

Ministry of Education, University and Research

Directorate General for IT Systems

Survey on Technological Resources Employed in Italian Schools

ABSTRACT

September 2004

Survey on Technological Resources Employed in Italian Schools

The following cooperated to the completion of this paper:

For the **Ministry of Education, University and Research:**

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RTI: IBM Italia, Finsiel, Engineering, FerServizi, PirelliRealEstate – Consultancy Service

Office V of DG for IT Systems collected data in cooperation with **CASPUR**

This report is also accessible on the Internet and Intranet web sites of the Ministry of Education, University and Research (www.istruzione.it)

Foreword by Director General

The world of Italian education has been going through rapid changes since the reform was passed (Law No 53/2003 and the following Implementation Regulations). This transformation is being carried out with the major contribution of Information and Communication Technologies (ICTs).

This is why we are particularly glad to have issued this report which is intended to assess the major steps that the Italian school system has taken over the last three years in terms of ICT equipment.

As you will be able to learn from this report, in a short period of time the Italian school system moved from a situation where it lagged behind the other European countries to a context where it is fully aligned to the European average, and in some cases (i.e. broadband connections in schools) it ranks among the top five countries on the European continent.

The number of personal computers in schools went from a ratio of 1:28 in 2001 to 1:10.9 in 2004; the Internet is now available in over 85% of Italian schools; there are more than 23,000 IT laboratories in all Italian schools and wireless facilities have been installed in over 700 schools.

Surprisingly, there has been a significant increase of ICT equipment in primary schools and not only in secondary technical schools like it was often the case in the past; the greater availability of ICT in primary schools will certainly foster the introduction of IT education in those institutions as established by the Reform Act, as well as the experimentation of new teaching models based on the use of ICT in all subjects.

Obviously, the availability of technological infrastructure has to run parallel to teaching and non teaching staff training. Last year, a series of training courses were delivered to over 196,000 people using the most innovative e-learning methods. This process will continue in order to provide human resources with the basic skills they need to be able to use the technological infrastructure which is going to be constantly renovated and expanded in the next few years. This programme will be funded by the Ministry and local administrations that are increasingly willing to invest on technological innovation in schools.

Finally, this publication suggests that there is a close connection between technological innovation and the expansion of IT equipment in families, thus encouraging a “virtuous cycle” in the use of multimedia facilities not only to facilitate learning during class time, but also to fully exploit the potential offered by ICTs even during extra time. Such a wide-ranging use of ICTs will be further enhanced by the increasing use of “e-books”, multimedia teaching aids and open source software products that will be dealt with in the penultimate chapter of this report.

The analysis contained in this volume has become a structural tool for the Ministry’s Information System and can be freely updated by schools and accessed through the portal www.istruzione.it; we therefore urge all schools to cooperate and constantly enter data about their

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ICT equipment so that the relevant planning and monitoring department of the Ministry receives the information which is needed to regularly update and expand IT infrastructure in schools.

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The Online Census

On the 16th of February 2004, our Ministry published an online questionnaire to collect data about technological teaching infrastructure in state-run schools, in order to plan effective actions, both regulations and funding, when having to acquire new equipment and upgrade the existing one.

By July the 31st, 88.7 % of schools – 9,699 out of 10,929 – had returned the questionnaires, thus allowing us to elaborate parameters with an adequate degree of approximation.

In order to create a real-time accessible and updateable database, the “Permanent Observatory of Technological Teaching Equipment in State-run Schools” was set up and can be accessed at the same address following the same modalities as for the February questionnaire (www.istruzione.it – reserved area).



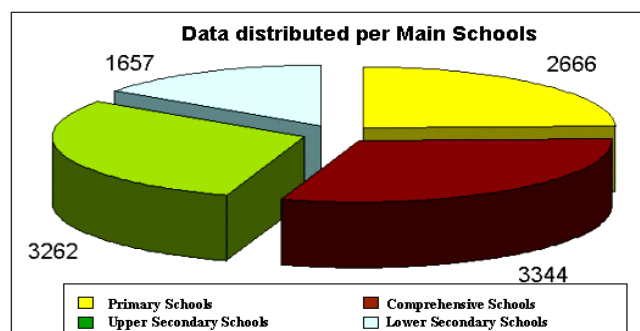
GENERAL DATA

Surveyed Schools

- **Istituti Principali (Main Schools):** meaning all state-run schools where the School Principal has his/her office.
- **Direzione Didattica (Primary School):** a group consisting of the Main School and a number of primary schools;
- **Scuola Media di primo grado (Lower Secondary School):** a group consisting of the Main School and its branch schools;
- **Istituto Comprensivo (Comprehensive School):** a group consisting of the Main School and primary and lower secondary schools;
- **Istituto Secondario (Upper Secondary School):** a group consisting of the Main School and different types of upper secondary schools.

The total national data presented in this section slightly differ (137 schools) from those included in the 2003/2004 “Summary of data” since they were processed by taking into account the specific school reference codes.

As previously stated (in “the online census” paragraph) these codes specifically indicate the actual point where education is delivered. Therefore, also annexed lower secondary schools having a code in the form of xxxxxx00x are included; the Istituti Onnicomprensivi were also included on an experimental basis and they were attributed codes having the same structure as those of annexed lower secondary schools.



SCHOOL POPULATION

School population as observed during the census (absolute values)				
	Students in Primary Schools	Students in Lower Secondary Schools	Students in Upper Secondary Schools	Total
Total number of students	2,244.278	1,415.077	2,186.949	5,846.304



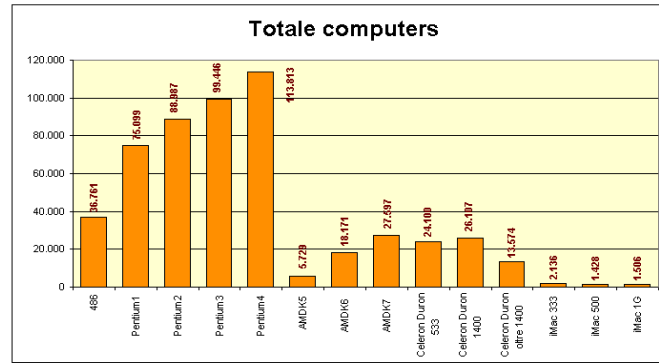
NUMBER OF SCHOOLS THAT RESPONDED TO THE QUESTIONNAIRE

Responses per type of school			
Type of school	Responses	National total number	%
Primary schools	2,467	2,666	92.5
Lower secondary schools	1,553	1,657	93.7
Comprehensive schools	2,781	3,344	83.2
Upper secondary schools	2,898	3,262	88.8



MULTIMEDIA EQUIPMENT

PROCESSORS				
Type of computer	No of desktops	No of laptops	total computers	% on total
486	36,013	748	36,761	6.7
Pentium1	74,569	530	75,099	14.0
Pentium2	87,923	1,064	88,987	16.5
Pentium3	97,279	2,167	99,446	18.2
Pentium4	108,226	5,587	113,813	20.2
AMDK5	5,676	53	5,729	1.1
AMDK6	17,711	460	18,171	3.3
AMDK7	27,219	378	27,597	5.1
Celeron Duron 533	23,743	357	24,100	4.4
Celeron Duron 1400	25,699	408	26,107	4.8
Celeron Duron oltre 1400	13,219	355	13,574	2.5
iMac 333	2,087	49	2,136	0.4
iMac 500	1,401	27	1,428	0.3
iMac 1G	1,397	109	1,506	0.3
Total	522,162	12,292	534,454	



Other IT equipment						
Type of school	Printers	Scanners	CD writers	CD players	DVD players	total
Primary schools	35,927	13,881	3,386	7,994	1,635	62,823
Comprehensive schools	19,750	7,014	2,109	4,370	1,145	34,388
Lower secondary schools	21,592	7,556	1,848	3,470	1,034	35,500
Upper secondary schools	73,245	13,957	3,594	7,205	2,509	100,510
total	150,514	42,408	10,937	23,039	6,323	233,221

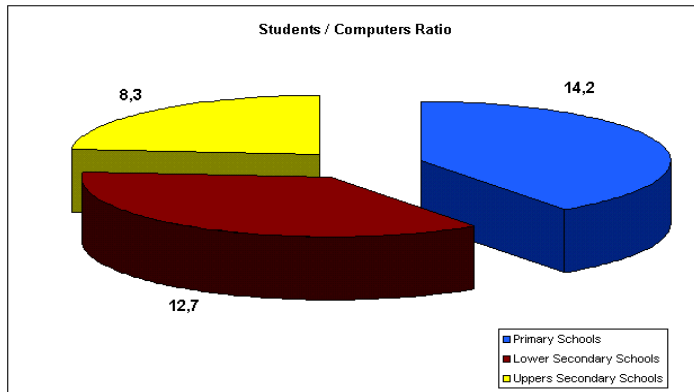
- external peripherals

Video Conferencing systems	1,689	Audio recorders	73,539
Web Cams	12,271	Video recorders	42,641
Satellite dishes	9,023	Slide Projectors	14,573
Digital satellite decoders	6,069	Over Head Projectors	24,182
Analogue satellite decoders	2,533	Digital video cameras	11,388
Multimedia projectors	17,789	Digital photo cameras	13,386
TV Sets	51,544		

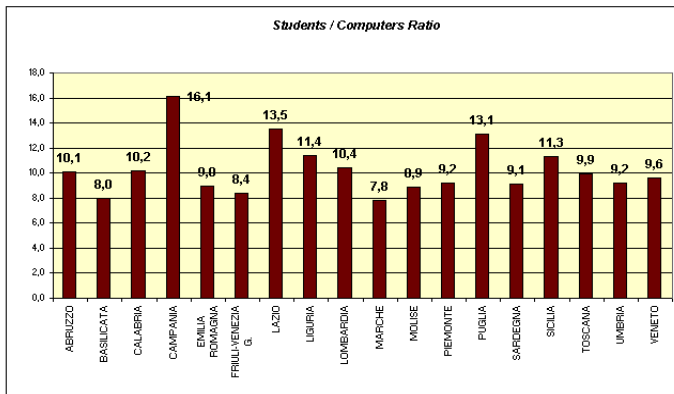
PCs/Students Ratio

The PCs/students ratio is 1/10.9 (1 PC every 10.9 students) which is in line with the target set by the European Commission in March 2001 when it adopted an action plan including, among others, the specific goal of: “Achieving a rate of 5-15 students per multimedia computer by 2004.” (source: “New Technologies” Europe – Education & training).

Type of school	No of students	No of computers	Students/computers ratio
Primary schools	2,244,278	157,697	14.2
Lower secondary schools	1,415,077	111,735	12.7
Upper secondary schools	2,186,949	265,022	8.3
National values	5,846,304	534,454	10.9



For the sake of thorough information, we are also including data concerning nursery schools: number of pupils 871,665, number of computers 3,355. It is to be noted that the “National Guidelines for Personalized Education Plans in Nursery Schools” contain the following specific learning objective: the optional use of multimedia tools and materials “to simply experiment forms of artistic expression of the inside and outside world”.



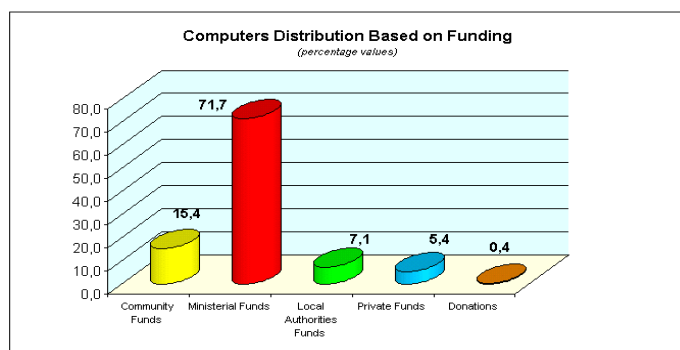
A general comparison between current data and those resulting from the study “Survey on Technological Teaching Resources in the Italian School System”, carried out by the Ministry in the schoolyear 2000/2001, as well as those of the project “Monitoring teaching technologies” in 2002 carried out by IBM Business Consulting, shows that the number of PCs in schools increased, going from an average of 1 PC every 28 students to 1 PC every 10.9 students in 3 years.

Region	Students/Computers ratio 2001*	Students/Computers ratio 2004
ABRUZZO	30	10
BASILICATA	28	8
CALABRIA	32	10
CAMPANIA	44	16
EMILIA ROMAGNA	23	9
FRIULI-VENEZIA G.	20	8
LAZIO	31	14
LIGURIA	27	11
LOMBARDIA	26	10
MARCHE	22	8
MOLISE	22	9
PIEMONTE	26	9
PUGLIA	29	13
SARDEGNA	24	9
SICILIA	39	11
TOSCANA	26	10
UMBRIA	22	9
VENETO	25	10
Total	28	11

Like in the past, most PCs are located in Technical Schools. At a national level, more than 1/5 of computers are found in those schools; the figure is 9.6% in non technical schools – *lyceums* - (10.8% if we include art schools). The following table illustrates the Students/Computers ratio:

Type of school	No of students	No of computers	Students/PCs ratio
Professional schools	339,668	51,668	6.6
Secondary schools	454,479	47,707	9.5
Technical schools	635,160	114,001	5.6
Lyceums plus music/art schools	70,627	6,452	10.9
Lyceums	687,015	45,194	15.2
Total	2,186,949	265,022	8.3

Funding



Data about the type of funding which was used to purchase computers is particularly interesting. The questionnaire mentioned four types of funding (the item “donation” was added at a later stage):

Community funds; Ministerial funds; local authorities funds; private funds.

Note that pursuant to C.M. 152 of 2002 and C.M. 114, ministerial funding in 2001 was rather generous.

During the period 2002-2004, many schools innovated and upgraded their technological equipment using the Consip conventions in accordance with art. 26 of Law 23/99; this is relevant information because the desktops and laptops purchased under this initiative account for respectively 18.3% and 54.9% of the whole installed infrastructure.

Year	Desktops	Laptops	Printers	Multimedia Projectors	Total
2002	670	1,460	216		2,346
2003	73,107	5,287	9,817	1,268	89,479
2004	21,541		324		21,865
Total	95,318	6,747	10,357	1,268	113,690



NETWORKS

Schools that said they have a local network			
Type of school	Respondents having a local network	Respondents to the questionnaire	%
Primary schools	1.213	2.467	49.2
Lower secondary schools	1.092	1.553	70.3
Comprehensive schools	1.357	2.781	48.8
Lower secondary schools	2.408	2.898	83.1
Total	6.070	9.699	62.6

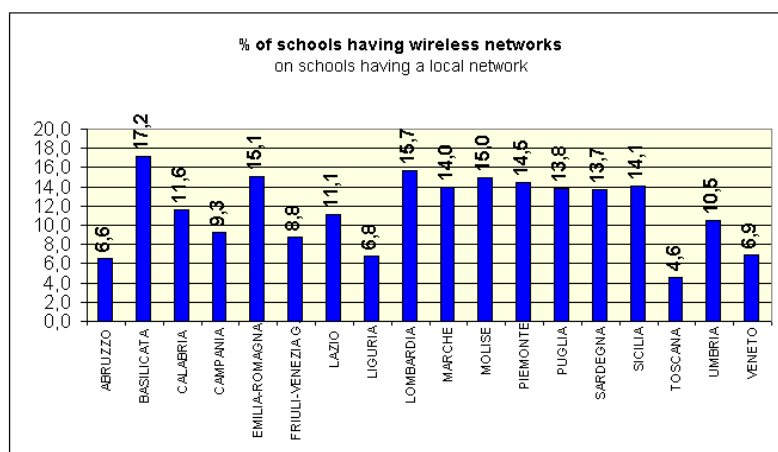
Branch schools connected to local networks per type of school							
Type of school	Only part of it	%	Only headquarters	%	All	%	Total
Primary schools	204	16.2	930	73.7	128	10.1	1,262
Lower secondary schools	144	13.5	688	64.7	232	21.8	1,064
Comprehensive schools	324	23.4	943	68.2	115	8.3	1,382
Professional schools	48	12.6	245	64.5	87	22.9	380
Upper Secondary schools	62	14.6	239	56.4	123	29.0	424
Technical schools	52	6.9	427	56.9	271	36.1	750
Lyceums plus Art/Music schools	10	9.3	75	69.4	23	21.3	108
Lyceums	62	8.9	458	65.4	180	25.7	700
Total	906	14.9	4,005	66.0	1,159	19.1	6,070

As in previous surveys, this study examines cases of local networks with more than 3 network ports in different rooms. We also included cases of networked classrooms and schools having network ports in more than 3 classrooms.

Type of school	Respondents having a local network with more than 3 network ports in different rooms	Respondents	%
Primary schools	828	2,467	33.6
Lower secondary schools	766	1,553	49.3
Comprehensive schools	954	2,781	34.3
Upper Secondary schools	2,015	2,898	69.5
Total	4,576	9,699	47.2

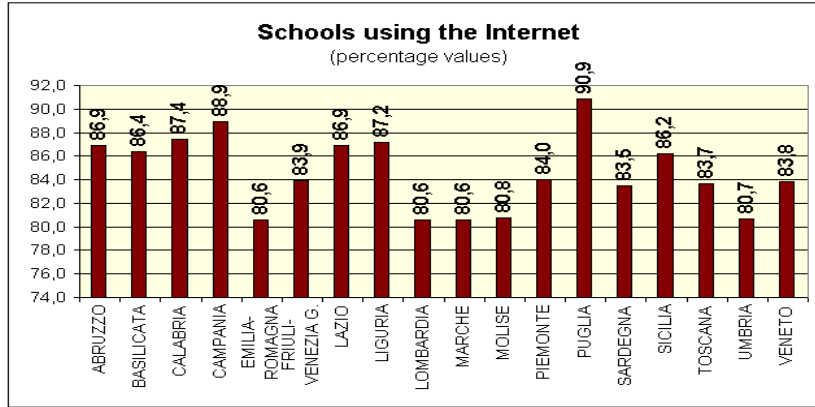
Local networks having network ports in more than 3 classrooms (compared to 2001 survey data)				
Type of school	year 2001 *	% on respondents	Year 2004	% on respondents
Primary schools	16	1	234	10
Lower secondary schools	28	4	242	16
Comprehensive schools	37	1	252	9
Upper Secondary schools	249	7	808	28
Total	330	4	1,536	16

* Source: "Technological Teaching Resources in the Italian School System"



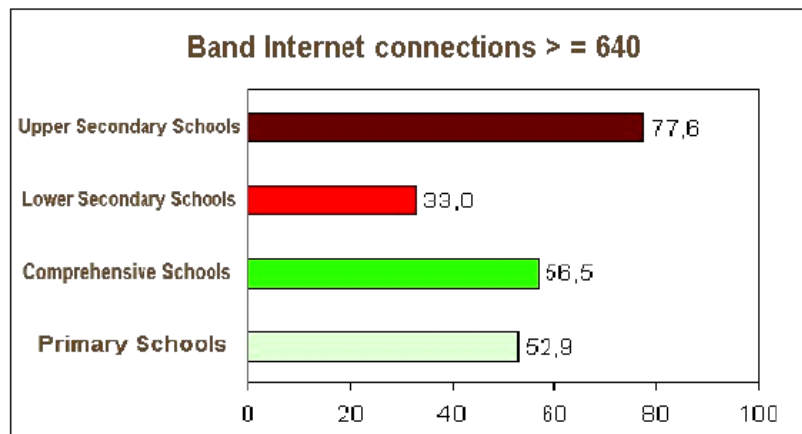


INTERNET



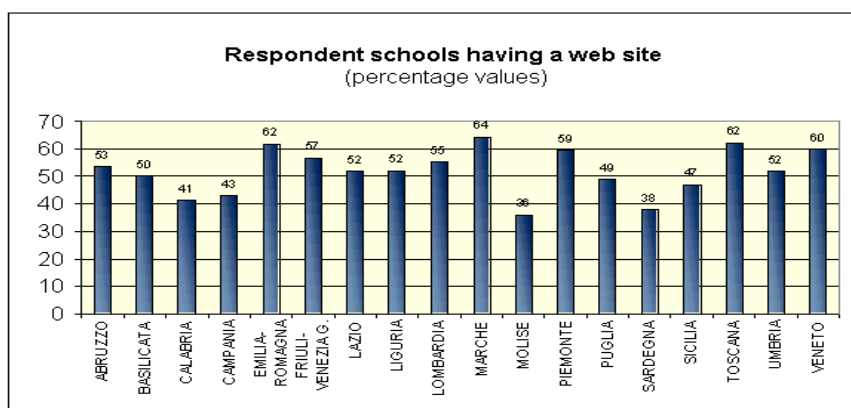
Access modalities							
<i>Geographical Area</i>	<i>No of schools having an Internet connection</i>	<i>Centralised Access</i>	<i>%</i>	<i>Access from single computers</i>	<i>%</i>	<i>Dedicated connection</i>	<i>%</i>
Northern Italy	2,747	2,402	87.4	768	28.0	52	1.9
Central Italy	1,773	1,521	85.8	540	30.5	33	1.9
Southern Italy	2,549	2,068	81.1	795	31.2	51	2.0
Sicily	900	771	85.7	249	27.7	14	1.6
Sardinia	309	239	77.3	131	42.4	8	2.6
Responses and % on total responses	8,278	7,001	84.6	2,483	30	158	1.9

Type of access										
<i>Geographical Area</i>	<i>Fiber optic</i>	<i>%</i>	<i>ISDN</i>	<i>%</i>	<i>PTSN</i>	<i>%</i>	<i>ADSL</i>	<i>%</i>	<i>Satellite</i>	<i>%</i>
Northern Italy	110	4.0	1,140	41.5	356	13.0	1,673	60.9	6	0.2
Central Italy	14	0.8	847	47.8	230	13.0	986	55.6	4	0.2
Southern Italy	26	1.0	1,213	47.6	290	11.4	1,311	51.4	5	0.2
Sicily	7	0.8	373	41.4	79	8.8	538	59.8		
Sardinia	3	1.0	175	56.6	54	17.5	139	45.0		
Responses and % on total responses	160	1.9	3,748	45.3	1,009	12.2	4,647	56.1	15	0.2





WEB SITE



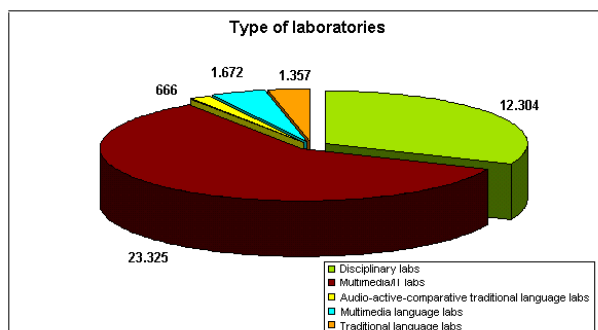
E-MAIL

E-mail facilities for educational purposes per type of schools			
Type of school	Respondents having education-related e-mail facilities	Total respondents	%
Primary schools	1,429	2,467	57.9
Lower secondary schools	962	1,553	61.9
Comprehensive schools	1,454	2,781	52.2
Upper secondary schools	1,856	2,898	64.0



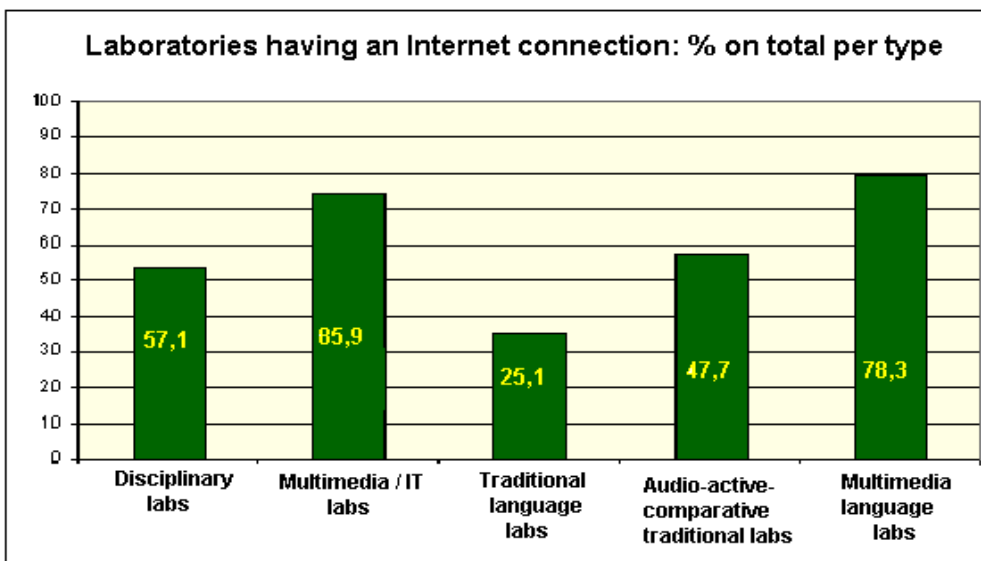
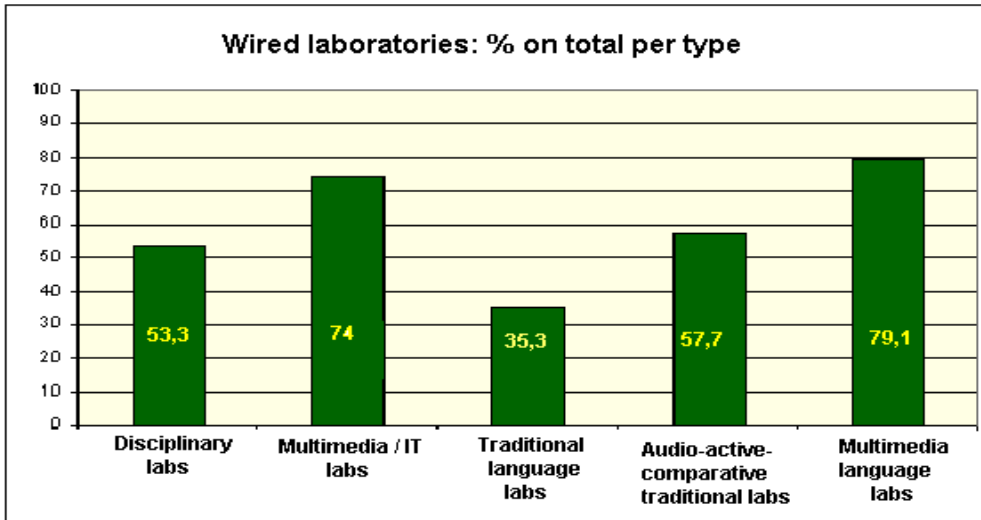
LABORATORIES

Five type of laboratories were investigated:

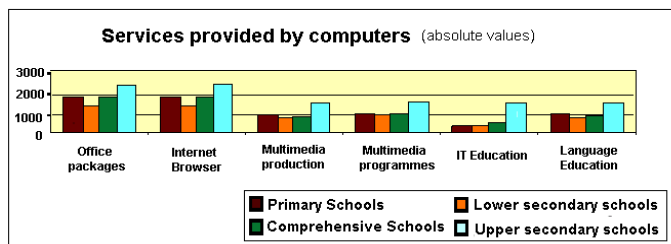
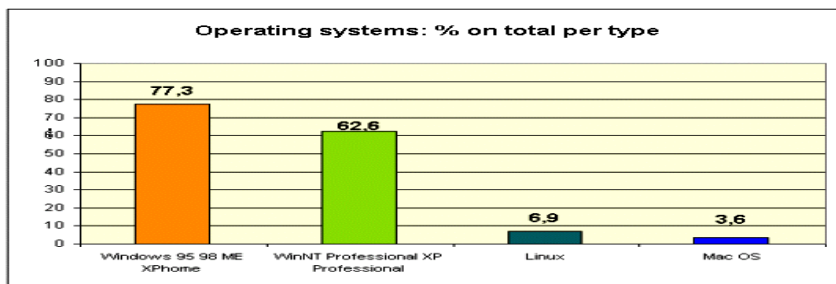


- Disciplinary labs
- Multimedia/IT labs,
- Audio-active- comparative traditional labs
- Multimedia language labs
- Traditional language labs

There are 39,324 labs distributed in 22,633 schools which belong to 8,672 Main Schools, accounting for 89% of 9,699 respondent schools.



OPERATING SYSTEMS AND SERVICES





OPEN SOURCE SOFTWARE

Server with open source operating systems

Primary s.	4
Lower s. s.	6
Compreh. s.	10
Lyceums	24
Upper s. s.	27
Technical s.	57
Total	128

Open source applications

Primary s.	37
Lower s. s.	35
Compreh. s.	78
Lyceums	66
Upper s. s.	51
Technical s.	142
Total	409

Client computer with open source operating system

Primary s.	6
Lower s. s.	15
Compreh. s.	6
Lyceums	27
Upper s. s.	29
Technical s.	89
Total	172

131 schools run OS applications out of all those which declared they have Client computers running OS software

348 schools use at least one open source programme on client computers, of which:

69.8 % on proprietary operating systems and 30.2 % on open source operating systems.



THE SITUATION IN EUROPE

Our comparison between the Italian situation and the situation of the other European countries is based on the latest Eurydice Report “Key Data on Information and Communication Technology in Schools in Europe”, which is available at the following web site address: www.eurydice.org.

The report compares ICT equipment in European schools. It is based on 35 indicators which are grouped in 5 chapters:

- Context
- Structures and Organization
- Equipment
- Teachers
- Processes

In particular, we used chapter C indicators (ICT equipment) to compare facilities between Italian schools and European schools and chapter D indicators for teacher education.

ICT Equipment

The computerisation level of Italian schools is much higher than the average level of other European

schools; the 2004 Eurydice Report shows that the current ratio within compulsory schooling for 15 year-old students is 1 computer every 20 students; in seven countries, in particular, (Denmark, Luxembourg, Finland, Sweden, UK, Liechtenstein and Norway) the figure is less than 10, while in Bulgaria and Latvia the ratio is 1 computer every 30 students and in three countries (Greece, Portugal and Romania) it is 1 computer each 50 pupils.

As you can read in this report, the ratio for Italian students of the same age (upper secondary schools) is 1 computer each 8.3 pupils, well below the European average. The report puts Italy among the top five European countries for computer facilities in schools.

The same overall report shows that the Italian average is 1 computer each 10,9 students, which is far better than the abovementioned European average of 1:20.

During the period 2001-2004, Italy succeeded in bridging the computer facilities gap that separated it from the rest of European countries and is currently among the best performing countries in this sector at the European level.

Internet Connections on Computers in Schools

The previously mentioned Eurydice report points out that “Those countries in which the schools have a greater number of computers also show high rates of computers connected to the Internet”.

In this field too, Italy is aligned to the general European trend; after the expansion of ICT equipment in the years 2001-2004, most of the infrastructure was connected to the Internet.

This report shows that 85,3% of Italian schools use the Internet and an equivalent portion of computers in schools connected to the network; therefore the connected computers/students ratio is 1.12.8, fully in line with the European indicators as shown in the Eurydice report.

Computer Distribution

The Eurydice report also shows that the expansion of computer facilities entails a more homogenous distribution of the infrastructure itself. The report states that at the European level “The lower the average pupils/computer ratio – indicative of a significant measure of computerisation – the more the distribution of the school ratios is concentrated. The higher the average pupils/computer ratio, the broader is the distribution, with some schools well equipped and others clearly less so”.

As previously pointed out, one of the goals of the current upgrading process of computer facilities in schools is achieving a homogeneous distribution at national level, avoiding major unbalances yet protecting areas of excellence.

Similarly to other European countries, the growth of ICT equipment and the improvement of the students/computers average ratio leads to a more homogeneous distribution of infrastructure which is no longer affected by the traditional gap between the North and the South (the Italian region showing the best ratio is Marche and many southern regions have better ratios than the average level of Northern and Central regions), and is fully in line with the standards of other European countries.

Computer Location

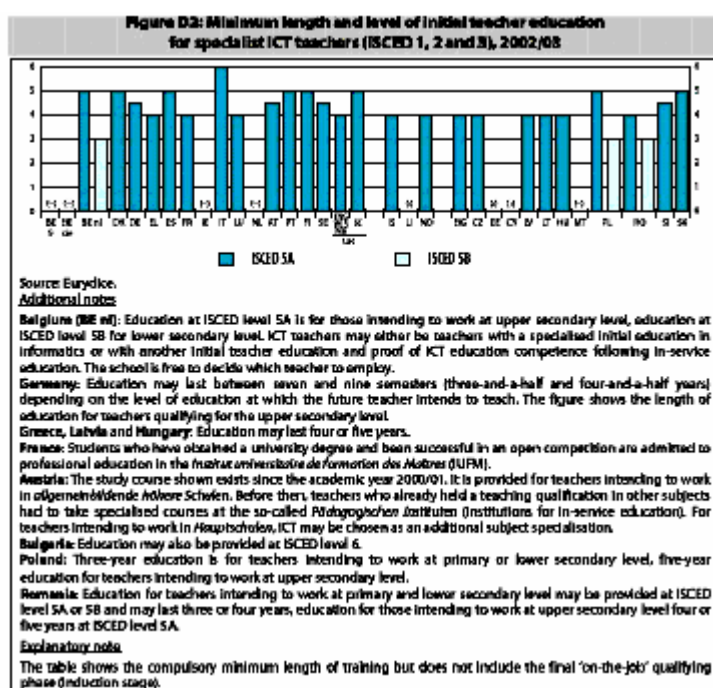
The Eurydice report also points out that “The computerisation of schools in primary education generally presupposes two options which both involve making at least one computer available to an increasingly greater number of pupils. These one or more computers are either located away from the classroom, or within it. Countries in which the level of school computerisation is relatively low generally choose the first option. In the remainder, both options may be possible, with relatively large numbers of pupils able to access the classroom computer and virtually all pupils able to access a computer away from the class. Depending on the level of computerisation, they may do this either in a separate specially equipped room or a multimedia library”.

Italy seems to have chosen the latter since our survey suggests that there are as many as 23,325 multimedia IT labs and 85.9% of those are connected to the Internet; these are complemented by classroom computers that are meant to actively support teaching.

The Eurydice report claims that “in 4 countries (France, Italy, the Czech Republic, and Slovenia), computerisation is relatively well developed in that the estimated percentage of pupils able to access at least one computer away from the classroom is in all cases higher than 60 %.”

The next stage of ICT infrastructure expansion in Italian schools has to set off from such a favourable situation to enhance the distribution of classroom computers connected to the Internet. This will promote the adoption of teaching methods in which computers are not “away from the classroom” but rather “within it”.

Teacher Education



Chapter D of the Eurydice report offers some more insight on teacher education. It states that “Most countries provide an initial education pathway leading to a qualification as an ICT specialist teacher.” This pathway can be said to be similar to the recent training courses organised within the framework of the ForTIC training scheme, which involved over 196,000 both educational and non educational school staff.

The table shows that in Italy the level of specialist ICT teacher initial education (in school year 2002/2003 when some of the ForTIC courses were delivered) is the highest compared to the rest of European countries.

This is not be considered a final achievement but a further stimulus to invest more on teacher training so that the whole ICT infrastructure can be used at its best thanks to the adoption of more innovative teaching methods which are part of the overall ongoing education reform process.