunity to play a leading role in advancing thinking about how education will change, as digital technology becomes ubiquitous. The UNESCO Institute will help make this happen. But it will benefit as well. Indeed the whole world will have much to learn from how the educators of the region modernize their educational systems.

This paper is about the encounter between School and the wave of change that is sweeping the Globe in multiple manifestations known by such names as *"The Information*

Age" ... *"The Knowledge Economy"* ... *"Globalization"* ... *"The Connected Society"* and *"The Ubiquitous Computer"*. The names alone are enough to suggest implications for educational policy. A deeper look strengthens the impression: all important sectors of public life and many sectors of private life are being affected in ways that demand a thorough re-examination of the systems of education that became established by the early twentieth century with a remarkable degree of uniformity across the globe.

Can mega-change happen in learning? I think mega-change is

happening in learning, but not necessarily in schools. And not only in schools. And I think when we look around we see incredible changes in the way that learning happens in all sorts of ways. The Internet, these computer games I think is a very interesting phenomenon. I have done a lot of work on analyzing how much knowledge goes into some of these computer games. And I tell you – this is something that UNESCO ought to be studying seriously. Some of these games have much more knowledge than anybody would dare put in a school curriculum. And if all that knowledge had been

IITE ON-LINE NEWS

21 to 23 May 2001 (Kiev, Ukraine): Working meeting on a national pilot project for Ukraine *Distance Learning in Higher Education* within the International Conference of Technical Universities Rectors of CEE and CIS Countries *Higher Technical Education on the Turn of the Centuries*

23 to 26 May 2001 (Almaty, Kazakhstan): Working meeting on a national pilot project for Kazakhstan *Distance Learning for Rural Schools*

7 to 9 June 2001: Workshop on European/Russian co-operation in Digital Libraries and Expert meeting *Digital Libraries for Education* (in

co-operation with DELOS Network of Excellence on Digital Libraries and the Institute of Informatics Problems of the Russian Academy of Sciences)

5 to 7 July 2001 (St.Petersburg, Russian Federation): Expert meeting *Multimedia in Education*

13 to 14 July 2001: Research seminar *Ethical, Psychological, Societal and Legal Aspects of Application of ICTs in Education*

put in a school curriculum you wouldn't dare to teach it in such a way that the children would learn it. But when they meet to play this game – they learn it.

This is one of the most significant facts about learning. In our schools we are very far from mobilizing the learning potential of the individual students and very very far from mobilizing the global learning potential of the world.

In addition to changes in what should be known there are even greater changes in the means to learn. *There is much more to know but also much better ways to learn.* Using computers connected to the Internet students can obtain better and quicker access to sources of historical as well as scientific knowledge; they can explore economics as well as physics by making models and simulations; the rigor of mathematics can be extended to areas that were previously inaccessible.

But in the midst of these explosions of change the institution of School has remained as remarkably constant over time as it is across countries.

So why am I wasting time drawing attention to familiar facts and problems that are already being addressed? The answer is saddening: Although the problem is widely recognized, its depth is seldom appreciated. *Most of those billions of dollars are being wasted.*

Digital media are THE media for intellectual work as much as writing was in past centuries.

So what is required here is a deep change in how to think about education. So, technology is not the solution, it's only the tool. But while technology does not automatically make good education, the lack of technology automatically guarantees bad education.

Much more needs to be said to develop a full picture of the educational needs and opportunities for entry into our new century. But this short survey is enough to show the reasoning behind a six-point minimal program for educational planning:

- Adopt a vision of the future of learning supported by the assumption that every student will have a personal computer.
- Commit it to a timetable for implementing the technological support in a period of 4-6 years.
- In every region create pilot schools equipped with the full technology.
- Establish institutes for research on new curricula and methodologies for learning and teaching.
- Incorporate the educational vision and the acquisition of technological fluency in the preparation of future teachers.
- Ensure that serious attention is paid to the spiritual as well as the cognitive and to the social as well as the personal dimen-

sions of growing up in a context of high technology.

There is nothing specifically Russian in the six-point program. I have advocated similar ideas in many countries where I have worked, sometimes on the scale of large-scale government education projects and sometimes on the scale of a village school. Indeed I am convinced that within a decade all but the poorest and the most crisis-ridden countries will have implemented the program or be close to doing so. What is special about Russia is a unique combination of the need, resources, and an opportunity to profit economically and politically by achieving a position of international leadership:

- ... an exceptional base of highly educated people;
- ... Russia could change its education because it is changing everything;
- ... creating the new education is a challenging undertaking but I perceive Russia as a country that is at its best in achieving great feats;
- ... the intellectual resource. Despite a certain degree of 'brain-drain' and despite partial breakdown of the educational system there is still in Russia an exceptionally large pool of highly educated people deeply dedicated to their country's future;
- ... the opportunity for investment in a highly modern in-

dustry that would benefit the country by creating jobs at the same time as it enhances the conditions for workers to be prepared for all other modern jobs create an opening into the digital export market;

- ... the spirit of love, faith, and hopeful dedication that has placed working with Russian teachers among my most inspiring experiences.

Summary. The reconstruction of education is an essential component of Russia's commitment to rebuilding its social and economic structures and its international stature. Doing so incrementally by local fixes will not work. It will be insufficient in the best case and disastrous in the very probable worst case. A deep modernization requires much more than technology. But it does require technology. Creating an industrial-communication infrastructure to provide a bold technological basis for modern learning is economically feasible for Russia and could even open an international market. The 'industrially advanced' countries are on a path that leads clearly to being in this position within a decade and probably much sooner. In order not to be left far behind Russia must act now. The educational conservatism of the present leadership of 'Western' countries, and the smugness of public opinion, offer Russia an opening to the many advantages of being first.

INTERNATIONAL TRAINING SEMINAR

"Programme of ICT Application in Education: Projecting National and Regional Strategies"

IITE, Moscow, 21-23 February 2001

From 21 to 23 February 2001, IITE together with the Ministry of Education of the Russian Federation and the Moscow Committee on Education, and supported by the World Bank, Open Society Institute, and the Institute of New Technologies of Education, held an international training seminar *Programme of ICT Application in Education: Projecting*

National and Regional Strategies. The seminar was attended by nearly 80 representatives from 35 regions of the Russian Federation and CIS countries. Prof. Seymour Papert of the Massachusetts Institute of Technology (USA) was a plenary reporter.

The seminar explored possible regional strategies and infrastruc-

tures of informatization in education, single out general problems in the field of rendering informational support to the informatization programmes in education and ways of their solution as well as to analyze the world experience in this respect.

The seminar participants attended demonstration lessons on various

subjects using ICTs: informatics, art, technologies, speech development, mathematics, physics, foreign languages, natural sciences, etc. They witnessed application in the process of education of a computerized laboratory complex based on the LEGO, music keyboards, spelling tutors, virtual constructions kits *Geometer's Sketchpad*, *Interactive Physics* and

MicroWorlds. The seminar participants attended the integrated lessons: *Russian language + informatics, informatics + technology, physics + electronics* and the presentation of the school Internet-server as well as of international telecommunications projects. They were familiarized with interdisciplinary projects, methods of application of an automated teacher's workstation in every classroom and joint activity of two teachers at one lesson.

On 22 February 2001, Prof. S. Papert (USA) and Prof. A. Semenov (Russian Federation) made their reports.

A concise presentation of Prof. S. Papert's lecture *Education for the Knowledge Society. A Russia-Oriented Perspective on Technology and School* is presented on p. 1. In the near future, the full text of Papert's lecture will be published as a special IITE edition.

Prof. A. Semenov's lecture *Different Approaches to Forming National and Regional Scenarios and Informatization Programmes in Education* makes the point that the main avenues of ICT development are:

- modernization of ICT-based education (modernization of the content of education and structure of school education for any children's categories as well as special pedagogic systems, external studies, home studies, additional education, questions of educational management);
- personnel support (selection, methodological support, professional re-training, personnel re-training);
- organizational and methodological as well as scientific and methodological support in the field of education systems and technologies;
- co-operation with the community by using mass media, institutions belonging to the non-education system, parents, and multi-channel financing;

- implementing information environment and providing information resources (analysis of the existing resources in the Russian Federation and worldwide, their approbation and choice, acquisition of licenses as well as development of methods of their use);
- providing equipment for ICTs (premises, computers, general and special additional equip-

ment, non-computer means of ICTs, repair and servicing, telecommunication);

general process of education modernization, implementation of new priorities in education. As the world experience reveals, underestimation of any of the above mentioned avenues leads to a considerable decrease of the effectiveness of informatization efforts.

The seminar programme included also Prof. V. Meskov's (IITE) report *The IITE Educational*



At the seminar

ment, non-computer means of ICTs, repair and servicing, telecommunication);

- creation of the normative framework (education plans, personnel roster and wages, including distance education, the working regime of teachers using ICTs, sanitary standards for designing buildings, equipment and use of technical means, regulations of using, handing over and writing off technical means, communication resources, spare parts and disposable materials, tax and other privileges).

All these avenues were discussed in detail by using the example of the Government of Moscow target programme *Development of an Integrated Education and Information Environment for the Years 2001-2005*. In the course of answering the questions and later discussion, the participants came to the general conclusion: informatization is a complex process, and it is organically connected with the

Programme which presented the IITE training programme for the year 2001, plans of seminars, courses, and a discussion *Programme of ICT Application in Education: Projecting National and Regional Strategies*.

More than 20 seminar participants made reports on such key questions as: principles of creating informatization programmes, their content and structure; resource support of their design and implementation; training and re-training of personnel.

Following are abstracts of some of the reports.

Mr V. Musafirov, Uzbekistan, Ministry of Public Education:
 "Project *Development of the Programme for the Educational Sector*, which has already been started in Uzbekistan, envisages the creation on the basis of institutions for teachers re-training of a so-called *Distance Education System* equipped with the modern

computers and other technology linked to the Internet. At the first stage, it creates possibilities for teachers re-training, and at the second stage – to introduce distance education in general education schools. Along with the above mentioned projects, phased equipment of schools with modern computers".

Mr V. Galiev, Russian Federation, Ministry of Education of the Republic of Tatarstan:

"The Republican concept of informatization in education is the nucleus of the informatization efforts in education in the Republic of Tatarstan. It consists of five main blocks: ideological, cognitive, methodological, educational and personnel as well as implementation and management. The integrity of the conception is stipulated by the versatility of forming programmes. It also means that no part of this concept may be fully implemented without practical consideration for the state bilingualism. In order to fulfill the main tasks of the concept, a package of programmes on various avenues of pedagogical projecting and methodological integration of the Republican educational system as well as implementing activities have been created. Each of these processes has to be provided with the corresponding programme for short-term (2001-2002) and medium-term (2001-2005) perspectives".

Mr N. Artemiev, Russian Federation, Ministry of Education of the Republic of Sakha (Yakutia):
 "The Republican educational institutions started using modem communications and electronic mail since 1993; the Internet has been used since October 1997. Since then, the practice of conducting disciplinary competitions using e-mail (in mathematics, physics, informatics, foreign languages, as well as teaching mathematics and physics in English) has been introduced. At present, practically all secondary schools have access to the Internet. With the purpose of optimal employment of

the Internet and the mastering of new technologies by schools, it is planned to put a regional educational server in every small community on the basis of the New Technology Centers with the Local Education Department. This educational server will be capable of providing information for a students, teachers, parents, etc. It is especially important because every day brings an increase of personal computers in possession of the citizens of the Republic“.

Mr M. Barenbaum, Russian Federation, Main Department of Education of the Voronezh Region Administration: "Creation of an infrastructure of district education telecommunication network and integrated information and education environment is the main important task. Any educational institution, no matter how important its level and location, should have access to communication networks and information resources. Considering the

high cost of the basic telecommunication equipment, not only the development of new channels comes to the foreground, but also the use of all existing channels including the departmental ones“.

At the end of the seminar, the participants expressed their general opinion that it is necessary to coordinate the informatization programmes in education conducted in some Russian regions with due regard for worldwide experience.

The seminar participants paid attention to the importance of conducting regular practical and re-training seminars intended for educational managers of different levels based on the IITE programme. They addressed the Ministry of Education of the Russian Federation with a suggestion to launch a large-scale effort to re-train educational managers (starting with top managers), methodologists and other educational personnel.

WORKING MEETING ON THE IITE NATIONAL PILOT PROJECT FOR THE RUSSIAN FEDERATION

“Re-training of School Educators in Application of the Information and Communication Technologies (ICTs) in Education“

On 23 February 2001, within the framework of the IITE international training seminar *Programme of ICT Application in Education: Projecting National and Regional Strategies* a working meeting was held to discuss the conceptual foundations of the IITE national pilot project for the Russian Federation *Re-training of School Educators in Application of the Information and Communication Technologies (ICTs) in Education*. This project is being implemented under an agreement between the Ministry of Education of the Russian Federation and IITE, targeted at starting a large-scale effort to re-train educational managers (including top ones), methodologists and other educators.

The meeting was attended by representatives of 35 regions of the Russian Federation and CIS countries. The participants discussed a modern situation in the informatization of schools in the Russian Federation, the conception of the proposed project, the means of its implementation and expected results. The following main tasks of the project were under discussion:

- determination of ways to introduce the concept of education informatization into the general context of education modernization;

- working out of the concept of ICT application to administrative tasks in the education system;
- re-training general and top managers of the education system in the field of ICT application in schools, to teach them planning skills as well as skills in the implementation of regional strategies and development of infrastructures of informatization in education;
- determination of principles of project design and analysis of regional strategies as well as infrastructures of informatization in education.

Prof. A. Semenov made the keynote report. He stressed that the primary tasks of the project include the working out of the Basic Course on ICTs in Education; conducting on its basis regular training with educators, and organizing an international seminar, *Programme of ICT Application in Education: Projecting National and Regional Strategies*, as well as regional seminars on this subject.

The participants studied a draft of the Basic course, designed by IITE (Prof. A. Semenov, Co-Chairman & Joint Editor, and Dr A. Knierzinger, Co-Chairman, Austria). They were requested to discuss a methodologic text-book, the curriculum, training plan and time-

table as well as questions and tasks for educators.

The re-training course is based on *Recommendations on Informatics for Primary Education*, designed by IITE in 2000 which were highly acclaimed by a number of international organizations and experts from Austria, Denmark, Finland, France, India, Japan, the Netherlands, Norway, the Russian Federation, and other countries.

The course's is intended for managers, administrators, leading educators and methodologists.

The course's main target is to give an idea of how to apply modern ICTs to pedagogical and administrative problems in the education system, and to familiarise trainees with positive results of using ICT tools in schools, and methods of building an information environment in their regions.

The course includes:

- lectures by leading experts in ICT application in education;
- seminars and training in small groups in a modern learning information environment;
- acquaintance with certain scenarios of ICT application in Moscow schools; individual and group work with certain environments and scenarios of education activity using ICTs;

- project activity in creating an informatization programme specially designed for the educator's region.

The course curriculum includes nine broad modules.

The *First* module studies targets and tasks of modern education, new types of education activity, new opportunities linked with ICTs, and the educational importance of ICTs. Informatics is demonstrated not as an isolated subject, but as a necessary component intended for the implementation of the most important and objectives of education. Its elements are included into modern literacy and are used for studying all fields of education at today's school.

The *Second* module gets the educator acquainted with diverse technical, communication tools and software used in education. Sanitary and psychological aspects of ICT application are studied. It is demonstrated to educators that ICTs present one of the main instruments of implementation of 'open education' providing considerable expansion of the education content, ways of receiving education services, certification forms, and the comprehensive term of additional, correspondence and life-long learning.

The *Third* module explores problems of implementation of an information environment in modern schools. Versions of equipping both informatics and subject classrooms with ICTs intended for schools with various types of programmes and activity, as well as feasibility studies for choosing a version of the technological composite element of the school information environment are demonstrated.

The *Fourth* module examines versions of the education process using modern software: sources of information, virtual construction kits, simulators, testing environments, information systems of education management. The outlook for the application of computers in science and technology laboratories as well as electronic text-books are discussed.

The model of informatics study examined in the *Fifth* module is based on the conception that the basic elements of mathematical informatics, studying ICT elements,

mastering information technologies as well as constructing an information picture of the world are the most important elements of modern literacy, and they can be studied even at primary schools. Versions of teaching informatics and ICTs within various fields of education and the distribution of time at a certain level of technological support are suggested for discussion.

Internet learning resources are the main theme of the *Sixth* module. Possibilities of the Internet learning environment, main forms of using the Internet technologies in schools as well as technical and technological means of the Internet are examined.

The *Seventh* module is dedicated to the administrative application of ICTs and basic definitions that need to be mastered by educational managers. Examples of information systems are discussed.

The *Eighth* module deals with questions of personnel re-training,

and sustaining their skills. Modular construction of educators re-training system as well as use of distance forms of re-training are discussed. Implemented by a number of European countries, the concept of the International Computer Driving License for Teachers is expanded through conceptual and practical acquaintance with the basic approaches and examples of ICT application in education.

The final, *Ninth* module studies the informatization strategies in general education in districts, towns or regions of the country, including the development and correction of plans, support of the technological infrastructure, experimental work, re-training and methodological support of personnel, normative and financial support as well as other factors including regional ones.

The methodological text-book for the course contains conceptual basics of ICT application in education, the structure and place of both informatics and information

technologies in the process of general education, and basic principles of practical implementation of informatization in general education.

Education within the framework of the IITE course has an active nature: the educator acquires certain technical skills in ICT application, gets an idea of a broad spectrum of technical solutions (equipment and information resources), and plans education activities and the education environment with respect to the education system of his region.

The meeting participants positively evaluated the presented materials; they also appreciated the fact that the IITE Basic education course had already been tested within the framework of the education re-training seminars in Moscow and other regions of the Russian Federation.

The participants were notified that regular education sessions of this Course would start in October 2001.

DEVELOPMENT OF IITE ACTIVITIES IN CIS COUNTRIES

Working Meeting of National Focal Points for Co-operation with IITE IITE, Moscow, 24 February 2001

One of the main priorities within the programme of IITE activities is co-operation with national focal points nominated by UNESCO Member States. The previous issue of the IITE Newsletter (No. 2'2000), carried information about the aims of the network of focal points, the responsibilities of national focal points and IITE, advantages for participants, and the funding and support of the programme. In October 2000, IITE started a series of working meetings in order to get acquainted with the institutions nominated as focal points for co-operation with IITE, as well as to develop basic principles of co-operation. The first working meeting devoted to the IITE co-operation with the European focal points took place on 26 and 27 October 2000 in Prague, at the

Czech Focal Point located at the Czech Technical University Center for Scientific Computing. Representatives of the organizations nominated as national focal points from nine UNESCO European Member States, namely Andorra, Belarus, the Czech Republic, Finland, Iceland, Macedonia, Poland, the Russian Federation, and Ukraine, as well as heads of the IITE project's teams participated in the working meeting. Information concerning this event was published in the IITE Newsletter (No. 4'2000).

The second one-day working meeting on the activities of national focal points for co-operation with IITE in the Commonwealth of Independent States (CIS) was held at IITE on 24 February 2001. Representatives of nine countries,

namely Armenia, Georgia, Belarus, Kazakhstan, Kyrgyzstan, the Republic of Moldova, the Russian Federation, Tajikistan, and Ukraine attended this event. The meeting was opened with a presentation by the Director of IITE. He outlined to the participants the structure of IITE, its functions, and its main tasks. Furthermore, the participants learned of the IITE programme activities and of the role of the Institute as a clearing house which assists Member States in the application of ICTs in education. The Director of IITE paid special attention to the Institute's project activities and reviewed the working plan for 2000-2001, as well as new publications. Finally, he expressed his interest in launching joint national projects in the field of the use of ICTs in education in each country of the

Commonwealth of Independent States.

Furthermore, Dr Azat Khannanov, IITE Programme specialist, presented the IITE web-based *Information System on Information Technologies in Education (ISITE)*. Dr Khannanov introduced the conceptual design of the system and gave an exhaustive description of the types of resources accumulated, the database architecture, and schemes for information sharing between IITE and focal points. The web pages devoted to documents on the application of ICTs in education, to IITE projects and co-operation with focal points were demonstrated. Finally, the participants were familiarized with the philosophy of online use of the ISITE.

After a coffee break, each national focal point representative gave a report concerning the role of their institutions in the development of the national policy in the field of ICT application. In particular, Mikhail Zgyrovsky, Rector of the National Technical University of Ukraine "Kiev Polytechnical Institute", described the development of distance education in Ukraine and stressed the importance of close co-operation with IITE on this issue.

One of the noteworthy outcomes if this meeting was the discussion and approval of concrete plans of co-operation between IITE

and the national focal point of each CIS member. For example, it was proposed to organize a seminar on *ICTs in Special Needs Education* in Yerevan in September 2001. The Deputy Minister of Education and Science of Armenia, who took part in the meeting, strongly supported this idea, taking into account the demographic situation in Armenia after several earthquakes. Another seminar, on *ICTs in Teacher Training*, was proposed to be held in the Republic of Moldova, and a working meeting on *Distance Learning for Rural Schools* is planned in Kazakhstan.

The participation in the working meeting of Mr K. Odinaev, Deputy Minister of Education of Tajikistan, Mr P. Kuharchik, Deputy Minister of Education of Belarus, Mr N. Kuzmich, Secretary of the Council on Co-operation in the Field of Education of CIS, and other important policy-makers stressed the importance of this event with a view to launch national pilot projects.

It should be mentioned that the participants included high-ranking observers from Uzbekistan and Azerbaijan. In view of their great interest in the UNESCO activities in the field of education and cul-

ture in general, and in the IITE activities in the use of ICTs in education in particular, they expressed the willingness to initiate the nomination of national focal points in their countries. IITE is interested in establishing close co-operation with both of these countries, considering their educational and cultural traditions and potential.

Closing the meeting, the IITE Director expressed his appreciation to the participants. He summarized the results of their work and underlined the importance of the working meeting for the future development of the IITE network of focal points.

IITE BRINGS TOGETHER PRODUCERS AND EDUCATORS

Workshop

New Lotus Information Technologies for Distance Education **(In Co-operation with IBM and Lotus Development Corporation)** **IITE, Moscow, 21 March 2001**

The workshop *New Lotus Information Technologies for Distance Education* was arranged by IITE in close collaboration with the Ministry of Education of the Russian Federation, Moscow Department of Education, General Education Department of the Moscow Region, and the Lotus Development Corporation. There were more than 70 specialists from Moscow, Moscow Region and other regions of the Russian Federation attending the workshop.

Lotus Development Corporation, founded in 1982, is an IBM company. Lotus sets the standard for truly innovative software products and services that reflect the company's unique understanding of the new ways in which individuals and businesses can work together to achieve success. Lotus is redefining the concept of conducting business through practical knowledge management, e-business and other ground-breaking ways of connecting the world's ideas, thinkers, buyers, sellers and communities via the Internet. Lotus markets its products in more than 80 countries worldwide through direct and ex-

tensive business partner channels. The company also provides numerous professional consulting, support and education services through the Lotus Professional Services organization.

The keynote speech of the IITE Director was devoted to the role of distance learning in the Information Society. First of all, to meet large-scale learning needs arising from social and economic development. For the first time in history, information and knowledge are not simply means of improving society but are becoming the main products of the economy. More and more people are being drawn into the Information Society as workers, learners and consumers, since it is fast becoming central to employment and learning. It could be explained by new understanding of social security and specific conditions of economic development in the Information Society. The fact is that social security in the Information Society can be guaranteed only to a comprehensively educated person capable of doing different jobs in order to meet the requirements of the latest tech-

nologies and the market. Moreover, knowledge is the main asset and product of the Information Society upon which continued economic well-being and social development depend.

Distance learning is in the mainstream of these developments. Distance learning and the Information Society are both concerned with the creation, acquisition, sharing, dissemination, delivering, support and recognition of knowledge. Distance learning is the means for providing access and achieving continuous learning necessary for successful participation of all social groups of the population in the Information Society.

The present level of development of information and communication technologies lays out a realistic basis for creating a global system of distance learning, which will help people to create an educational milieu without boundaries. It is necessary to point out that regardless of the physical distance, new information technologies ensure the kind of direct and interactive communication between teacher and student, that has

always been characteristic of full-time education as well as its undeniable advantage.

During the workshop, the participants discussed the following issues:

- the programme of information space in the context of educational development;
- the general IBM/Lotus conception of ICT application in education and ways of its realization;
- Lotus LearningSpace: the Lotus Development Corporation software for distance education;
- the experience and perspectives of the Lotus LearningSpace usage for staff development;
- new IBM hardware – the framework for ICT use in educational systems of various countries of the world.

Special training for the workshop participants in the use of Lotus software was organized at the end of the programme. The subjects of learning were the usage of Lotus LearningSpace in education.

TOWARDS INCLUSIVE EDUCATION

Review of the Analytical Survey Information and Communication Technology in Special Education

As mandated by the Dakar Framework for Action, UNESCO will act as the catalyst for international co-operation in education, thus mobilizing partners and resources in the pursuit of the Education For All (EFA) goals set by the international community at Dakar.

Success in achieving these goals lies at the country level. UNESCO will therefore emphasize the integration of early childhood care and education into education policies and systems. Furthermore, it will try to ensure that educational policies choose inclusive approaches that embrace marginalized groups, *people with special needs*, and ethnic minorities.

Ensuring access to education to millions of children and adults who are mired in poverty and are disadvantaged by their economic status, geography, cultural or linguistic barriers or special needs, is the core challenge. In order to ensure that the needs of those excluded and marginalized are addressed through inclusive educational strategies, UNESCO will contribute to building the necessary capacities in national governments and civil society, gather and disseminate best practices, and stimulate dialogue about inclusive education.

Last year IITE started a project, *Information and Communication Technologies in Education for People with Special Needs*, targeted at inclusive education of that group of people. Within the framework of this project a survey under the same title was published at the beginning of 2001. This survey was prepared by an international editorial working group: Alistair Edwards (United Kingdom, University of York, leader of the group), Kevin Carey (United Kingdom, HumAlTy), Grigori

Evreinov (Russian Federation, Specvuzavtomatika DB), Kent Hammarstrom (Sweden, Swedish Institute of Computer Science), Marshall Raskind (USA, The Frostig Center).

The survey was prepared from the materials of an expert meeting which was held at IITE, Moscow, in February 2000. The survey consists of seven compact parts (Foundations, Objectives, Fundamental Assumptions, Definitions, ICT in Special Education: An Intermediary Role, Implementation, and Conclusions), a glossary, and a bibliography. Parts of the survey are quoted in this review.

This document outlines the role that information and communication technologies can achieve in special education, with the objective of getting it more widely adopted and used in UNESCO Member States. It establishes some definitions and outlines the role ICT can play in education in *three identifiable roles*:

- *prosthetic* (Technology can substitute or compensate for the lack of natural function. This is important for all people with disabilities and has particular importance in education);
- *educational* (Again, ICT is growing in importance in all forms of education but can play a particularly valuable role in teaching people with special educational needs);
- *distance communication* (Technology can mediate communication between people with disabilities. Furthermore, where teachers are in short supply (as in special education), distance teaching methods can help to share what expertise there is. Mapping of

technologies to communication needs is presented).

The authors consider that although some countries have made major strides in the education of people with disabilities, the fact remains that, for the majority of countries, especially developing countries, the reality is bleak, both in terms of access and quality education for disabled persons. The findings of the UNESCO survey conducted in 1986/87 revealed that 34 out of the 51 countries that supplied information had fewer than 1 % of all pupils for whom special educational provision had been made.

For the purposes of the survey, existing definitions were listed as follows:

Impairment

Any loss or abnormality of psychological, physiological or anatomical structure or function.

Disability

Any restriction or lack (resulting from impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

Handicap

A disadvantage for a given individual, resulting from impairment or disability, that limits or prevents fulfilment of a role (depending on age, sex and social and cultural factors) for that individual.

Special Education is that sector which deals with education of all people identified as disabled. The objective of all education is to enable a student to take a fuller part in society. So, according to the above definitions, the effects of

good education should be to reduce the handicapping effect of disability.

The educational needs of people with disabilities are vastly diverse. They have the same needs as everybody else to learn the basic skills of literacy and numeracy to the best of their ability, as well as other abilities that are required in the society in which they live. At the same time, they have (by definition), educational needs that others lack (often referred to as *special educational needs*).

The role of ICT in special needs is very important as it plays an intermediary role. Many forms of disability affect learners' ability to access standard educational materials, and ICT for prosthetic uses can surmount some of these barriers: in access to texts, graphics, writing, speaking and face-to-face communication, and other therapeutic applications for different groups of learners.

Computer programs can be used to teach students directly. They have a number of benefits. They offer a form of individual attention to the learner. A program is infinitely 'patient' and can present a lesson or idea repeatedly and consistently without variation or fatigue. It is particularly useful in drill-and-practice lessons, where repetition is necessary for a concept or skill to be learned. This can be most useful for children with learning disabilities.

ICT can be used as part of distance teaching. This can be important when (specialized) teachers are in short supply and have to be shared between geographically dispersed students and teachers. Communication can take place in different modes and requires different rates of information flow (bandwidth). These are all summarized in the Table.

	Synchronous/ Asynchronous	Bandwidth (High, Medium, Low)	Direction (1-way or 2-way)	Dispersion (1-to-1, 1-to-many, many-to-many)
Video conferencing	S	H	2	m-m
Video broadcast	A	H	1	1-m
Audio broadcast (radio)	A	M	1	1-m
Webcast	A	M	1	1-m
Telephone	S	M	2	1-1
Telephone conferencing	S	M	2	m-m
Web pages	A	H/L	1	1-m
Chat	S	L	2	m-m
E-mail	A	L	2	1-1
Bulletin board	A	L	1	1-m
Newsgroups	A	L	1	1-m

Table. Summary of communication styles

Different styles of communication have different characteristics in terms of teaching objectives. For example, to demonstrate a physical action, a synchronous (real-time) connection (presumably a video link) is required, whereas imparting of factual information can be achieved by a low-band, asynchronous channel, such as e-mail.

There is a simple relationship between bandwidth and cost: the greater the bandwidth, the greater is the cost. So, while video conferencing may offer broadest possibil-

ities for communication, it may be too expensive, or infrastructure to support it may not be available. At the same time, advancing development implies that bandwidth is constantly becoming cheaper. In technologically advanced countries, demand for bandwidth is always slightly in advance of its availability (we always want more) and in less developed countries the bandwidth available is less than the current state of the art. ICT can also form a useful communication medium between people with different sensory abilities.

There is a number of points that have to be considered if the introduction and maintenance of ICT in Special Education is to be successful.

It seems likely that there will be three areas in which the role of ICT will grow:

- prostheses;
- standard software;
- educational software.

In conclusion, the authors note that children with disabilities gen-

erally have special needs with regard to their education. Some of those needs can be met by using information and communication technologies. As the technologies become more advanced and more available, there is an opportunity to significantly improve the quality of life of this disadvantaged group.

The analytical survey *Information and Communication Technology in Special Education* is available on the IITE website (<http://www.iite.ru>)