01.4 Education and Training

The application of Information Technologies has a considerable impact on the area of education, and it can also make lifelong continuous education more feasible. ICT will be applied in this area in accordance with a global perspective that will therefore include the field of education in its entirety: pre-school, basic (primary and secondary), university, professional, continuous and vocational education.

When there is discussion of education and training in the context of the Information Society, reference is made both to technical and technological issues and to the need to broaden the horizons of traditional education to embrace other educational practices, in order to adapt to the new situation. Reference is also made to ideas such as learning to learn and self-education, group work, participation in networks, and learning to think and analyse in a critical manner. In short, the accent is on a more participatory type of education that differs from the conventional forms of learning known to date.

The information technologies introduced into the education sector exert an influence in three different areas: pedagogy, technology and organisation. Thus the use of the new technologies will only have the desired effect, if the steps taken to apply them impinge correctly on these three areas.

The Bangemann Report emphasises the strategic importance of integrating education into ICT, and focuses particular attention on the deployment of initiatives to provide equipment, training and support to users, as well as on the development of the necessary materials.

The arrival of the Internet has special relevance in the field of education, since it opens the door to the production and dissemination of information, the possibility of gaining access to this, and the establishment of collaborative projects between schools and universities within Catalonia, across Spain and on an international scale.

The proposed indicators for monitoring the position of this area in Catalonia are the following:

01.4.1 Teaching infrastructures: number of students per computer
01.4.2 Educational profiles: graduates in sciences and technology
01.4.3 Investment in continuous training

Possibly, very soon, we will see other indicators that measure the number of curricular subjects on the network, or virtual campuses in a country, etc.

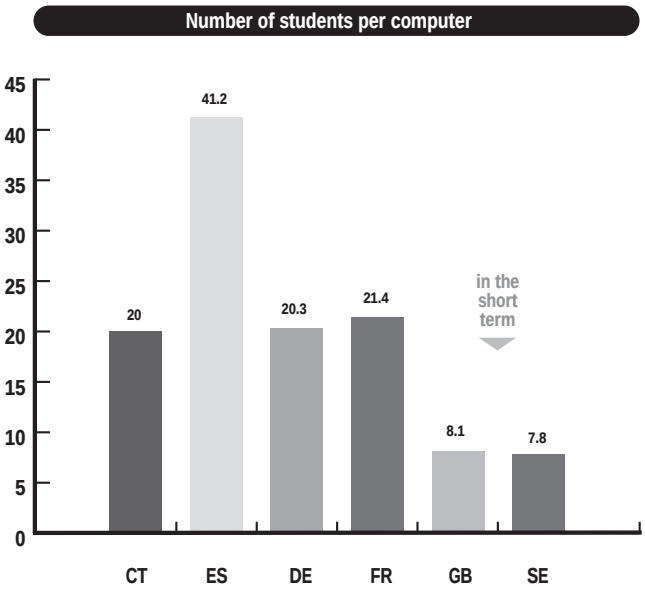
01.4.1 Teaching infrastructures: number of students per computer

Since it is an important indication of teaching infrastructures, the number of students per computer in teaching centres (schools, colleges and universities) in various countries in Europe is shown in the graph.

Thanks to the Arco/Educalia program promoted by the Program on Computer Science in Education (PIE) of the Department of Education, and the CSI by mid-1999 all the public-funded and private primary schools in Catalonia have a minimum of two computers, a printer, an Internet connection, and access to a virtual network for pupils, teachers and parents. Moreover, according to PIE, in Catalonia all the public-funded and private cofinanced secondary schools have computers and access to the Internet.

Globally the ratio of students per computer in the primary and secondary schools of Catalonia in September of 1999 is of 20 PCs per student. This has been achieved thanks to the deployment of 10.000 computers in the catalan schools, that must be added to the 20.000 previously installed.

In the U.S.A. there is a ratio of 20 pupils per computer. In the United Kingdom the ratio is 16.3 pupils per computer in primary schools and 8.7 pupils in secondary schools.



Sources: Dataquest 1997 and **http://www.nua.ie/surveys/**
The data for Catalonia ONLY include primary and secondary schools (Source: PIE).

01.4.2 Educational profiles

These data compare the number of graduates in technological subject areas with the total number of graduates.

In Catalonia in 1997 the following gained qualifications:

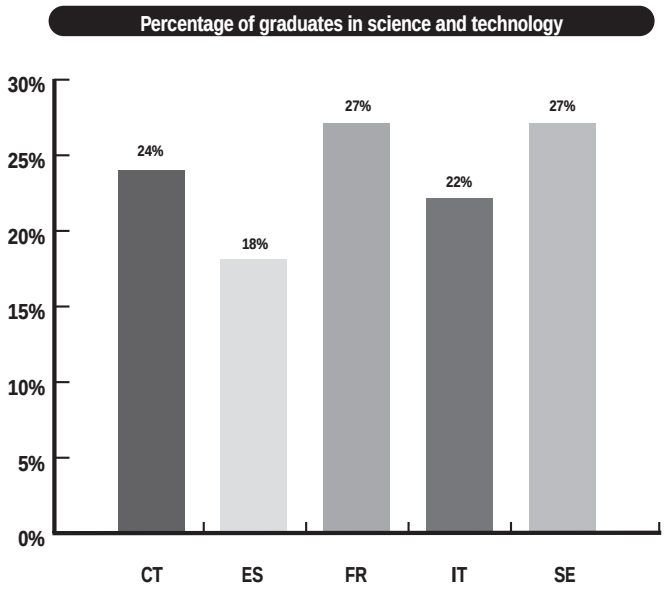
8,932 graduates (3-year “diploma” course) including Technical Engineers

15,554 graduates (5-year “llicenciatura” course) including Engineers and Architects

The European Commission estimates that there are currently 500,000 jobs in Information Technologies that are NOT occupied, due to a lack of available professionals. This situation will worsen, since it is estimated that in 2001 1.6 million experts will be needed in Europe in this area.

According to a Microsoft study, it is foreseen that 12 million jobs in IT could be created in Europe, if the necessary infrastructures existed.

At present, the Information Technologies (IT) sector accounts for 5% of the total GDP in the U.S.A. and provides work for 4 million people.



Sources: OECD 1995 and Commissioner’s Office for Universities and Research.

01.4.3 Investment in Continuous Training

With regard to continuous training, in 1996 Spain invested 34,000 pesetas/worker in training, compared with the European average of 74,000 pesetas/worker.
In Spain, 0.6% of the total wages bill is assigned to training, while in Europe this figure is as high as 1.4%.
Therefore, Spain (and by extension, Catalonia) must double its investment in continuous training in order to approach the European average. Spain makes an annual investment of 550,000 million pesetas in continuous training (1997).