

NEW TECHNOLOGIES IN EDUCATION: AN ITALIAN REPORT

EDUCATIONAL TECHNOLOGY IN ITALY

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1. THE ITALIAN EDUCATIONAL SYSTEM

A notable characteristic of the Italian educational and training system is the varying degree of decisional autonomy in the various sectors (primary and secondary school, university, vocational training). The primary and secondary school sectors have a strongly centralized structure with little local autonomy, except for some technical secondary schools which have some financial autonomy. The curriculum contents and school-hours are nationally unified. Educational experimentations affecting the curriculum must be authorized by the Ministry of Education. At higher levels of education, universities and polytechnics are largely autonomous and decide for themselves what subjects to teach and how to teach them. The vocational training sector is also largely free from central direction and the responsibility lies mostly in the regional governments.

The basic principles underlying Italian education are stated in the Constitution of the Italian Republic. Here the State is declared responsible for the promotion and development of cultural activities, and for scientific and technical research. The State determines also the general regulations governing education and sets up State schools of all types and at all levels. This task is delegated to the Ministry of Education which is responsible for the moral and intellectual education of children and young people through the school system.

Moreover, the Constitution affirms the principle of freedom of teaching, allowing private people to create schools and educational institutes not financed by the State.

Education is compulsory and free from the age of 6 to 14, and is given in Primary and Middle schools.

In 1974 the Italian Ministry of Education introduced an important innovation with delegate decrees concerning rules on legal position of management, supervising, teaching and not teaching school's personnel, the institution and the rearrangement of the collegial organs, the experimentation and educational research, thus allowing the participation of both families and society in school management.

A. STRUCTURE AND ORGANIZATION OF ITALIAN EDUCATION

The Italian educational system consists of 5 levels:

1. Pre-primary schools; 2. Primary schools; 3. Secondary schools-I° Degree; 4. Secondary schools-II° Degree; 5. University.

1. Education in Pre-primary Schools

Pre-primary schools take children from the age of 3 to 6; they are optional and free. Their purpose is an early training of both character and intelligence of children thus supplementing family training.

2. Education in Primary Schools

The first 5 years of compulsory education are committed to Primary schools which take children from the age of 6 to 11. These Primary schools have two teaching cycles: from 6 to 8 yrs and from 8 to 11 years. The teaching syllabus, which is of guidance in character in the first cycle, in the second one is split up into different subjects.

At the end of this cycle a written and oral examination is requested.

3. Education in Secondary Schools-I degree

Compulsory education in the Middle school (Scuola Media) continues being free from the age of 11 to 14. The qualification for entering the Middle school is the Primary School Leaving Certificate.

The purpose of the Middle school is that of forming good men and citizens along the lines laid down in the Italian Constitution and to help pupils in the choice of their future occupation. At the end of the Middle school the pupils sit for a State examination to obtain the Middle School Leaving Certificate, which is the qualification required for entrance to all upper secondary schools including Technical institutes, Vocational Training and Art schools.

4. Education in Secondary Schools-II degree

Education at upper secondary level comprises: a) classical, scientific, and teachers' training schools; b) technical schools; c) vocational schools; d) art schools.

a) Classical, Scientific and Teachers' Training Schools

Classical, Scientific and Teachers' Training education comprises the Classical Secondary school, the Scientific Secondary school and the Normal Institute.

- the Classical Secondary school consists of a five-years course (two years in the lower stage and three years in the upper stage). It continues the traditional training in Humanities, and prepares its students for University and advanced studies. The subjects taught are mainly those of a classical culture, owing to the historical-humanistic heritage. At the end of the course the pupils sit for State examination qualifying for the Classical Final Certificate of Secondary Education.
- The Scientific Secondary school consists of a five-years course. While continuing the training in humanities, it has a scientific trend, which is reflected not only in the introduction of single subjects, but in the teaching style as a whole. At the end of the course students sit for State examinations qualifying for the Scientific Final Certificate of Secondary Education, which is valid for entrance to all University faculties.
- The Normal Institute trains Primary school teachers. The course lasts 4 years. The subjects are presented in such a way as to train students as future teachers. At the end of the course they sit for a State Examination and are awarded the Normal Final Certificate of Secondary Education, which is the qualifying diploma for Primary school teaching and allows to enter the "Magistero" Faculty of the University and to the University Institute of Physical Training. Those students who intend to enter other Faculties of the University must attend a propeдевics course of one year.
- The Normal school trains Nursery school teachers. At the end of the course (3 years), students are awarded the qualifying Diploma for Nursery school teaching.

b) Technical Schools

The aim of Technical institutes is to train students in trade, technical, and administrative activities in agriculture, industry and commerce.

There are a number of different types of schools, but they are all engaged in training technicians and clerical workers. The courses last five years. With the introduction of new and different school hours and syllabuses each course is now subdivided into a two-years introductory course and a three-years advanced course. At the end of the entire course students sit for a State Examination qualifying for a Diploma as a technician. The school hours and syllabuses of these schools were set up to meet the particular needs of the different trades for which the various institutes qualify their students.

The criteria followed aim at training students along lines which enable them to keep the pace with technical and scientific progress.

Some subjects are taught throughout the entire course, others only during the two-years introductory course, while the final three-years advanced training period is particularly devoted to the subjects in which each institute is specialized. Teaching is both theoretical and practical.

Technical education is given in the following types of Institute:

- Agrarian Technical Institute
- Naval Technical Institute
- Commercial Technical Institute
- Technical Institute for Experts in Business Management and Foreign Correspondence
- Technical Institute for Tourist Trade
- Women's Technical Institute
- Industrial Technical Institute

Thirty-one specialized branches exist, with subjects pertaining to each of the specializations (e.g. Computer Science, Telecommunicating, Nuclear Chemistry, etc.).

c) Vocational Training

Most of the vocational training activity is organized by the regional government, namely by the "Assessorato Istruzione Professionale" (Vocational Training Office). Regions either organize vocational training directly or assign it to other institutions which are the expression of different national groups (e.g. IRI-Istituto Ricostruzione Industriale; ACLI-Associazioni Cristiane Lavoratori Italiani; Trade Unions; Confindustria).

There are many schools providing vocational training which depend upon the Ministry of Education, but they are considered as transitory.

The Regions perform research on the labour market and organize their plans in the field of vocational training: the various institutions annually involved submit their own proposals which are examined by a committee appointed by the "Assessorato Istruzione Professionale"; if approved, financial support is provided.

5. Higher Education

Higher Education aims at encouraging the progress of knowledge and providing the specialized education required for professional practice and for the holding of particular offices. Such a teaching is provided by (a) State University and University Institutes, (b) officially recognized "free" Universities, (c) "equivalent status" University Institutes and Higher Institutes.

Higher Education Institutions, legal entities in Public Law, are classified as State and Non-State ("free" and "equivalent status"). The former ones are State financed, though they may receive additional contributions from private organizations, and are State recognized (by Presidential Decrees, upon advice of the Higher Council for Education). The State approves the Statutes and recognizes the degrees and any other qualification awarded. These Universities are State controlled and are financially dependent on the University budget, for which the promoting and financing organizations are responsible. The system is based on the principle of autonomy, in respect of administration, teaching and discipline, within the limits determined by law.

B. INSTITUTIONS INVOLVED IN THE APPLICATION OF NEW TECHNOLOGIES TO EDUCATION

Institutions involved in the organization and management

- Ministero della Pubblica Istruzione (Ministry of Education).

As far as primary and secondary schools are concerned, the Italian school system has a strongly centralized structure, under the control of the Ministry of Education; also universities and polytechnics are under its direction, still, they have a high degree of autonomy.

Within the Ministry, there are several "Direzioni Generali" (Directorate) in charge of different sectors of the educational system; they depend directly upon the Ministry.

The following is a list of the "Direzioni Generali".

- Direzione Generale Istruzione Elementare (Directorate for Primary Instruction)
- Direzione Generale Istruzione Secondaria di Primo Grado (Directorate for Secondary Instruction - First Level)
- Direzione Generale Istruzione Classica, Scientifica e Magistrale (Directorate for Classical, Scientific and Teacher Training Lyceums)
- Direzione Generale Istruzione Tecnica (Directorate for Technical Education)

Recently two new branches in technical education have been created:

Istituto Commerciale per Ragionieri Programmatori (Technical Commercial Institute for Computer Programming, 76 Extant)

Istituto Tecnico industriale per Periti Elettrotecnici e Programmatori (Technical Industrial Institute for Electronics and Computer-Programming) 57 Extant)

This Directorate gives in-service training courses for teachers of these schools.

- Direzione Generale Istruzione Professionale (Directorate for

- Vocational Training)
- Direzione Generale per l'Università (Directorate for University)
 - Direzione Generale Scambi Culturali (Directorate for Cultural Exchanges)
 - Direzione Generale Istruzione Media non Statale (Directorate for non Public Secondary Instruction)
 - Ufficio Studi e Programmazione (Office for Studies and Planning).
This office deals with pedagogical research and experimentation proposals coming from the educational system, not including universities. It may either carry out specific educational research and projects or assign them to other institutions. From the standpoint of information, this office has remarkable possibilities. Data are available on educational experimentation performed within the educational system, in particular the ones concerning Information Technology.
 - Local authorities for primary and secondary school are located in each "Provincia" (95), and are called Provveditorati agli Studi (Curators of Studies); they mainly have administrative responsibilities. An important step toward a more decentralized system has been the creation of IRRSAEs (Regional Institutes for Educational Research, Experimentation and Teachers' Further Education) which are fully independent in their activity. Local educational experiments in schools still have to be authorized by the Ministry of Education if they are of a "structural" type (i.e. modification of subject school hours). In these cases, IRRSAE acts as advisor of the Ministry.
 - Istituti di Ricerca, Sperimentazione ed Aggiornamento Educativi (Institutes for Educational Research, Experimentation and Continuing Education). These include:
 - IRRSAE - Istituti Regionali di Ricerca, Sperimentazione ed Aggiornamento Educativi (The Regional Institutes for Educational Research, Experimentation and Teachers' Continuing Education).
 - CEDE - Centro Europeo dell'Educazione (European Centre for Education).
 - BDP - Biblioteca di Documentazione Pedagogica (The Library for Pedagogical Documentation).

These institutions have total administrative autonomy, under the supervision of the Ministry of Public Education. Their activity, which is still in the "take-off" phase, will become closely integrated, as described in the following. These institutions are coordinated by the Conferenza dei Presidenti (the Presidents' Conference), a committee whose members are the presidents of IRRSAE, of CEDE and of the Biblioteca di Documentazione Pedagogica. The Conferenza dei Presidenti, whose chairman is the Minister of Education, coordinates and promotes activities of common interest and ensures the exchange of information and experiences among the institutions. This committee prepares an annual report on the results of the activities of common interest.

IRRSAB

They are 20, one for each region. The institutional tasks of IRRSAE are:

- to carry out educational research and studies
- to gather, organize and disseminate educational documentation
- to coordinate inter-school educational projects
- to organize, in cooperation with other institutions, the in-service teachers' training
- to advise the Ministry of Education on local "structural" experimentation projects which need to be approved by the central authority.

CEDE

Its institutional aims are:

- to gather, organize, and disseminate educational documentation, both national and international
- to carry out studies and research on the structure of educational systems of foreign countries (in particular the Member States of the European Community)
- to study the educational activities of international organizations.

CEDE is deeply concerned with the introduction of information technology in education under two respects:

- introduction of information technology in primary and secondary school curricula
- use of information technology and methodologies in the teaching-learning process.

CEDE has recently started a project for the introduction of information technology in the curricula of secondary (and possibly primary) schools. The project includes curricular design, the selection of instructional strategies and hardware to be used, and the production of suitable multimedia packages to experiment with and distribute to schools. The experimentation is now in progress.

BDP

Its institutional aims are:

- to collect and store bibliographic material of pedagogical interest and any kind of pedagogical documentation, and to make it easily accessible and more widely used. This activity is accomplished in close collaboration with IRRSAEs and CEDE;
- to develop and organize the National Pedagogical Library, to supply a high quality service to schools, institutions, and researchers.

The Biblioteca is endowed with an information system which will be soon connected with all the IRRSAEs.

Three data bases will be available:

- a bibliographical data base on Italian and foreign publications in the educational and pedagogical field;
- a data base on educational research and experimentation accomplished or in progress within the Italian Educational System;
- a data base on teachers' continuing education activities either completed or in progress.

2. APPLICATION OF NEW TECHNOLOGIES

A. COMPUTERS IN EDUCATION

In Italy there is no national policy for the introduction of new technologies in schools.

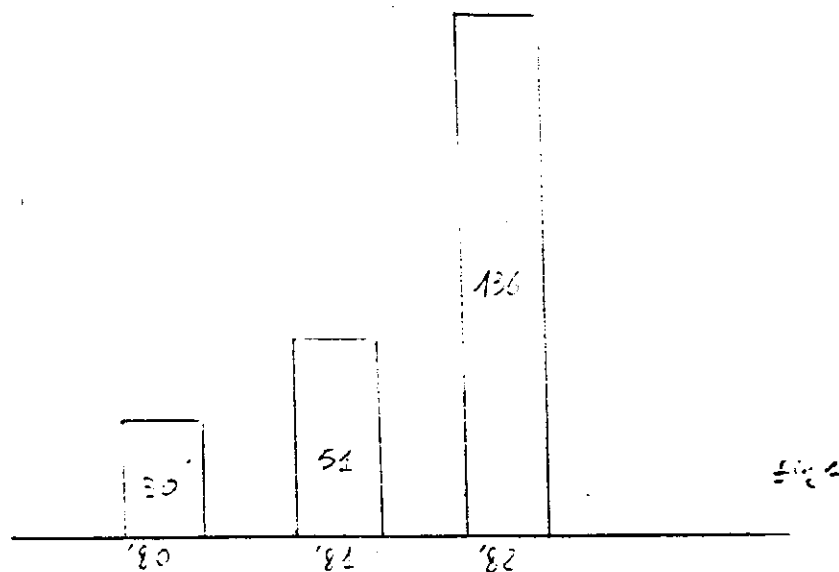
New computer science courses in some branches of the second level of secondary school and university are the main innovation introduced in the school system by new technologies.

However, the consciousness of the importance of using computers and the related science as instructional tools, is increasing. An instance of this is IRIS (Iniziativa e Ricerche per l'Informatica nella Scuola), a national project promoted by CEDE. The project, which will involve about 50 schools in 1984 is aimed at introducing the basic concepts of computer science into scientific and humanities courses both in primary and secondary schools.

In this general institutional and cultural context, the application of information technology to education and training is manifold: from centrally planned projects to experiments involving special groups, both public and private institutions, etc. The spread of information technology in education and training is taking place in many ways, often highly dispersed and informal ones, and are based on voluntary efforts. This pattern is evolving rapidly, and any sketch tends to become obsolete.

Hardware

Single schools buy their own instructional equipment and there are no official data about the media installed in schools and their utilization. The Office for Studies and Planning of the Ministry of Education has recently promoted a national survey for gathering these data, and the results will be available at the end of this year. Nevertheless, it has been estimated that, so far, 10.000 microcomputers are installed in Italian schools (mainly Olivetti M20 and Apple IIE). However, the increase rate of the number of microcomputers in schools is much more significant than the single figure. A survey of the "Provveditorato" of Milan on a sample of 359 secondary schools, showed that the number of installed microcomputers doubles every year (see Fig.1)



Software

So far, computers are used in secondary schools mainly for programming purposes. An overview of some other applications is contained in the following two reports:

- "l'Elaboratore nella Didattica": a list of Italian instructional products based on computers. This list was produced in 1980 by the Interest Group of AICA (Italian Computer Society);
- a catalogue of the courseware marketed by Mondadori (the most important publisher in this field).

In the first report 37 applications are listed. These applications cover the following fields:

- vocational training
- Chemistry
- Physics
- Computer science
- Mathematics
- Author languages and software tools for computer managed instruction.

Although some of the above cited products are of a high quality, they result obsolete when compared with the most recent technology developments in this field. Since these products are mainly based on mainframes, their dissemination is quite hard. Mondadori catalogue lists about 10 CAL products based on microcomputers.

Teachers too have started producing and using their own material. Several conferences organized by the professional associations of teachers have revealed a very dynamic movement which operates in the field of production and use of instructional software.

Institutions involved in courseware production and educational technology in research

1. Universities

- University of Milan - Istituto di Cibernetica (Department of Cybernetics)

This Institute has several areas of interest among which is the application of communication and information technology to education. It is also responsible for a wide-range educational activity involving a large number of students.

- University of Naples - Istituto di Fisica Sperimentale (Department of Experimental Physics)

In this Institute there is a group concerned with the development of courseware in the field of physics at high school and university level.

2. Institutes of the National Research Council of Italy (CNR)

- Istituto Tecnologie Didattiche (Institute for Educational Technology)

This is the only Institute of the CNR entirely devoted to the application of technology to education. The Institute exists since 1971, and carries out studies in the field of courseware development based both on AV media, computers and educational technology.

- Istituto per la Matematica Applicata (Institute for Applied Mathematics)

This Institute carries out research and experimentation on CAL in the fields of mathematics and statistics at Junior high school and high school levels. Continuing education for teachers is organized.

- Istituto di Analisi Numerica (Institute for Numerical Analysis), This Institute carries out research and experimentation on CAL in the fields of mathematics and physics at university level.

3. Other Public Institutions

- CNITE - Centro Nazionale Italiano Tecnologie Educative (Italian National Center for Educational Technology)

This Center carries out research and studies on instructional science, formulation of training strategies, new technologies for education, recovery of basic skills, adult and teacher continuing education, distance learning.

- CRAI - Consorzio per la Ricerca e le Applicazioni dell'Informatica (Consortium for Research and Application in Computer Science)

The University of Cosenza is affiliated with this Consortium, along with Regione Calabria and some other public and private institutions. Education is one of the major concerns of this Consortium which is involved in a wide-range project on distance learning at university level based on a high speed microwave network for exchange of data, images, voice, etc.

- CSATA - Centro Studi ed Applicazioni in Tecnologie Avanzate (Center for Research and Application of Advanced Technologies)

CSATA has been working for many years on the application of new technologies to education and training, and carries out studies and research on different aspects of these areas.

Teachers' Training

The Ministry of Education has committed to ELEA (a private society of consultancy and training linked to Olivetti), a self-instructional course for training in-service teachers. The course will be available next summer. Meanwhile, the Ministry is recommending schools to buy this course and to encourage teachers to use it. There are also a lot of local initiatives promoted both by the IRRSAEs and by the professional associations of teachers, aimed at introducing teachers to programming and to the instructional use of computers.

B. APPLICATION OF OTHER ADVANCED TECHNOLOGIES

Videodisc

Several projects for studying the instructional application of interactive videodisc are being started. Institutions involved in these projects are:

- the Istituto per le Tecnologie Didattiche of the CNR, Genova;
- the Institute of Cybernetics of the University of Milan;

- the Dept. of Electronics of the University of Genova.
 - RAI-TV (Public Radio & Television Broadcasting Corporation)
- The first results will be available in late 1984/early 1985.

Videotex/Teletext

The Italian Teletext service (Videotel) is at the very beginning, and no educational use is foreseen for the immediate future. However, educational applications of Videotel have been planned.

C. APPLICATION OF EARLIER TECHNOLOGIES

The general framework for the application of earlier technologies (transparencies/dias, radio, film, Tv) is very similar to that described in the previous section: the Ministry has no policy for coordinating and managing the dissemination and use of AV equipment, and the responsibility for buying and managing audiovisual media is up to schools. Quantitative data on the amount of AV media in schools are not available. However, it can be estimated that every school has several overhead projectors, one or more slide and film projectors, and, about the 10% of schools are also equipped with videocassette player and Tv sets. AV media are mainly used as adjunct for other activities rather than as independent devices for instruction.

As far as the production of instructional material is concerned, in the following some institutions are listed which produce multimedial packages and are interested in new communication technologies:

- RAI - Radio Televisione Italiana (the Public National Broadcasting Corporation).

RAI is involved in the application of technology to Education both through its School and Education Department (DSE) and its Research Center.

RAI/DSE produces and broadcasts educational units and courses, mainly based on radio and television. Written material which complements the AV information, is also available for some courses. Educational packages, (RVM cassettes and books) produced by RAI-DSE, are also marketed by 3 publishers: Giunti markets material for primary schools; Garzanti markets material for the primary level of secondary schools; Nuova Italia markets material for the secondary level of secondary schools. About 300 titles are available.

- ISFOL - Istituto Sviluppo Formazione Professionale Lavoratori, (the Institute for the Development of Workers' Training)
- ISFOL is an autonomous public agency under the supervision of the Ministry of Labour. On the basis of the requests of this Ministry, ISFOL:
- carries out studies and research for the national planning of vocational training activity;
 - makes proposals for vocational courses of requalification in case of special needs arising from new industrial activities or other possible causes;
 - if requested, gives assistance to the Regions in the vocational training sector.

Universities

There are 6 university AV Centers:

- CTU-Centro Televisivo Universitario (University TV Center), Milan
- Centro Didattico (Educational Center), Firenze
- CATTID-Centro Applicazioni della Televisione e delle Tecniche di Istruzione a Distanza (the Center for Application of television and of Techniques for Distance Learning), Roma
- Centro Cinematografia Scientifica (Center for Scientific Cinema), Polytechnic of Milano
- Centro Cinematografia Scientifica e Audiovisiva (Center for Scientific and AV Cinema), Padova
- Centro Audiovisivo (AV Center), Arcavacata, Rende (Cosenza).

These Centers have produced about 400 hours of AV programs. Some of them are strongly interested in the use of new technologies. CTU has been involved in a project for the development of CAL material and is now planning the use of the videodisc for instructional purposes.

- The University of Rome

Recently, the Department of Medicine of this University experimented a system for distance learning as a service for non resident students.

- The University of Calabria

In 1979 the Administration of this University created a committee for studying the feasibility of an integrated multimedial system for distance learning for students of that University. The system has not yet been implemented.

- Istituto dell'Enciclopedia Italiana (Italian Encyclopaedia) It is the major Italian editing institute funds, officially supported by public funds. It has set up an audiovisual section which produces slides, films, and tapes for training programmes and adult education.

Institutions for Distance Learning (correspondence school)

In Italy there are two main private correspondence schools and no public ones. These schools are occasionally involved in the application of new technologies to instruction.

- Scuola Radio Elettra (Torino). It has about 30,000 new students/year.
- Accademia (Rome). It has about 18,000 new students/year.

CONCLUSIONS

This review is an attempt to give the flavor of the impact of new technologies on the Italian Instructional System.

We have tried to show that this system has a high amount of inertia, and several factors hinder the application of new technologies: the Italian government has not set up a policy for introducing new technologies in the school system and the organization and structure of the existing one are not flexible. Nevertheless, there are institutions which are very actively involved in research, experimentation, and application of new media and methodologies. Many initiatives and conferences are promoted by several professional associations.

The activity of these institutions and a favorable cultural context exert pressure in the direction of innovation. This pressure is strengthened by other factors such as:

- the pressure of software and hardware market
- the decrease of hardware costs
- the spreading interest of teachers and students in new technologies
- the great diffusion of home computers

In conclusion, we think that the existing spontaneous grass roots movement is a very important condition for innovation. But, a wide scale application of new technologies in instruction is strictly linked to a general rearrangement of the school system and, therefore, also to political decisions pertaining to the role of the Educational system in the Italian Society.