

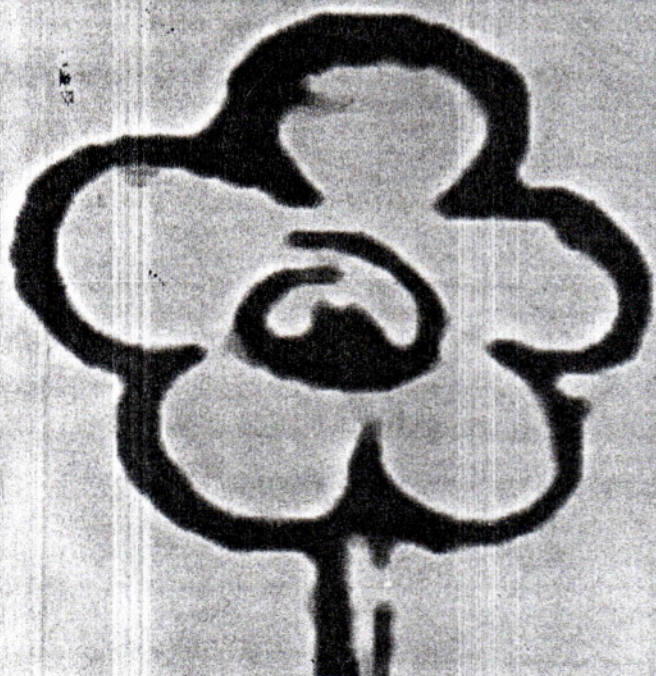


# OPEN CLASSROOMS

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## in the Digital Age

Cyberschools, e-learning  
and the scope of (r-)evolution



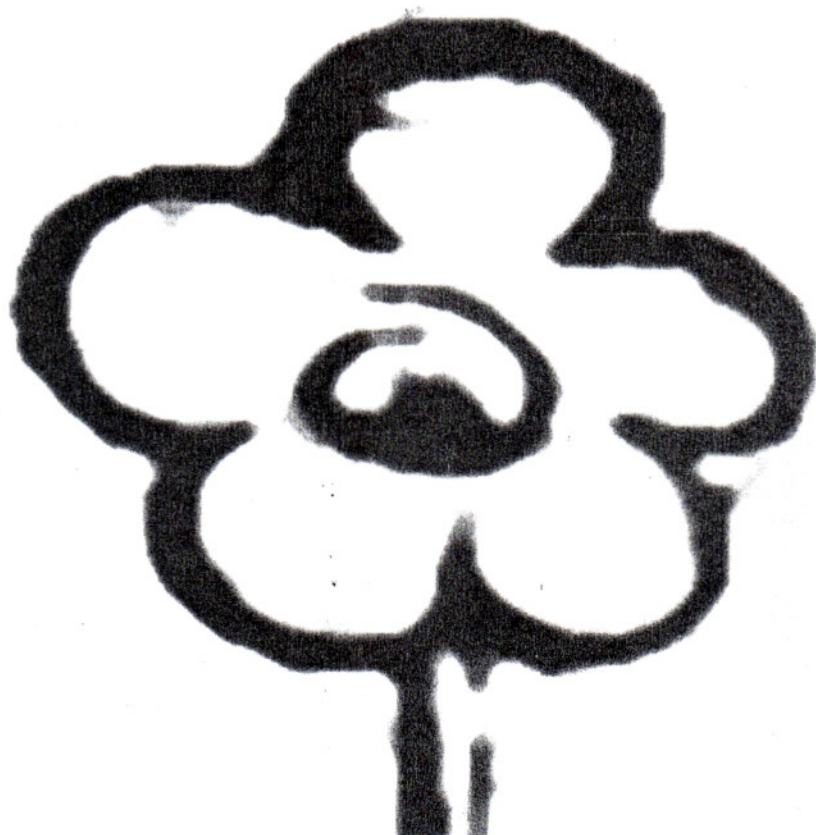
open classroom  
*IV Conference*



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## Conference Proceedings

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Barcelona  
November 19, 20-21, 2000

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***Acknowledgement and thanks are given to the  
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# **EDEN FOURTH OPEN CLASSROOM CONFERENCE 2000**

## **Open Classrooms in the Digital Age**

Cyberschools, e-learning and the scope of (r-)evolution

Proceedings of the EDEN Fourth Open Classroom Conference,  
held in Barcelona, Spain

19, 20-21 November 2000

Edited by Dr. Nikitas Kastis

on behalf of the European Distance Education Network

European Distance Education Network

# **EDEN Fourth Open Classroom Conference - 2000 Barcelona, Spain**

Published by EDEN

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## **INTRODUCTION**

Nowadays most people agree with the contribution that ICT is offering to improve the quality of education. Education has to keep on at the same level of social changes and the predominance of ICT in all sectors. We educate students in their culture and this culture has every day more relation with the fields of information, audiovisuals and communication.

The Universitat Oberta de Catalunya (UOC) is making an effort from its very beginning to consolidate the best use of technology in teaching and learning. Technology is not the objective, it's only a tool that helps us to bring up education to the emerging needs in society.

But there is still a hard work to do until the use of ICT will find its natural place in education. For this reason, we are very interested in the Open Classroom Initiative of EDEN and we host the 4<sup>th</sup> Open Classroom Conference in Barcelona. Students, teachers, universities and educational administrators have to work together for the research of the best use of technology in education, particularly at school level.

The use of ICT in education cannot be the result of isolated experiences. The educational community has to think about the consequences of it in a global society and has to guarantee the development of each specific culture. ICT can help us to overcome barriers of space and time without losing our individuality.

The organisers of the 4<sup>th</sup> Open Classroom Conference, UOC and EDEN, will continue looking for new ways of teaching and learning that contribute to the dissemination of culture and we will be working together with other professionals and institutions around the world that share with us the objective of achieving an educational system that makes the best of ICT.

Barcelona, November 2000

***Gabriel Ferraté***  
***Rector de la Universitat Oberta de***  
***Catalunya***  
Chair of the Conference Committee

***Dr. Erwin Wagner***  
***President of EDEN***  
Co-Chair of the Conference  
Committee



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# THE BULGARIAN NATIONAL EDUCATIONAL STRATEGY FOR INFORMATION AND COMMUNICATION TECHNOLOGIES AND ITS IMPLICATION FOR SCHOOL LEVEL EDUCATION

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## Introduction

The development of the National Educational Strategy for Information and Communication Technologies (ICT) was assigned by the Minister of Education and Science (MES), developed by a working group, headed by A. Eskenazi and P. Assenova, coordinated by the National Institute of Education, and approved by the Board of MES in July 1998. The implementation of the Strategy is included in the Program of the Bulgarian Government for the period 2001 - 2005 and its main ideas lie in the National Strategy for Information Society Development in Republic of Bulgaria adopted in December 1999.

This presentation emphasizes the basic elements of the National Educational Strategy for ICT.

## 1. Corner-stones for the Strategy design

The main ideas of the Educational Strategy are developed on the base of following principles and goals.

### 1.1. Principles:

- Contemporary education on ICT - an opportunity for all;
- Integration of ICT in the complete educational activity and culture;
- Leading role of the individual in the technological changes;
- Life-long learning.

**1.2. The main goals of ICT education** and their use in school practice are considered hereafter in three main contexts as follows:

The **personality-social context** reflects the opinion that all students should acquire general knowledge and good skills for using computers and nets technologies as necessary basic tools for living and working in a modern dynamic society. The following aspects are considered in details: information literacy; intellectual development; skills, abilities and capacity for independent life-long learning; personal development.

The **professional context** relates to the students' ability to use computers and information technologies in their future work or professional carrier. As a result of the vocational orientation and education students should acquire a determined number of skills and qualities. This context also includes the preparation of competitive specialists for the information industry with secondary education.

The **pedagogical context** of ICT usage is aiming at the improvement of the education quality. It is based on the new possibilities of the ICT environment to hold out more effective technologies and means for teaching and learning, for diagnosis and assessment of the educational results, for collecting, handing, storage and transfer of the information.



## 2. The levels of ICT education are presented on Figure 1:

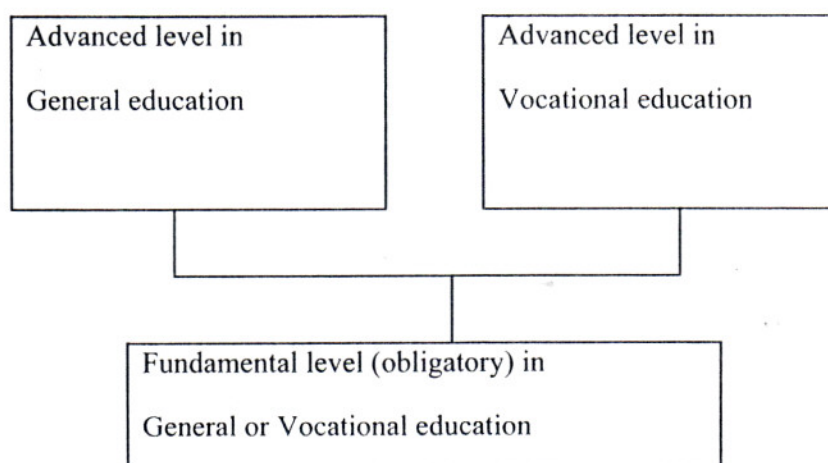


Figure 1. Levels of ICT education

**The fundamental level** is compulsory for every one as a part of the general or vocational education. The fundamental level gives the **minimum** of knowledge and skills that every student completing secondary school should have acquired. Having in mind the present situation that:

- the computer equipment is localised dominantly in upper secondary schools and in the close future it is not realistic to expect that all Bulgarian schools, including elementary or junior secondary ones, would be equipped with computers and nets;
- the teachers on ICT are concentrated mainly in the upper secondary schools and it is not possible to organise training for all teachers from lower educational structures

it is quite natural to place the fundamental part of ICT education today and in the close future in 9th-10th grade or, respectively, in the first two years of education in vocational schools. Computer equipment and teacher education represent very heavy problems and their solving would allow the age level to be lowered to 6th-7th grade or even to 5th-6th grade.

**The integration of ICT in education** begins from the first and continues to the last grade. Computer use by children in primary grades (didactical games, simple word processors, drawing editors, etc.) would provide a basis for further use of modern information technologies. The integration of ICT in other school subjects has to be expanded and in long-term - to become a part of the fundamental level.

**The advanced level on ICT** is possible for both general and vocational education. In the framework of the **general education** it is elective and is built on what is learned in the fundamental level. It can be organized through separated or integrated forms of education and depends on student's interest. For certain general education profiles, for example, for ICT specialists with secondary education, a part of the elective topics on ICT can become compulsory ones.

The advanced level on ICT in the framework of **vocational education** depends on the professional area selected by the students and is based on the fundamental level. This level offers special ICT applications. Two approaches are possible here - separate modules or integration in some vocational subjects. For certain professional areas teaching and using ICT is compulsory. This is determined by the curriculum for the respective profession or is a decision on a school level.



The place of ICT in the school curriculum is shown on Figure 2.

Grade	Gymnazia / Vocational Schools	
12	Advanced Level	Integrated
11	Elective or selective separate modules	Upper Secondary Education
10	Fundamental Level	
9	Compulsory separate modules	Forms
	Elective separate modules	
8	Integrated Forms	Lower Secondary Education
7		
6		
5		
4		
3		
2		
1		

Figure 2. Place of ICT in the secondary school curriculum

**The compulsory ICT education is guaranteed by the state educational standards** Optional (elective or selective) forms are intended to satisfy specific students' needs. They are connected with the future job selected or with additional interest to ICT.

As a result of the ICT educational system proposed, three type of specialists with secondary school education are distinguished:

- **users of basic ICT.** These are all students completing secondary school;
- **users of ICT in various professions.** These are students completing vocational secondary schools.
- **specialists for the information industry.** These are students completing vocational schools with professional area on ICT or students completing general secondary school with ICT profile.

**3. The basic topics of the ICT curriculum are presented below.**

### 3.1. Fundamental Level

- F1. Introduction to ICT;
- F2. Operating environments;
- F3. Computer-aided word processing;
- F4. Data bases;
- F5. Spreadsheets;



- F6. Graphics computer environments;
- F7. Social, ethical and legal aspects of ICT use;
- F8. Selection of Software tools.

The fundamental topics are obliged. Each of them could be taught deeply through optional form.

### 3.2. Advanced Level

- A1. Programming;
- A2. Programming and software development;
- A3. Typing skills;
- A4. Advanced word processing (desktop publishing);
- A5. Work in a local network;
- A6. Global Net. Work with Internet;
- A7. Web documents design;
- A8. Computer graphics;
- A9. CAD applications;
- A10. Organization and public presentation of information;
- A11. Multimedia;
- A12. Computer modelling and simulation;
- A13. Expert systems;
- A14. Robots and feed-back devices;
- A15. Computer music;
- A16. Computer-aided processing of statistical data;
- A17. ICT in the library;
- A18. Computer architecture;
- A19. Dedicated applications.

**3.3. There are some peculiarities in the curriculum aspect. In future, together with the improvement of the equipment and teachers education, some of the advanced topics should be placed in the fundamental level. Such topics are:**

- A5. Work in local networks;
- A6. Global nets. Work with Internet;
- A10. Organization and public presentation of information;
- A11. Multimedia;
- A17. ICT in the library.

The education is organised on module principles that gives the possibilities for flexibility of education and has respect for students' interests and willingness. The combination of certain modules could give a professional orientation or even a profile. One example only is presented below:

The combination of the modules:

- F3. Computer-aided word processing;
- F6. Graphics computer environments;
- A4. Advanced word processing (Desktop publishing)

would be recommended to those who would be interested in publishing or advertisement.

The ICT modules studied by the student should be stated in the certificate for education completion (the diploma). This will make clearer the individual skills and competencies in this area and will enrich the possibilities for finding a job.

ICT education in vocational schools should be oriented according to the following professional spheres:

- Industrial-technical sphere;
- Economic, trade, administrative or service sphere;
- Agricultural sphere.

Certain compositions for each sphere are recommended in the Strategy. Which topics are compulsory - this will be determined through the curriculum frame adopted for each professional area by the Ministry of Education. Other ICT topics could be added to the curriculum at school level.

#### **4. There are several important reasons for the integration of ICT in other school subjects:**

- Students will acquire new technologies solving problems for educational needs.
- They will be brought up to use them in everyday life.
- The high-technology environment for the education in different school subjects will increase the entire effectiveness and students' achievements.

The problem with ICT integration in other subjects is very heavy and is expected to be solved in a long term. The main reasons are following:

- All educational structures have to be equipped with computers and Internet access;
- All teachers have to be prepared to use new ICT in their subjects;
- The Bulgarian experience in ICT education is not very rich.

The main functions of ICT in another subjects are described and some strategies for teachers are proposed.

**5.** The successful results of our most **talented students** from schools and universities in competitions, Olympiads and software development demonstrate the possibilities of training specialists with different qualification for the computer industry needs. The work with gifted students is the most natural way new ideas for teaching informatics in secondary school to be tested, and to be determined to what extent the students of a certain age are able (objectively or as a level of achievement) to perceive school material with certain complexity. In this sense the basic purpose of training gifted students is to put the top of an „educational pyramid” with sufficiently comprehensive base in the area of computer information technologies.

The organization of gifted students' education is based on the previous educational experience obtained through school activities or individual ones. Therefore the following forms should be provided:

- Elective/selective class forms;
- Forms for students' participation in the developing activities;
- Programming competitions and Olympiads;
- National competition for students developing software applications.

The education of talented students willing to deal with ICT combines the efforts of schools, universities and highly qualified specialists from the industry in this area. Special attention is devoted to teachers who educate students with higher interest.



## 6. Equipment and providing access for schools to Internet

The investigations made about the equipment in Bulgarian schools show a picture of strong insufficiency of modern computer and communication equipment. These conditions, combined with the quite limited possibilities of the national budget, make it necessary unconventional ways to be found for solving the three basic questions requiring considerable financial resources:

- Providing appropriate equipment;
- Providing regular and reliable service and supply with consumables;
- Obtaining a license for the minimum of the necessary software products.

The strategy proposes an appropriate procedure based on competition and satisfying the above requirements. It basically involves MES, but also the municipalities and the schools themselves.

One of the basic principles of the IS strategy which is to be developed in Bulgaria is the **opportunity for everyone** to have an access to the new information and communication services. In the framework of the new conception for universal service at community level the educational institutions should be considered as a special group of users. It is necessary skills for work with Internet to be developed from earliest age by **providing permanent access for all schools to the network**. Therefore a national school net is to be developed through which all schools would have access to Internet. Possible financial resources are proposed in the Strategy.

7. At present we do not have a sufficient number of **well-educated teachers on ICT**. It is necessary to educate the following groups of pedagogic specialists: teachers and co-ordinators of ICT, teachers in other school subjects, the school administration.

The following levels of education are proposed:

- Pre-service education - implemented on the university level (Bachelor or Master degrees).
- In-service education. The purpose of the continuous education is to maintain and to raise educational staff qualification: teachers on Informatics/ICT, teachers on other subjects, administration (principals, inspectors and other managers). It is implemented at two levels: supporting (refreshment and improvement of professional knowledge and skills) and qualification raising (acquirement of new professional competencies). The main topics of education are: ICT modules; modern approaches for curriculum development; active methods for education using ICT; ICT integration in different school subjects; design, organisation and management of the educational processes. The system for continuous teachers' education is a diversity of forms of education, activities and practices in which the teachers are engaged in order to widen their knowledge, to improve their skills and to assess and improve their professional approach. It is implemented on the following levels: school, regional, institutional (universities, Institutes for Teacher education), non-institutional (conferences, seminars, etc.).

Therefore the basic **principles** of the system should be:

- voluntary participation in the continuous education;
- flexibility of the forms and topics of education with predominantly development of the educational forms without quitting their jobs;
- free selection of the form and topics of education as well as of the instructing group;
- credit system of education;
- division between the education and certification: the education is implemented by various units (universities, institutes for teacher education, other organizations) but a certificate for reaching a certain degree is given by an expert body;



- the educating units which are willing to train teachers should apply for accreditation (submitting also a conception for education, curriculum, other materials, etc.) by an expert body;
- competition in relation with the centralized financing for the groups providing the instruction;
- binding the qualification results to the statute and payment of the teacher.

Based on these principles, the Strategy considers educational topics, forms of instruction, organization, management and financing of teachers' education, assessment of teacher education.

#### **8. A special part of the Strategy relates to the management and financing.**

The management combines centralised and decentralised approaches in the following aspects:

- pedagogical, organizational, and economic problems of the management;
- the levels of management (national, regional, school);
- possible sources of funding;
- the interaction between educational structures and business environments;
- the normative provision of ICT integration in the secondary schools.

The approaches proposed encourage the initiative of the schools and local authorities to develop their own policy for raising the role of ICT in schools.

The Strategy is terminated with a **6 years Program** for its implementation. The Government Program 2001-2005 plans to provide 63 millions Euro for all stages of the Strategy.

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