UNITED NATIONS EDUCATIONAL, SCIENTIFIC
AND CULTURAL ORGANIZATION

EXPERT MEETING

ICTs IN EDUCATION: STATE-OF-THE-ART,
NEEDS AND PERSPECTIVES —
INDICATORS AND INFORMATION SYSTEM

28-30 March 2001, IITE (Moscow)

Final Report

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FOR INFORMATION TECHNOLOGIES IN EDUCATION

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EXECUTIVE SUMMARY

International Expert Meeting *ICTs in Education: State-of-the-Art, Needs and Perspectives – Indicators and Information System* was held from 28 to 30 March at the UNESCO Institute for Information Technologies in Education (IITE) in Moscow.

The main goal of the expert meeting was to provide a contemporary vision of the problems of evaluation of ICT usage in education within the framework of IITE project *ICTs in Education: State-of-the-Art, Needs and Perspectives* that will help to promote the activity of UNESCO Member States in integrated evaluation of national action plans and policy documents on information technologies in education. To attain this goal, IITE established contacts with UNESCO National Commissions, Regional Offices, IFIP and other well-known international and national institutions and invited them to nominate representatives to participate at the expert meeting (see Annex 1. *First Announcement*). After nomination, personal invitations were sent to the experts.

In order to ensure a fruitful outcome of the meeting, IITE prepared working materials and reference documents and distributed them among the experts (see Annex 2. *List of Documents*).

Twelve experts from Belarus, Czech Republic, Finland, Germany, the former Yugoslav Republic of Macedonia, Mauritius, Namibia, Pakistan, Russian Federation, Thailand and United Kingdom met to share their experience in the realm of the meeting (see Annex 3. *List of Participants*).

The meeting started with Prof. Vladimir Kinelev, IITE Director, welcoming the participants. After briefing them on the main goal and procedure of the meeting, Agenda and Timetable were adopted (see Annexes 4,5). Mr Mike Aston was elected as Chairperson of the meeting and Ms Naseema Kapadia – as Rapporteur.

According to the Agenda and based on the Main working document (see Annex 6) the following issues were discussed during the meeting:

1. International and national experience in educational usage of ICTs in UNESCO Member States and its evaluation.

2. IITE international project *ICTs in Education: State-of-the-Art, Needs and Perspectives* – goals and perspectives. Indicator data set: its structure and application in evaluation of ICT usage.

3. Principles of data obtaining and requirements for IITE information system within the framework of the project *ICTs in Education: State-of-the-Art, Needs and Perspectives*.

Main trends and perspectives of development of the IITE activity in this field were intended to be clarified during the meeting.

Mr Aston started the main presentation on the first issue. He briefly went into the early history of computer usage in education and moved on with its usage in present days by giving example experience of different countries. He also described practice of data collection in some of the countries. The product of collaboration of IITE with the UK Advisory Unit: Computers in Education – *The Orbit-2000 Report* on Information and Communication Technology Provision in Primary and Secondary Schools in The Group of Eight (G8) Nations was discussed and its brief version distributed among the participants.


Mr Mike Aston
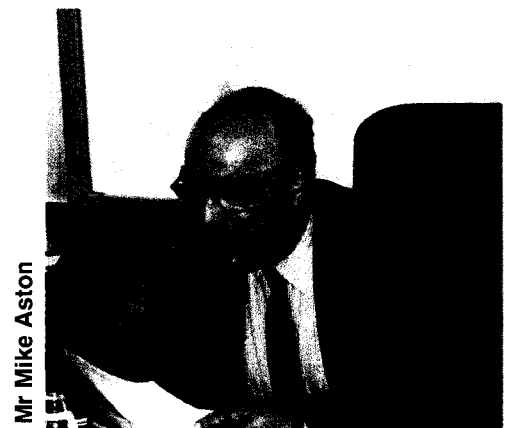
Discussions on this issue touched the matter of the application of ICTs as an indicator of education quality. A number of successive problems arising out of ICT usage in education were also considered. For example problems of equity of access and digital gap arise. The term 'equity' was considered to mean equality:

- in education between boys and girls;
- for residents and immigrants to that country;
- for children with special needs on par with normal children;
- for rural and urban cities.

A suggestion was made that the IITE focal points should deal with these problems.

Some of the members gave their views on how these problems have been dealt with in their countries. The conclusion at this point was that unless ICT is developed in a balanced and equitable way, the gap can get wider among different countries, schools or individuals.
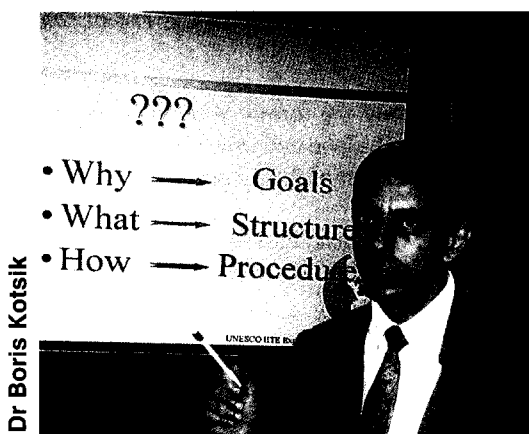
Goals and perspectives of the IITE international project *ICTs in Education: State-of-the-Art, Needs and Perspectives* were in focus of second issue of the discussion.

Main presentation *Indicator Data Set, Its Structure and Application in Evaluation of ICT Usage* was made by Dr Boris Kotsik (see Annex 8). Goals of the project were explained and main indicator categories were exposed as well as various types of data and procedures of their obtaining. IITE experience in this field was described and methodologies for developing adjustable evaluation procedure for different countries and educational models were proposed. A large and serious discussion on the subject ensued revolving round the following issues:

- some countries have a low literacy rate. For developing countries resources are scarce, cost of maintenance is high;
- changes are taking place constantly and in 5-10 years there will be bigger technological changes affecting all spheres including education;
- one can only gauge what is happening now and get statements by interviewing people or running pilot projects;
- a lot of research in ICT usage in education was already performed in many areas and existing experience should be taken into consideration.

Following this discussion, national practice of ICT usage in education and its evaluation was presented by some of the experts.

Mr David Groenewald from Namibia described the work done in Namibian curriculum – teacher training, school networking started as pilot projects. The UNESCO role in teacher training provision in the country was highly appraised. Official decision for ICT to be a compulsory subject for the whole country and participation in the US project IERN were also presented.

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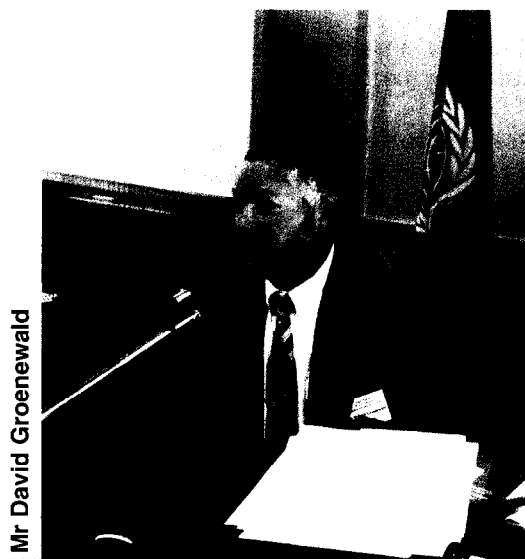
Ms Ritva Kivi gave a detailed description of the Finnish plans for 2000-2004. She talked about teacher training, network usage in concept of virtual schools and colleges. Hardware and maintenance problems were also discussed.

Ms Naseema Kapadia from Pakistan representing the PACES association touched upon IT at private schools of Pakistan and pilot projects initiated at state schools.

Dr Karel Kveton from the Czech Republic divided his presentation into issues of Information, Literacy, Software and Infrastructure. Experience of implementation of the *European Computer Driving License* project for teachers in the Czech Republic was described.

Mr Hansjorg Lagher from Germany gave a description of the national education system and local ministry experience in evaluation of the ICT usage in education in the land of Brandenburg.

Dr Vladimir Verzhbitsky presented the project of the Ministry of Education of the Russian Federation for collecting data and description of types of information resources in higher education.

Ms Liudmila Pankratova from the Russian Federation shared an experience in measuring and evaluating of ICTs in education with the help of aggregated index based on a system of indicators. The attention was also paid to the necessity of measuring educational goals and their achievement in implementation of ICTs in education.

Dr Katerina Zdravkova from the former Yugoslav Republic of Macedonia described the problems in implementation of ICTs in school education in the former Yugoslav countries.

Mr Suresh Munbodh from Mauritius presented the experience and specifics of the ICT usage in his country.

Ms Carmelita Villanueva made a very detailed presentation on the programme of the ICT development and evaluation in Asia-Pacific region. Huge project is starting all over the region, pilot schools are selected and data collection is to be made for further teacher training and education development in all the countries of the region. A lot of help is needed here from IITE, and collaboration was highly appraised.

Principles of data obtaining and requirements for the IITE information system within the frame-
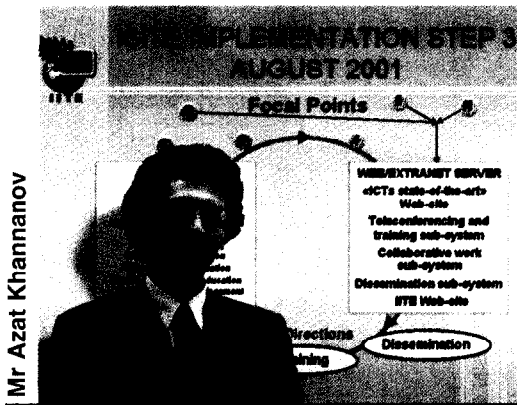
Ms Naseema Kapadia

Ms Carmelita Villanueva, Dr Vladimir Verzhbitsky, Mr Hansjorg Lagher

Mr Suresh Munbodh

Ms Carmelita Villanueva

Mr Azat Khannanov

work of the international project *ICTs in Education: State-of-the-Art, Needs and Perspectives* were the third issue under the discussion. Mr Azat Khannanov started it with the presentation of the conceptual design of the IITE *Information System on Information Technologies in Education (ISITE)* (see Annex 9). The goals and planned activities of the project were described. Special attention was devoted to information contribution and data acquirement for the IITE national focal points. A common taxonomy and metadata approach were offered for consideration as a key solution.

Most of the participants took part in the discussion on the possible advantages and disadvantages of the ISITE in the context of indicators of the ICT usage in education. Mr Lagher stated that the possibility of implementation of the metadata technology in everyday practice is a questionable issue, but the proposal to develop a special indicator subsystem within the ISITE framework was supported by the experts.

After general discussion on the main trends and perspectives for the progress in this field, the Recommendations on the discussed issues of the expert meeting were presented by the Rapporteur. After some debate they were unanimously approved (see Annex 7). All the participants expressed the necessity of future collaboration and desire to participate in the development, expertise, approbation and implementation of the results of the IITE projects.

**Expert meeting.
Discussion**

FIRST ANNOUNCEMENT

Dear Sir/Madam,

I am very pleased to inform you about the Expert Meeting *ICTs in Education: State-of-the-Art, Needs and Perspectives – Indicators and Information System* to be held by the UNESCO Institute for Information Technologies in Education (IITE) in Moscow on March, 28-30, 2001.

Following the decision of the 30th session of the General Conference of UNESCO (Paris, November 1999), our Institute launched an international project *ICTs in Education: State-of-the-Art, Needs and Perspectives*. The main goal of the project is to create an information system that will promote the activity of UNESCO Member States and their organizations in the area of application of information technologies in education, in particular to arrange an integrated evaluation of the national action plans and policy documents in educational information technologies in the countries and regions. Following the recommendations of the World Education Forum (Dakar 2000) and the Dakar follow up UNESCO Programme, it is important to obtain the information for ICT usage in education based on a system of balanced and standardized indicators.

IITE has already made some efforts in systematization of the existing experience, however a profound research performed by multiple profile specialists is still necessary.

So, we assume that an expert discussion in several areas of this realm would be of much help. These main areas are:

1. International experience in evaluating of educational usage of ICTs.

2. Structure of indicator data set and its application in ICT usage evaluation.

3. Organizational principles of data obtaining and requirements for information system within the framework of the IITE international project *ICTs in Education: State-of-the-Art, Needs and Perspectives*.

4. Development of a training module *Indicators of ICT Usage in Education* for policy- and decision-makers and its place in the overall IITE educational programme.

We would be also glad to consider your proposals for other discussion areas.

IITE plans to print and disseminate the materials of the Meeting and works of the experts on these issues both prepared for this event and already published.

We expect an attendance of 15 experts from about 10 countries, and knowing you as a high-level specialist in the field we will be glad to see you among them. The Institute covers all costs related to travel and accommodation. If you are interested in taking part at the Expert Meeting, please inform us as soon as possible and we'll send you an official invitation, provisional agenda, other information and reference documents.

LIST OF DOCUMENTS

IITE/MOS/ME1/01/DOC.1   AGENDA

IITE/MOS/ME1/01/DOC.2   WORKING DOCUMENT

IITE/MOS/ME1/01/DOC.3   RECOMMENDATIONS

INFORMATION DOCUMENTS

IITE/MOS/ME1/01/INF. 1   FIRST ANNOUNCEMENT

IITE/MOS/ME1/01/INF.2   TIMETABLE

IITE/MOS/ME1/01/INF.3   LIST OF PARTICIPANTS

IITE/MOS/ME1/01/INF.4   LIST OF DOCUMENTS

REFERENCE DOCUMENTS

1. OrbIt-2000 Report Information and Communication Technology Provision in Primary and Secondary Schools in The Group of Eight (G8) Nations (abridged version).

2. Educational progress indicator EPI – Synthetic indicator for monitoring education. Contribution to education for all Camaro Boubacar Breda, Dakar.

3. Core EFA indicators International consultative forum on education for all – The year 2000 assessment technical guidelines.

LIST OF PARTICIPANTS

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Dr Boris KOTSIK   Programme Specialist

Mrs Irina OBUKHOVA   Programme Specialist

AGENDA

1. Opening of the expert meeting.

2. Adoption of the agenda.

3. Election of the Chairperson.

4. Election of the Rapporteur.

5. Issues to be discussed:

   a. International and national experience in evaluating educational usage of ICTs in UNESCO Member States.

   b. Goals and perspectives of the IITE international project *ICTs in Education: State-of-the-Art, Needs and Perspectives* – indicator data set, its structure and application in evaluation of ICT usage.

   c. Principles of data obtaining and requirements to the IITE information system within the framework of the international project *ICTs in Education: State-of-the-Art, Needs and Perspectives.*

   d. Main trends and perspectives of the IITE activity in evaluation of ICT usage in education.

6. Approval of the Recommendations of the expert meeting.

7. Closure of the expert meeting.

TIMETABLE

March 28, Wednesday

Arrival of the participants; meeting at the airport, hotel accommodation.

20.00   *Reception on behalf of the Director of IITE.*

March 29, Thursday

09.30 – 10.00   Registration of the participants.

10.00 – 10.45   Opening of the expert meeting. Introductory speech by Prof. V. Kinelev, Director of IITE. Introduction of the participants.

10.45 – 11.10   Adoption of the agenda. Election of the Chairperson. Election of the Rapporteur.

11.10 – 11.30   *Coffee-break.*

11.30 – 12.20   **SESSION #1.** International experience in evaluating of educational usage of ICTs in UNESCO Member States. *Main presentation – Mr Mike ASTON.*

12.20 – 13.00   **SESSION #1.** Discussion of national experience. *Presentation of the information materials by the participants of the meeting.*

13.00 – 15.00   *Lunch.*

15.00 – 16.20   **SESSION #2.** Goals and perspectives of the IITE international project *ICTs in Education: State-of-the-Art, Needs and Perspectives* – indicator data set, its structure and application in evaluation of ICT usage. *Main presentation – Dr Boris KOTSIK.*

16.20 – 16.40   *Coffee-break.*

16.40 – 18.00   **SESSION #2.** *Thematic discussion – all participants.*

18.00 – 19.00   *Dinner.*

19.00 – 21.00   Moscow City sight-seeing tour.

March 30, Friday

10.00 – 11.20   **SESSION #3.** Principles of data obtaining and requirements to the IITE information system within the framework of the international project *ICTs in Education: State-of-the-Art, Needs and Perspectives. Main presentation – Mr Azat KHANNANOV.*

11.20 – 11.40	*Coffee-break.*
11.40 – 13.00	**SESSION #3.** *Thematic discussion – all participants.*
13.00 – 15.00	*Lunch.*
15.00 – 16.30	*General discussion.* Main trends and perspectives of the IITE activity in ICT Usage in Education.
16.30 – 17.00	*Coffee-break.*
17.00 – 19.00	Discussion and approval of the Recommendations of the expert meeting. Closure of the expert meeting.

March 31, Saturday

Departure of the participants.

WORKING DOCUMENT

I. INTRODUCTION

ICT Role and Goals of Educational Development – UNESCO Vision

In its report *Learning: the Treasure Within*[1], the International Commission on Education for the Twenty-First Century called learning throughout life 'the heartbeat of society'. UNESCO is committed to fostering learning throughout life for personal and societal development. Even moving towards this goal requires far-reaching educational innovation, renewal and reform.

Early on, UNESCO was concerned with exploiting the potential of technology and media for education. Its emphasis has always been placed on improving and expanding both the reach and quality of teaching and learning to progress towards learning throughout life for all. As early as 1960, UNESCO's General Conference adopted a resolution noting the obvious impossibility of abolishing mass illiteracy through traditional means alone, and urged Member States to consider other approaches. In 1967, IIEP published *The New Media: Memo to Educational Planners* based on 23 case studies aimed at providing educational planners with tools for informed decisions on the use of media for education and development.

At the time when knowledge is surpassing production of goods and services as the main feature of economies, information and communication technologies (ICTs) have become more and more integrated in the development strategies. The role of ICTs in and for education is expanding in many countries, and their use elsewhere is seen as both a necessity and an opportunity. The Dakar Framework for Action (April 2000) identified the use of new information and communication technologies as one of the main strategies for achieving the *Education for All* goals[2].

In 1996 a position paper *UNESCO and an Information Society for All* reviewed the major challenges and opportunities and offered a framework for UNESCO's medium-term strategy 1996-2001. The Second International UNESCO Congress on Education and Informatics (Moscow, 1996) recommended a detailed agenda of future research and action. The growing recognition of ICTs in pushing forward the frontiers of educational change gave rise to the inter-sectoral UNESCO programme *Learning Without Frontiers*, jointly conducted by the Communication and Information Sector and the Education Sector. The UNESCO Institute for Information Technologies in Education in Moscow is using its considerable capacity and staff proficiency in implementing basic functions relating to policy advice, research on new ICT applications in education, training of educational personnel, and continuous monitoring of the use of information technologies at all levels and in all aspects of education.

IITE and Developing ICT Usage in Member States

Anticipating ongoing challenges and problems for information and communication technologies in contribution to peace and human development in an era of globalization through education, science, culture and communication in the 21 century, UNESCO focuses activities on:
* aiming at excellence;
* enhancing interdisciplinarity;
* enhancing UNESCO's outreach and effectiveness;
* broadening partnership and alliances;
* improving management processes;
* enhancing UNESCO's visibility and communication.

This can be achieved by developing universal principles and norms, protecting pluralism and diversity, empowerment of emerging knowledge in global society on the ground of Concentration, Flexibility,

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[1] UNESCO, Paris, 1997.
[2] *The Dakar Framework for Action Education For All: Meeting Our Collective Commitments.* Text adopted by the World Education Forum, Dakar, Senegal, 26-28 April 2000.

Creativity, Convergence and Cooperation as the main principles for developing a strategic vision and applying innovative approaches.

IITE promotes international experience of ICT usage in education envisaging the Institute's role as:
- a laboratory of ideas – in accumulating and producing experience in technology usage in education through the system of research projects;
- a standard-setter – in generation and promotion of norms of ICT usage in education through gathering information on the most effective models and best international practice and in disseminating this knowledge by implementation of the IITE educational programme;
- a clearing house – in collecting and disseminating knowledge on ICT usage in education by means of the integrated data acquisition and search machines on the basis of the IITE information system; .
- a capacity builder in Member States – by providing assistance in development and realization of the national action plans and pilot projects, providing consulting services in developing national information and staff educational resources and implementation of the IITE educational programme particularly through the system of the national focal points;
- a catalyst for international cooperation – by providing means and content for Member States' experience exchange in educational usage of ICTs via the IITE information system, by implementation of international research and organizational projects workshops, discussion groups and other kinds of activity.

IITE programme activities are focused on strategies identified in the *Dakar Framework for Action*. Emergence of the information and communication technologies affects the quest for education for all, encloses potential to overcome geographical distances, empowers teacher and learner through information and brings the world into a classroom. It also includes support in development of the national strategies and national action plans; implementation of the national pilot projects; collection, analysis and dissemination of knowledge on ICT usage in education on the basis of international clearing house services; development of instruction materials and implementation of educational programmes for policy- and decision-makers.

IITE Project "ICTs in Education: State-of-the Art, Needs and Perspectives"

According to the decisions of the 30th session of the General Conference of UNESCO (30 C/5), IITE activity aims are attained through the system of projects, such as:
- ICTs in Education: State-of-the-Art, Needs and Perspectives;
- Distance Education: Structure, Methodology, Staff Development and Legal Aspects;
- Ethical, Psychological and Legal Aspects of Application of ICTs in Education;
- Education via the Internet;
- ICTs in Education for People with Special Needs.

The main goal of the project *ICTs in Education: State-of-the-Art, Needs and Perspectives* is to promote the achievements of UNESCO Member States and their organizations in the area of application of the information technologies in education by means of integrated evaluation of the national action plans and policy documents in educational information technologies in the countries and regions on the basis of respective information on ICT usage in education itemized by particular indicators. Facilities of the supporting information system should allow to carry out the comparative analysis of data, to explore existing needs and to forecast the main trends of development of ICTs in education on this basis. Information system should provide functions of a data and knowledge management tool for various IITE projects.

Main project activities include:
- research on the Internet-resources and main information systems in the field of education;
- analysis of the basic principles of systematization of the national models for ICT usage in education, basic needs and development trends;
- conceptual design of the information system: structure of subsystems, definition of basic functions and parameters, choice of communication means, hardware and software resources of the system;
- development of pilot thematic information sub-systems such as *Information Resources of ICTs in Education, National Action Plans and Policy Documents on ICTs in Education, Indicators of ICT Usage in Education* and other;

- pilot filling of the thematic sub-systems and information exchange between partners;
- evaluation of the thematic sub-systems usability.

Project is targeted at:
- policy-makers of educational systems of UNESCO Member States, their institutions and sub-structures in charge of information technology educational usage;
- teachers and trainers using educational information technologies in their work;
- science researchers of various aspects of information technologies in education.

II. GENERAL VISION AND GOALS OF THE SUB-PROJECT "ICTS IN EDUCATION: STATE-OF-THE-ART, NEEDS AND PERSPECTIVES – INDICATORS AND INFORMATION SYSTEM"

International Experience of Evaluation of ICT Usage in Education

Following the recommendations of the World Education Forum, (Dakar 2000) and the Dakar follow up UNESCO Programme, IITE started within the framework of its main project ICTs in Education: State-of-the-Art, Needs and Perspectives to obtain the information for ICT usage in education on a base of a system of indicators.

IITE initiative in developing indicators of ICT usage in education is not unique. Many national and international projects in this area were developed. In 1998, within the framework of the international project SITES-M1 such information was collected on the basis of sample statistics from different countries. Since 1978, a comparative study of information and communication technologies at schools was held by the *Advisory Unit: Computers in Education* in more than 100 countries. In G7(8) countries this project is called OrbIt, and on the basis of the collected data the Report and Executive Summary are published annually. This experience is very useful.

Collecting and analyzing the information allow to compare progress of UNESCO Member States and take a wider view of penetration of the new technologies in the global educational sphere. Nevertheless, as a rule contemporary educational statistics contain a superfluous amount of mixed, heterogeneous redundant indices some of which are important only for narrow profile specialists and some are of a reference value only.

Indicators of ICTs in Education – Common Vision

Outworking a classification scheme for indicators of ICT usage in education is quite a natural task and it has three main goals. The first one is to systematize and put in order a given set of indices. Second is to find blank spots, if any. And the last but not the least goal is to find during this systematisation the special subset of the most important figures that can describe satisfactory the processes under consideration.

The issues of indicators of ICT usage in education face not only a classification problem. They also include organizational, informational and educational aspects which could be briefly described as follows:
- organizational – including legal aspects and procedures of obtaining and processing all the necessary data and statistical information;
- educational – including description and evaluation of the phenomena under consideration;
- informational – including all the necessary procedures of information maintenance and provision.

Indicator problem is also a multilevel one as the education system can be considered on regional (sub-regional), national, local levels and on the level of the educational institution itself.

Role of the IITE Information System in Promotion of ICT Usage in Education

The information system is developed at IITE for better cooperation with UNESCO Member States. It comprises a local area network within the Institute, database and website, and will later include a distributed information system on the basis of Intranet connection with the IITE national focal points. The distributed structure of the network involves different data exchange types – information (by access providing), interaction (by providing the opportunities) and transaction (by providing the means to

carry out transactions) – on various levels, including UNESCO Member States, intergovernmental and worldwide professional community levels. The knowledge management tool of this system should include the following functions:
- decision support (including guiding search);
- document access (with document workflow, reference tools);
- instruction (both instructor led and stand alone);
- knowledge acquisition (best practices and case studies);
- communication (points of contact, threaded discussion, frequently asked questions);
- evaluation and monitoring (indicator subsystem).

The main principle of system development is synergetic union of organization (grouping, classifying, relating and formatting) and analysis (separating, evaluating, validating, comparing and interpreting) functions in the knowledge management tool. In this context, the approach for international data collecting, processing and sharing must be developed in view of the highest priority of indicators subsystem that should provide data for measurement and description of these processes. Such description should include a report on the current situation, identification of demands in informational, managerial and technological aspects of indicator system and elaboration of feasible interaction models within the framework of information system.

The data delivery method is designed as an integrated instrument using a wide range of different levels of technologies – from text mail and fax to WWW and multimedia technologies. The information system is developed as a distributed database with client web-access points.

Application of Information System on Indicators of ICT Usage in Education in Member States

For countries, which already use ICTs in education broadly or are still at the initial stage of this process, there is a real possibility to avoid many problems and difficulties through developing new mechanisms of experience sharing or by integration of the existing experience. It can facilitate planning, research and development by making worldwide knowledge on ICTs in education globally accessible.

Main functions of the system are planned in view of demands of the target audience – policy-makers, planners, research and development personnel, experts and consultants. The database will contain policy documents, legal texts, normative instruments, methodological guidelines, comparative studies and best practice. Special attention will be paid to developing an indicator subsystem that will provide data for evaluating and monitoring the situation in the field of ICTs in education. On this basis IITE will be able to present advisory services, studies, training and technical assistance on ICTs in education issues at the request of Member States.

III. IITE ENVISAGES THE FOLLOWING ACTIVITIES:

- To make a study and research on existing experience; to determine a system of ICT indicators; to evaluate standards and procedures of indicator measurement for different educational systems.
- To develop IITE Recommendations and Policy paper on Indicators of ICT usage in education for UNESCO Member States; to implement national pilot projects on application of indicators of ICT usage in the national action plans for education development; to prepare special recommendations for an IITE training module on indicators of ICT usage in the developing national action plans.
- To create a mechanism for acquisition and processing of statistical and analytical data on indicators of ICT usage in education within the framework of IITE information system; to establish a systematic procedure and organizational scheme for data collection and analysis on the basis of indicators of ICT usage in education.

IV. ISSUES FOR EXPERT REFLECTION

1. Should the study of existing experience be conducted?
2. Should a further research in the problem be made?
3. Should a system of indicators be determined?
4. Should standards and procedures of measurement be developed for different education systems?

5. Should IITE Recommendations and Policy paper on indicators of ICT usage in education for UNESCO Member States be developed?
6. Should national pilot projects on indicators of ICT usage in the national action plans of education development be implemented?
7. Should special recommendations for an IITE training module for policy- and decision- makers on indicators of ICT usage in developing of the national action plans be prepared?
8. Should a mechanism for statistical and analytical data acquisition and processing on indicators of ICT usage in education be created within the framework of the IITE information system and knowledge management tool?
9. Should systematic procedures and organizational schemes for indicators of ICT usage in education data collection and analysis be established within the framework of the IITE information system?
10. Are the materials of the expert meeting worth disseminating among UNESCO Member States?

RECOMMENDATIONS

Members of the expert meeting approve the following:
- considering the activity on evaluation of ICT usage in education to be one of the most important parts of the whole work on the project *ICTs in Education: State-of-the Art, Needs and Perspectives* in the IITE activities, a study and research on existing experience should be made, analytical survey be prepared and disseminated, a system of ICT indicators be determined, standards and procedures of indicator measurement for different educational systems should be included in the list of the IITE activities for the nearest future;

- taking into account that education systems of UNESCO Member States vary significantly, there is a need for a *Development Module for policy- and decision-makers and educational authorities on indicators of ICT usage in education*, to recommend IITE to form an international working team for preparation of this *Development Module*;

- a policy paper on *Indicators of ICT Usage in Education* based on the expert meeting Recommendations should be developed by the IITE in collaboration with the partners in UNESCO Member States. IITE, at the request of UNESCO Member States, should support pilot projects on the application of ICT usage indicators in the national action plans and policy documents;

- the IITE information system and distributed network should include a mechanism for data on indicators of ICT usage in education acquisition, processing, analysis, and dissemination. This mechanism should be made as a part of the IITE clearing-house activities.

INDICATORS OF ICT USAGE IN EDUCATION

Dr Boris KOTSIK
IITE programme specialist

ICTs in Education: State-of-the-Art, Needs and Perspectives is one of the main IITE projects. Besides other directions of this project, the extent and nature of Information and Communication Technologies (ICTs) usage in schools is surveyed.

The main goals of this work are:
- to collect data on the usage of ICTs in education;
- to evaluate them on the basis of relative description;
- to determine the trends of further development of ICT usage in education;
- to create accordingly national action plans for education development.

Within this framework, IITE collects information on the extent of ICT usage in education. We make emphases on basic levels of education (primary and secondary schools).

It is important to obtain the information for ICT usage in education based on its main indicators. A classification scheme for indicators of ICT usage in education is quite a natural task, and it has three main goals:
- to systematize and put in order a given set of indices;
- to find blank spots if there are any;
- to determine during this systematization a core set of the most important data that can satisfactorily describe the processes under consideration.
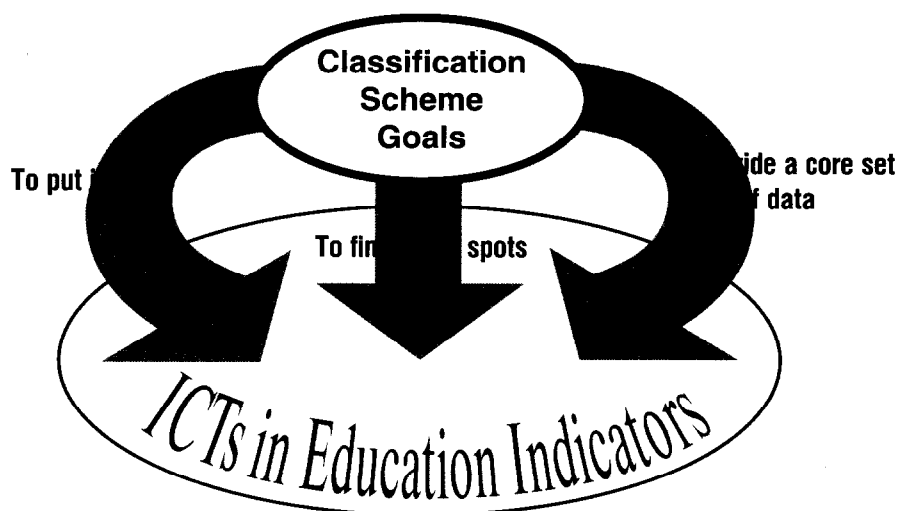
Scheme 1. Indicators of ICT usage in education – goals of classification

The problem of ICT usage indicators in education is not only a problem of classification; it also includes organizational, informational and educational aspects.

The indicator problem is also a multilevel one as the education system can be considered on regional (subregional), national and local level as well as level of educational institution and further down to the level of a specific classroom or single student itself. Though IITE in its work is mainly considering two former levels, we remember that other levels are also important and should be considered in different projects.

Level \ Aspect	Organizational	Educational	Informational
Regional			
National			
Local			
Institutional			
Classroom			
Student			

Scheme 2. Aspects and levels of the indicator problem

At the first stage of our work, we developed a preliminary version of a _Questionnaire for ICT Usage in Education_. Items of the _Questionnaire_ presented three main groups of indicators referring to the Educational Content, Technology and Staff. Each of these groups consisted of several tables with the sets of multiple-choice or open questions. In September 2000, this _Questionnaire_ was distributed among national focal points for cooperation with the IITE and some data were collected.

But this first experience revealed that further development of the _Questionnaire_ was necessary. Not only a more accurate designation or indicator categories turned out to be important but clarification and description of measurement procedures themselves were even more significant.

To achieve this goal we made a more clear specification of the indicator categories including:

Docware   official documents and policy papers, ICTs in curriculum, regulation of student access to information technologies.

Hardware   number of students and computers, number of computers in schools, type of computers, multimedia devices, networking and the Internet.

Software   type of operation system and user interface, systems software and basic software applications.

Contentware   digital educational media in-basic education, vocational training, complementary education, special needs education, distance and other forms of education.

Staffware   educators' computer competence, vocational development of teachers in ICTs, availability of ICT maintenance specialists in schools, administrators' and other staff computer confidence.

Other   categories not included in the above.

For further usage in every category, an indicators sub-set should be specified and described more distinctly and strictly.

While attending to measurement procedures – scale of measure, sampling methods, statistical measuring, level of specification and frequency of data collection should also be specially distinguished.

Scale of measure   from international and regional down to a classroom and single student as mentioned above.

Sampling methods   total array, random sample, expert judgments or combined.

Statistical measure	verbal description, absolute, relative or comparative value.
Level of specification	distinction of data on primary/secondary/high school, Humanities/Natural/Computer sciences, separate courses and themes of curricula.
Frequency of data collection	occasionally, twice a year, annually, biannually.

Judging from our previous experience, it is extremely difficult to select a system of valid and representative indictors of ICT usage in education for all UNESCO Member States because of high diversity of educational systems in the countries of different development stage with various political, economical, social, cultural, and educational standards. Obviously this diversity is only amplified by the processes of ICT integration which we are going to evaluate.

Therefore a special mechanism of fine-tuning of the proposed indicator data set is necessary. To achieve this goal, we propose a special scheme of selection of the most appropriate indicators and methods of their measurement based on expert decisions and ranking procedures. To implement this scheme, it is necessary to make a team of 5-8 experts and to ask them to fill in the check-list for the most appropriate indicators and procedures of obtaining data. This check-list may be similar to the shown below (Table 1); significance of each of the selected indicators should be ranked and averaged, and the most important indicators selected then. It will enable us to compose a final questionnaire for data collection and further analysis. The whole procedure may consist of the following steps:
- preparation of an indicator evaluation check-list consisting of the described above categories;
- selection of a team of experts and ranking the indicators;
- composing of final indicator questionnaire;
- distribution of questionnaire, data collection, performance and analysis;
- integration of data and production of the recommendations for further development.

We believe that his material will help to evaluate ICT usage and develop education among UNESCO Member States.

Dear experts! To elaborate a collective vision of contents and procedure of evaluation of ICT usage in education by means of the system of indicators, we would like to ask you to check an adequate property for each indicator category

Expert personal data

Name
Country
Organization
Position
Contacts:
    Phone
    Fax
    E-mail

Comments:

INDICATOR CATEGORY \ PROPERTY	Scale of measure — Rank of indicator significance :: International 1.1	Regional 1.2	National 1.3	Local 1.4	Institutional 1.5	Sampling method — Source of data :: Total array 2.1	Random sample 2.2	Expert judgments 2.3	Combined 2.4	Level of specification — Data collected separately for :: Primary\Secondary\High school 3.1	Humanities\Natural\Computer science 3.2	Separate courses and themes 3.3	Frequency — Should the data be obtained :: Occasionally 4.1	periodically :: Twice a year 4.2	Once a year 4.3	Biannually 4.4	Statistical measure — Most indicative measure :: Verbal 5.1	Absolute 5.2	Comparative 5.3	Relative 5.4	Your suggestions on other category properties
A Official documents and policy papers																					
B ICTs in curriculum																					
C Student access to information technologies																					
D Number of computers																					
E Mean number of computers in schools																					
F Type of computers																					
J Multimedia devices																					
H Local area networks																					
I Access to global communications																					
Other																					
K Type of operation system and user interface																					
Other																					
L Educational software availability																					
Other																					
N Educators' computer competence																					
O Educators' vocational development in ICTs																					
Other																					
Your suggestions on indicator categories																					

Table 1. Indicator evaluation check–list

DEVELOPMENT OF IITE
WWW INFORMATION SYSTEM

Azat KHANNANOV
IITE programme specialist

Following the decision of the 30th Session of the General Conference of UNESCO (Paris, November 1999), UNESCO Institute for Information Technologies in Education (IITE) launched an international project *ICTs in Education: State-of-the-Art, Needs and Perspectives.* The main project's objective is the creation of an information system that will promote the activity of UNESCO Member States and their interested organizations in the area of application of information and communication technologies (ICTs) in education. The proposed information system (IS) is directed at creation of methodological and information basis for preparation and realization of all posterior projects of IITE and its partner organizations in UNESCO Member States.

The following activities were planned for the project:
* investigation of the existing Internet-resources and main information systems;
* elaboration of terms of reference for the information system;
* conceptual design of the information system;
* development of pilot thematic information sub-systems of *"Information System on Information Technologies in Education" (ISITE): "Information Resources of ICTs in Education", "National Action Plans and Policy Documents on ICTs in Education"*;
* forming IITE/focal points joint working group;
* elaboration of the project for IITE distributed information system;
* international expertise of the project;
* pilot filling of the thematic sub-systems and organization of information exchange between partners.

Within the framework of the project initial investigation in the form of analytical survey *Existing Information Systems on Information Technologies in Education* has been carried out. More than 180 specialized web information systems (websites) on ICTs in education with interfaces in four languages have been analyzed. The survey has shown that most of the information systems executing the navigation (32%)[1] and monitoring (30%) functions. Less than 20% of the information systems support accumulation and the processing of the data. The target audience has been defined as teachers (41%) and learners (35%). Only 24 of the information systems provide services for administrators in the educational field.

The questionnaire on IITE IS development issues was disseminated among two groups of international experts who attended the expert meeting *Internet in Education* (Minsk, March 2000) and the expert meeting on distance education (Moscow, March 2000) (totaling 20 experts from 13 countries). The Table 1 presents the summary of the experts' evaluation of the different aspects of IITE IS creation:

|	Minsk expert group	Moscow expert group
Advisability of ISITE	80% agreed	95% agreed
Priority target groups	Administrators – 91% Teachers – 64% Learners – 54%	Administrators – 75% Teachers – 70% Learners – 30%
Main functions	Navigation – 80% Monitoring – 54% Processing – 36%	Navigation & monitoring – 70% Processing – 47%
Most useful thematic types	ICTs and learning process – 91% International organizations – 82% Ministries of Education sites – 19%	R&D in distance education – 92% International organizations – 91% ICTs and learning process – 23%
Information sources and gathering methods	Search in the Internet with expert evaluation – 70% IITE R&D results – 68% Network of IITE partners – 54%	Network of IITE partners 70% Search in the Internet with expert evaluation – 70% Data gathering with web tools – 64%

Table 1

[1] All figures here and after are estimated.

Based on the survey findings and experts' evaluation, main requirements within the framework of IITE IS conceptual design have been formulated. The desirable functions have been described as navigation and monitoring, the target audience – as administrators and teachers (in order of priority) at all levels of education. Bearing in mind that one of the main goal of the IITE establishment was promoting the activity of UNESCO Member States and their organizations in the area of application of information technologies in education, in particular arranging an integrated evaluation of national action plans and policy documents in educational information technologies in the countries and regions, the following thematic types have been adopted as top-priority:

- policy papers and national action plans;
- legislation, curricula and standards;
- organization, administration and financing;
- teacher training;
- research and development and statistics;
- technologies;
- learning process.

The IITE IS implementation period started in the year 2000. The three main steps were planned for the 2000-2001 period. Currently the project is at the second stage. The main components of the IITE IS at this stage, forming the IITE WWW portal (website, database and interactive tools) are shown at the
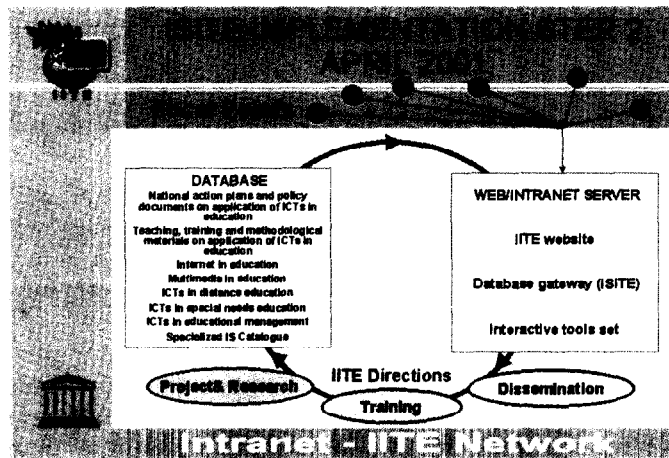

Scheme 1

The structure of the IITE website content is presented in the Table 2.

Structure of IITE website content	Structure of ISITE content
About the Institute Welcome by the Director Organizational chart IITE presentation Contact information Feedback	About ISITE What ISITE is Background Goals Site overview Contact us (Team)
Programme activity Aims of the Institute Activities in the 1st half of 2001 Projects Meetings Publications	IITE resources (publications): more than 25
	Database of WWW resources on ICTs usage in education: more than 600 links Policy papers and plans on ICTs in education Legislation, curricula and standards Organization, administration and financing Teacher training R&D and information Internet in education Multimedia in education ICTs in distance education ICTs in education for people with special needs
IITE focal points Interactive map Proposals Role of the network Submit Form Network Scheme IITE facilities	
Community Fora Goals IITE subscribe list Conference hall (BBS)	Specialized information systems catalogue: more than 138 links English interface Russian interface French interface Spanish interface
Information resources – ISITE ➡	Help Site navigation Searching Browsing
Thematic on-line seminars	

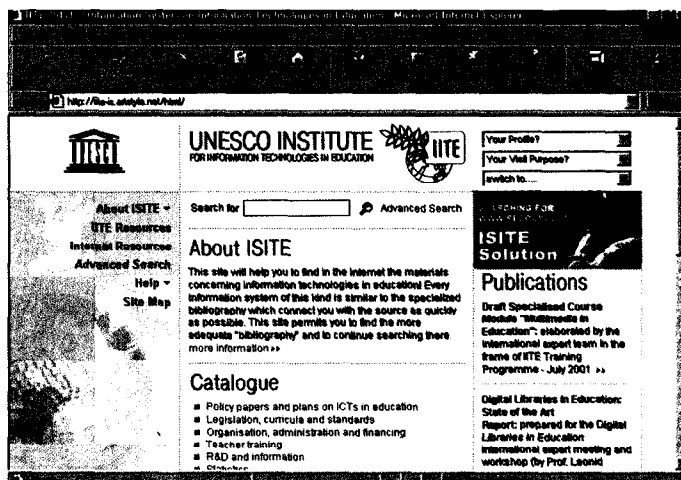| Structure of interactive tools set			
Introduction page	Interactive participants list	Materials (presentation page)	Interactive map
Contacts list	Paper discussion and editing page	Forum	Mailing list

Table 2

The website (http://www.iite.ru) contains information on IITE structure, partners, programme activities and publications. All sections of the website are equipped with the on-line feedback forms, allow visitors to make requests on particular questions, send comments and suggestions to IITE directly from the website. The screenshot of the website is shown in the Picture 1.
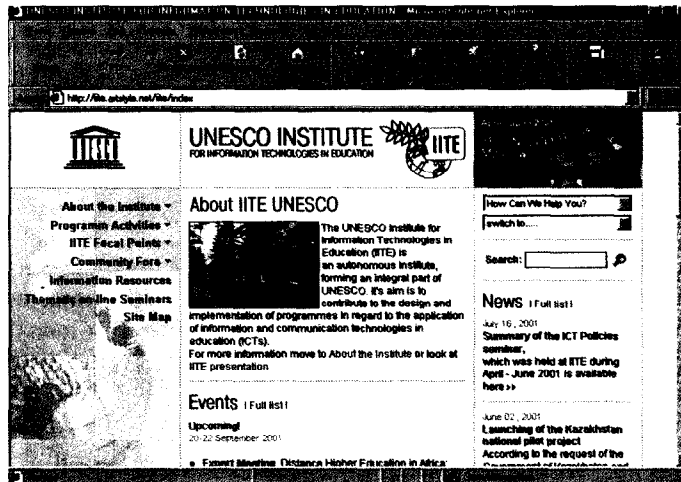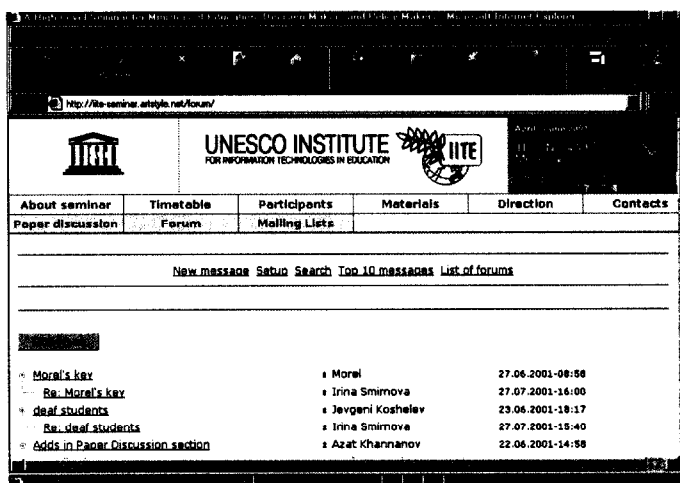

Picture 1

The database gateway ISITE (http://iite-is.artstyle.net/html) provides hundreds of hyperlinks to WWW resources in five languages with structured descriptions, associated indexation and query tools. There are more than 600 links to WWW documents in five languages (English, Russian, French, Spanish and German) with structured descriptions, representing 38 countries in database of the WWW resources on ICT usage in the education section.

There are more than 138 links to most important WWW sites on ICT usage in education with interfaces in English, Russian, French and Spanish in a specialized information systems catalogue section. The structure of thematic resources on the basis of the database of ISITE is being currently developed by IITE. It provides a mechanism for data exchange and supports the users by the Internet catalogue. The screenshot of the database gateway is shown in the Picture 2.


Picture 2

The set of interactive tools, enriched with instruments for group working and training activities allow professional networking by creating the worldwide virtual environments for policy-makers and planners, research and development personnel as well as educators. For example, the set of interactive tools (consisting of interactive list of participants, paper discussion and editing section, forum and mailing list), used during the ICT Policies seminar (http://iite-seminar.artstyle.net), held by IITE shown in the Picture 3.

Picture 3

The next step in IITE IS implementation (till the end of the year 2001) will involve the development of a distributed part of the IITE information system on the basis of the established network of national focal points for cooperation with IITE. The distributed structure of the network will involve the different types of activities – information exchange, interaction in collaborative research projects and training programs by using different levels of technologies: from mail and fax to World Wide Web. Special attention is given to IITE IS features that will allow to organize the true international collaboration through IITE IS between all national focal points for cooperation with IITE and other partners: different methods of access, interactivity, cooperation. For this purpose the following schemes of contributing information at different levels of interactivity have been proposed (Schemes 2-5):
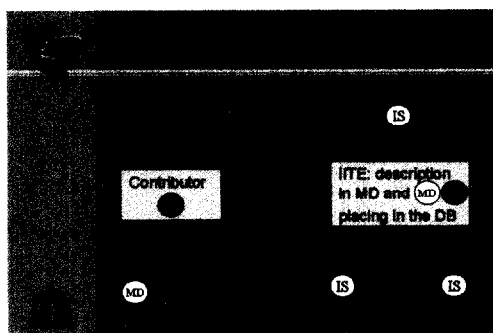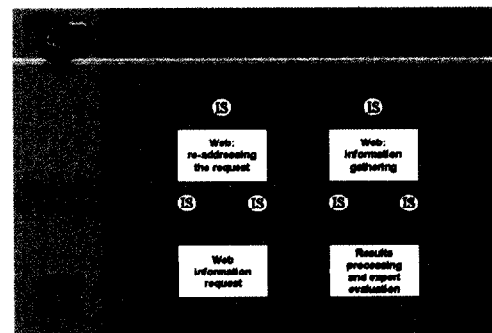

Scheme 2
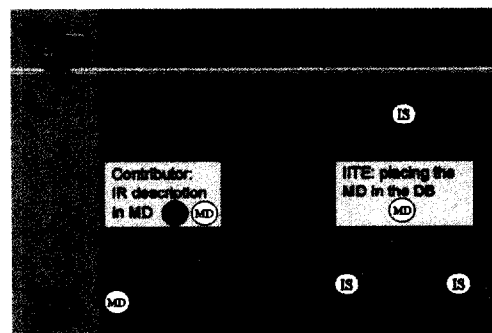
Scheme 3
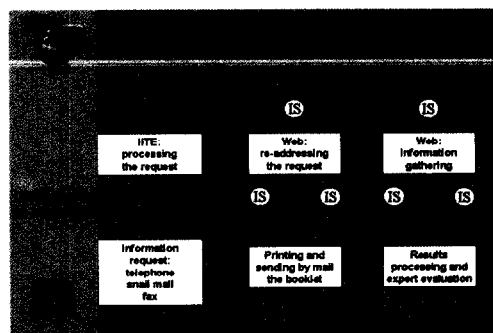
Scheme 4

Scheme 5

The issues of cooperation within the framework of IITE ISITE creation were discussed at the working meeting on activity of European focal points for cooperation with IITE (Prague, Czech Republic) in October 2000. The focal points representatives proposed the forming of task force on ISITE (ISITE TF) development. ISITE TF comprising four national focal points representatives started its work and now it is in the process of preparation of the Final Recommendations.