



CHAPTER 4

EUROPE AND THE COMMONWEALTH OF INDEPENDENT STATES

Zoya Naskova

A REGION OF GREAT DIVERSITY

The Continent of Europe is a region of great diversity, culturally, politically and economically. This diversity is reflected in the stage of development of educational technology. The availability of computer technology in schools varies greatly among the countries of Western Europe, Eastern Europe and the Commonwealth of Independent States (CIS).

A key factor that affects the drive towards school networking in these countries is the level of government involvement, which ranges from providing computer equipment to schools, to ministry-run national education Internet service providers (ISPs). Many Western and Central European governments have taken the initiative to integrate information technologies into school practices. But in the less economically developed countries, especially those in Eastern Europe and the CIS that have undergone a period of economic and political transition in the last decade, governments have not been able to take leadership in this field. In these countries, a great number of education technology initiatives have been driven by outside foreign aid funds and non-governmental organisations (NGOs), such as the Open Society Institute and Project Harmony, among others.

Greater and more highly developed school network developments exist in the more-developed countries; however, there are examples of some smaller-scale school networks in less-developed countries which have achieved notable success and are functioning quite well helping schools in their efforts to advance the use of technology for teaching and learning.

In all countries of the region, however, the integration of information and communications technology (ICT) in education practices is still relatively new, and there is much more to be done to take full advantage of the opportunities available. One especially weak point is the lack of ICT-based resources in local languages throughout Europe and the CIS, especially in the smaller nations and ethnic groups. Better-developed school networks within each country, as well as internationally, would help schools share

experiences and resources and create a quantity of high-quality bodies of educational content in the multitude of languages spoken on the continent. Locally relevant content will give ICT meaning: ICT will make sense for teachers and learners only when it can offer something that they understand and can use to improve their lives in tangible, measurable ways.

THE TECHNOLOGY LANDSCAPE

The vast differences between the countries and regions of Europe can most clearly be observed in the availability of modern technologies for students and teachers in the schools and other educational institutions. According to the Organisation for Economic Co-operation and Development (OECD) publication *Education at a Glance 2002*, the ratio of computers to students in Europe varies substantially, from a median of six in Norway to 36 in Portugal and 57 in Liechtenstein (see Table 4.1). Fifty per cent of this equipment in Norway, 35 per cent in Portugal and 79 per cent in Liechtenstein is connected to the Internet, as reported by school principals and weighted by student enrolment.

Some Eastern European countries have made great progress in this area, despite having undergone fundamental political and economic transition in recent years. For example, Estonia has surpassed more-developed countries like Italy and Hong Kong on the percentage of Internet users. In 2000, all secondary schools in Estonia had computer facilities and 75 per cent had Internet connections. This achievement was a result of the Tiger Leap programme, launched by the Estonian Ministry of Education with the objective of modernising the educational system. The success of this programme is due to the initiative of the country's leadership and the co-operation between schools, universities, local governments, private enterprises, public institutions and the third sector-funds and foundations. (See www.esis.ee/ist99/tiigrihype.html.)

However, in other countries of Eastern Europe and the CIS, computers are much less present in schools. For instance, the latest data show that in the Republic of Macedonia there are approximately 188 students per computer (see Table 4.2). It is not certain how up-to-date this equipment is, however current records show that out of the total of 1836 computers in schools, only 524 have CD drives, and out of 239 schools, only 44, or 18 per cent, have some sort of Internet connection (compared to 40 per cent in the Czech Republic and 84 per cent in Finland).

Other factors besides economic resources contribute to the persistent differences between Eastern and Western Europe in the integration of ICT in education. High on the list are basic environmental factors, such as political stability and the ability of local and regional bureaucracies to focus on technology and education. Macedonia, for example, is still recovering from years of conflict and unrest in the region. The situation is similar in other conflict-ridden areas. Government officials in those countries continue to focus on more fundamental issues of social infrastructure and security. ICT in education is not yet seen as a high-priority investment opportunity.

Computer usage by students also varies from country to country. For instance, according to the OECD, 6 per cent of the young people in Finland use computers almost every day, compared to 16 per cent in Sweden and 23 per cent in Denmark. Approximately 38 per cent of the 15-year-olds in OECD countries use computers on a weekly basis at school (almost every day or a few times a week). In Germany and Hungary, 14 per cent and 58 per cent of pupils, respectively, access computers on a weekly basis (see Table 4.3).

Table 4.1: Ratio of students to computers in Europe (2000)

(Total number of students enrolled in the school divided by the total number of computers for the school in which 15-year-olds are enrolled, by quartile, type of institution and location of school, weighted by student enrolment)

	Ratio of students to computers			Ratio of students to computers, by school location							
				Fewer than 3000 people (village)		From 15,000 to 100,000 people (town)		Over 1,000,000 people (close to the centre of a city)		Over 1,000,000 people (elsewhere in a city)	
	25th percentile	50th percentile (median)	75th percentile	50th percentile (median)	% students represented in the sample	50th percentile (median)	% students represented in the sample	50th percentile (median)	% students represented in the sample	50th percentile (median)	% students represented in the sample
Austria	5	7	15	10	6	6	28	4	5	15	11
Belgium	7	11	18	20	4	10	51	8	1	a	a
Czech Republic	9	15	28	19	6	15	40	13	2	16	10
Denmark	6	8	11	6	29	9	25	9	8	11	3
Finland	6	8	12	7	17	9	34	10	15	8	6
France	6	11	15	9	7	9	52	57	1	8	3
Germany	14	22	31	18	6	23	43	15	2	22	4
Greece	14	28	83	18	8	32	38	33	9	17	6
Hungary	5	9	15	12	1	8	39	10	10	7	9
Iceland	7	10	13	m	m	m	m	m	m	m	m
Ireland	10	14	19	14	28	16	13	12	12	9	8
Italy	7	12	19	9	2	13	54	a	a	12	12
Latvia	4	5	12	19	18	29	27	23	6	a	a
Liechtenstein	31	57	88	4	21	a	a	a	a	a	a
Luxembourg	8	9	11	a	a	8	19	a	a	a	a
Netherlands¹	6	10	14	a	a	10	63	a	a	a	a
Norway	4	6	9	5	38	8	20	a	a	a	a
Poland	8	26	45	7	3	27	41	39	7	4	2
Portugal	20	36	100	20	4	27	39	101	7	26	1
Spain	14	21	29	12	2	21	32	22	4	29	5
Sweden	7	8	10	8	23	8	34	10	4	4	1
Switzerland	6	9	16	9	12	9	25	a	a	a	a
United Kingdom	6	8	9	8	10	7	35	8	4	8	4

Notes: m = missing; a = not applicable

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2000, www.oecd.org

Table 4.2: Availability of computers in schools of the Republic of Macedonia (2000)

	Number of schools	Available computers for instruction	Computers with CD drives	Schools connected to the Internet/ WWW	Number of pupils	Ratio of students per computer
Elementary schools (grades 1–8)	155	613	182	11	253,997	414.35
High schools (grades 9–12)	84	1223	342	33	91,424	74.75
Total	239	1836	524	44	345,421	188.13

Source: Ministry of Education and Science of the Republic of Macedonia

Table 4.3: Frequency of use of computers at home and at school by 15-year-olds in selected European countries (2000)

(Mean percentage of 15-year-olds who reported using computers at school almost every day, a few times each week, between once a week and once a month, less than once a month and never)

	Use of computers at school				
	Almost every day	A few times each week	Between once a week and once a month	Less than once a month	Never
	%	%	%	%	%
Belgium	5	26	32	12	25
Czech Republic	4	24	34	11	26
Denmark	23	36	26	11	4
Finland	6	41	30	16	7
Germany	4	14	25	20	37
Hungary	7	58	19	5	10
Ireland	4	22	25	14	35
Latvia	6	35	26	12	21
Liechtenstein	5	24	50	11	10
Luxembourg	10	26	34	12	17
Norway	6	22	33	28	11
Scotland	18	39	18	14	12
Sweden	16	29	27	17	11
Switzerland	5	17	37	20	21

Source: OECD PISA database, 2001, www.oecd.org

Table 4.4: Nature and location of ICT training on the Internet and multimedia for teachers (1998–1999)

(Percentage of schools in secondary education where ICT training on the Internet and multimedia are available, by location of training and type of training course, expressed as a percentage of students)

	Introductory course for Internet use (retrieve information, send/receive e-mails, etc.)		Advanced course for Internet use (e.g., creating Web sites/developing a home page, advanced use of Internet, videoconferencing)		Special course with digital video and audio equipment							
	Upper secondary education		Upper secondary education		Upper secondary education							
	In-house ICT courses available	External ICT courses available	In-house ICT courses available	External ICT courses available	In-house ICT courses available	External ICT courses available						
Czech Republic	18	20	43	16	3	10	12	16	2	2	3	6
Denmark	63	44	m	m	11	34	m	m	15	34	m	m
Finland¹	51	44	m	m	15	36	m	m	3	16	m	m
Hungary	22	45	m	m	2	27	m	m	n	13	m	m
Iceland	22	73	84	40	5	63	35	54	1	21	9	19
Italy¹	43	19	47	16	21	9	24	6	6	4	11	6

Notes: m = missing; n = negligible or zero

1. Country did not satisfy all sampling criteria.

Source: International Association for the Evaluation of Educational Achievement (IEA)/SITES. In *Education at a Glance: OECD Indicators 2001*, OECD 2001.

Large gaps between countries and regions persist in the area of training teachers to integrate information technologies in their practices. OECD data show differences in availability of basic (hardware and software) training, while all country figures drop drastically when it comes to Internet and multimedia training for teachers (see Table 4.4).

Even when there are teacher training programmes, they often focus on building ICT skills, without much attention being given to the pedagogical issues of integrating technology into teaching practices. Much more needs to be done to raise the awareness and skill level of educators to effectively use information technologies as active, constructivist learning tools.

DRIVING FORCES

The larger and more highly developed school networks in Europe have been championed by governments of the more-developed European countries, most of which are associated with the European Union (EU). Larger regional initiatives by the EU have also stimulated and promoted national government programmes. Ministries of Education often partner with business, especially telecommunication companies and Internet service providers, in their efforts to offer Internet access to schools and other educational institutions. Other initiatives have been driven by local and international non-profit organisations, which frequently collaborate with national Ministries of Education because education has been quite centrally controlled in most European countries. In some instances, however, teacher and student networks have grown somewhat independent from the national education authorities.

Large regional initiatives in the European Union

Following the EU's "dot com summit" in Lisbon in March 2000, the European Commission (EC) set out a blueprint for action called eLearning: designing tomorrow's education, which was part of the comprehensive eEurope Action Plan approved in June 2000 (see http://europa.eu.int/information_society/eeurope/action_plan/pdf/actionplan_en.pdf). This initiative of the EC seeks to mobilise the educational and cultural communities, as well as the economic and social players in Europe, in order to speed up changes in the education and training systems for Europe's move to a knowledge-based society. An eLearning Action Plan was adopted by the Commission in March 2001, setting the following objectives (see http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0172en01.pdf):

- To provide all schools with access to the Internet and multimedia resources by the end of 2001
- To equip all classrooms with a fast Internet connection by the end of 2002
- To connect all schools to research networks by the end of 2002
- To achieve a ratio of 5 to 15 pupils per multimedia computer by 2004
- To ensure the availability of support services and educational resources on the Internet, together with online learning platforms for teachers, pupils and parents, by the end of 2002
- To support the evolution of school curricula with the aim of integrating new learning methods, based on ICTs, by the end of 2002

The plan also laid out these targets:

- To ensure that all school-leavers have had the chance to become digitally literate by the end of 2003
- To provide all teachers with appropriate training, adapt teacher training programmes accordingly and introduce measures to encourage teachers to make real use of digital technology in their lessons, by the end of 2002

In May 2002 the eEurope 2005 Action Plan was adopted, to succeed the eEurope 2002 plan (see http://europa.eu.int/information_society/eeurope/news_library/documents/eeurope2005/eeurope2005_en.pdf). This Action Plan aims “to provide a favourable environment for private investment and for the creation of new jobs, to boost productivity, to modernise public services and to give everyone the opportunity to participate in the global information society” by “stimulating secure services, applications and content based on a widely available broadband infrastructure.”

In the EU, for example, the Directorate General for Education and Culture within the EC sponsors several programmes designed to improve the availability and use of ICT for learning (see http://europa.eu.int/comm/education/ntechnologies_en.html). Examples of these EU programmes include the Comenius, the Minerva Action, and eLearning. All are encompassed within the Socrates programme and its various separate actions. (Socrates is Europe’s education programme and involves around 30 European countries. Its main objective is precisely to build up a Europe of knowledge and thus provide a better response to the major challenges of the new century: to promote lifelong learning, encourage access to education for everybody and to help people acquire recognised qualifications and skills).

The Minerva Action under Socrates II (2000–2007) seeks to promote European co-operation in the field of open and distance learning (ODL) and ICT in education. The Action has three main objectives (as stated on their Web site – see <http://europa.eu.int/comm/education/socrates/minerva/ind1a.html>):

- To promote understanding among teachers, learners, decision-makers and the public at large of the implications of ODL and ICT for education, as well as the critical and responsible use of ICT for educational purposes
- To ensure that pedagogical considerations are given proper weight in the development of ICT and multimedia-based educational products and services
- To promote access to improved methods and educational resources as well as to results and best practices in this field

The Minerva Action supports numerous projects on diverse themes (cross-culturally, joint content development, lifelong learning, networks and projects supporting the ODL community, ODL integration, teacher or trainer training) implemented by educational institutions, non-profit organisations, public authorities and/or private companies in the EU.

Schools and Ministries of Education around Europe have collaborated on various other initiatives. One is Netd@ys Europe, an initiative of the EC to promote the use of new media in the areas of education and culture (see www.netdayseurope.org). The initiative encourages and supports the development of multimedia projects that demonstrate good-quality educational content, and it provides an open platform to showcase such projects and develop educational and cultural links.

eSchola is another initiative, a campaign for e-learning in Europe — an event to provide an opportunity for schools and teachers to learn together and from each other about the use and impact of new technologies in education (see www.eun.org/eun.org2/eun/en/eSchola2002_About/entry_page.cfm?id_area=245). It features @Europe, an online forum where teachers and pupils find collaborative projects, the eXplora Challenge Web-based competition for secondary school students, and the School Channel broadcasts from schools all over Europe. Other eSchola features include examples and best practices of ICT in learning, online learning events such as workshops, live chats, forums and ICT expert discussions, as well as ICT tools for the classroom presented by e-learning companies and organisations.

In addition, 23 European Ministries of Education have partnered to form the European Schoolnet for the purpose of “developing learning for schools, teachers and pupils across Europe” (see www.eun.org/eun.org2/eun/en/index_eun.html). European Schoolnet, “the gateway to education in Europe,” manages a number of projects promoting ICT in education and offers numerous resources for teachers, school leaders, pupils and policy-makers. (See the case study below for further discussion on this initiative.)

The engagement of the EC on a regional level has facilitated a greater scale of effort which individual countries may not have been able to achieve on their own. Moreover, a regional approach has enabled international networks, offering teachers vehicles for collaboration across borders and emphasising the European dimension of education. The EC has been able to mobilise resources and motivate business involvement more, and with these greater resources it has been able to develop longer-term strategies. Also, large-scale initiatives contribute to the creation of an educational market for electronic educational aids, making them more commercially viable for content developers. EU resources can address digital gap issues among European countries, stimulating development in the poorer countries, which, if left on their own, would most likely lag behind their wealthier neighbours.

National government initiatives

Individual government bodies, usually Ministries of Education, alone or in co-operation with international and/or non-profit organisations, have made various efforts to improve the ICT infrastructure of schools, connect schools to the Internet and advance the level of ICT integration into the education practices and curricula.

The European Schoolnet partner countries have developed their own national school networks. Most of these provide connection to the Internet for schools, online information on various education initiatives, education resources and Web spaces that act as hubs for collaborative projects. Here are a few examples:

- **Kennisnet** is a non-profit organisation set up by the Netherlands Ministry of Education, Culture and Science as a partnership of Dutch education organisations, business and the Internet provider community. The network is constructed and managed by Nl.tree, a joint venture set up for this purpose by Dutch cable companies where each company is responsible for connecting schools in its own service area. During 2002, more than 11,000 schools and other educational institutions, libraries, museums and content providers — a total of some 2.5 million users — were connected to the Internet via Kennisnet. The network also features the Kennisnet education portal, providing access to secure educational content for users without advertisements (see www.kennisnet.nl/portal/overkennisnet/forourinternationalvisitors).

- The Portuguese Ministry of Science and Technology has lead a national initiative called **The Program Internet in School**. The National Scientific and Research Network (RCCN) was expanded so that all grades 5 to 12 schools, cultural associations, libraries as well as some grade 1 schools can be connected to the Internet. This programme located the equipment in school libraries and “aimed at stimulating schools to use Internet for educational purposes, supporting the production of scientific and technological content” (see www.uarte.mct.pt/eng/internet-escola).
- **Írisz-SuliNet** is Hungary’s national ICT programme for school education, which since 1996 has connected every Hungarian secondary school and about 30 per cent of the primary schools in their network.

In many cases, governments co-operate with business, usually telecommunication companies and Internet providers. For instance, in April 2000, the Russian government, in co-operation with the oil company YUKOS, formed the non-profit organisation Internet Education Federation with the goal of furthering the development of Internet-education in the country. Their five-year project proposed to open Internet education centres in 50 regions of Russia, where more than a quarter million high school teachers would become skilled at utilising Internet-technologies in the teaching process (see www.fio.ru/about.php).

Other examples of national school networks are Virtual School Austria, the Norwegian Schoolnet, Slovenian Education Network, the Swiss Education Server, the Swedish Schoolnet, the Estonian Educational and Research Network and the Icelandic Educational Gateway. Countries that have established national school networks have the advantage of the economy-of-scale effect, where on a national level they can mobilise greater resources and make greater progress in offering access to the Internet and online education content to their constituents.

Initiatives by non-profit organisations

OSI

The Open Society Institute (OSI), sponsored by the Soros Foundation, has played a vital role in equipping educational institutions throughout Eastern Europe and the CIS (see www.soros.org/internet). Early in the 1990s the OSI Internet Program (OSI-IP) offered e-mail and Internet access to various institutions, including some schools. In some cases the various national Soros Foundations became service providers, offering free connectivity to educational institutions but also subsidising their connections through fee-for-service activities. In the Republic of Macedonia, for example, in 1997, OSI-IP sponsored an aggressive national campaign to provide connectivity to medical centres, universities, secondary schools, NGOs and libraries throughout Macedonia through grants of modems, e-mail/Internet servers and connectivity subsidies.

The OSI Network Library Program (NLP) (originally “Regional Library Program”) supported the development of libraries in the region through a variety of activities. Presently, for instance, OSI Macedonia is implementing the School Libraries Project, which aims to modernise school libraries by equipping them with computer technology, Internet connection and library literature and software, as well as applicable professional development programmes for school staff. During 2001 and 2002, the programme networked 16 elementary schools throughout Macedonia (see www.soros.org.mk).

There are other examples of OSI teacher professional development efforts in the area of connectivity. For instance, in 1997, OSI-IP and the Mellon Foundation co-funded an “Internet Academy” in the University in Bucharest to teach students and teachers from non-science and technical disciplines to use the Internet effectively.

In many developing countries there has been an emphasis on using school ICT “labs” as community ICT centres in order to make resources available to a larger audience. This idea has worked well in some communities, but has faced resistance in others because of the special place schools are seen to have in society and the issues presented to school management by opening to the public.

One example is the Community Centers Program South Eastern Europe, created by OSI and the Mott Foundation in support of the Stability Pact for South East Europe and based on the principles and philosophy of the OSI Youth Initiative 2000.¹ The initiative is a regional project, which aims to strengthen the efforts of the countries of southeastern Europe to foster peace, democracy, respect for human rights and economic prosperity in the region. Twenty-six centres have been established in schools and other different hosting institutions in seven countries (Albania, Bosnia-Herzegovina, Croatia, Kosovo, Macedonia, Montenegro and Serbia). These centres are to address the Priority Areas of Action set by the Stability Pact in the area of “community education,” which aims to maximise the use of resources by encouraging joint use of existing infrastructure and expertise. This goal is to use schools to promote social inclusion and democratic values, as well as to enhance co-operation between school and community, local and regional initiatives and national authorities with a view to linking formal and non-formal education (see www.osi.hu/ccp/bp_history.html).

The Soros Foundation and the Open Society Institute has also supported the development of iEARN networks in Eastern European countries. iEARN is an international network of teachers and students who engage in educational projects online with peers in their countries and around the world, although they are often not recognised by education authorities. The development of national iEARN programmes in Bulgaria, Macedonia, Romania and most other Eastern European countries has been helped by local small grants for school programmes and technology, as well as by the establishment of formal local iEARN networks as non-profit organisations. Moreover, a number of special projects have established smaller iEARN networks around particular topics. One such project is Balkan Voices, a programme of collaboration among students and teachers in the Balkan and neighbouring countries (see www2.arnes.si/~sskkssb2s).

Small-scale school network initiatives

As mentioned earlier, there are also numerous small-scale school networks, often established for more specific educational purposes, in both developed and developing countries. These networks are often products of various non-profit organisations working to “bridge the digital divide” or just utilising ICT as a tool for other educational purposes.

- **Schools Online**, an American non-profit organisation, in co-operation with local telecommunication companies (BTK, MtNet), Ministries of Education and NGOs (Svest, iEARN, IMOR), provided ICT-equipment and Internet connection for a number of schools in Bulgaria, Macedonia and Russia. A programme of professional

¹Youth Initiative Fund is a grant-giving programme offered by the Open Society Institute, New York and administered at a national level by the Euroregional Center for Democracy. The programme aims at supporting the cross-border co-operation by financing activities that bring together youth from across southeastern Europe.

development training and support was established and some efforts have been made to link schools in networks using basic collaboration forums like Yahoo Groups and iEARN. Moreover, initial efforts have been made to encourage the development of Web-based local language educational resources in Macedonia for teachers, where there is almost nothing available. Two projects have been implemented through a small grant competition: an astronomy site and an art education site.

- **Project Harmony**, also an American non-profit organisation, has established and been operating more than 150 Internet access computer centres in universities, schools and libraries in Russia, Armenia and Azerbaijan since 1996. This was accomplished mostly with the help of grants from the U.S. Department of State and other funding sources. Their Internet School Linkage Program uses the Internet to create partnerships between American and NIS high schools to work on joint school projects. Project Harmony currently manages and provides educational support to a network of over 500 NIS schools. Project Harmony has also been actively engaged in technology training programmes for professionals, educators and students, providing hands-on training, both in technical aspects and in the application of online technologies (see www.projectharmony.org/programs/internet/past/islp).
- The **Project Harmony Armenia Connectivity 2000** effort is establishing an online school network for the Armenian education system, which so far includes Internet computer centres in over 100 schools around the country. The goals of this project are to “strengthen the capacity for Armenian educators to enhance civic education and to participate in online collaborative projects with international partner schools by providing ...the educational leadership, technical equipment and support to ensure that use of the Internet is integrated into the academic programme of participating schools in a way that strengthens democracy and supports civil society and cultural understanding” (see www.projectharmony.org/am/PHSite/eng/eng_AC2K.html).
- The **Azerbaijan School Connectivity Program (ASCP)** has established Internet computer centres in 10 schools, providing training to Azeri educators. It facilitates online collaborative projects with partner schools in the United States and other countries. Project Harmony is establishing a network Web site (ASCP Online School Network) and interactive Internet space for educators and collaborators in English and Azeri languages, with links to partner school home pages, archives of civics-related curricula and online project models, interactive communication tools for online events and collaboration and links to related resources and organisations. ASCP is utilising an applications service provider called WebCrossing to create online private workspaces, chat rooms, message boards and discussion lists for Online School Network (OSN) activities. Project Harmony plans to provide ASCP participants with a dynamic central repository and venue for real-time programme interaction in order to enhance co-operation among OSN schools and partners (see www.projectharmony.az/ascp.html).

One of the major issues that small-scale initiatives face is sustainability. Information technology infrastructure and programming are cost-intensive, and without long-term planning and commitment of resources, results tend to be erratic. For instance, when an organisation sponsors a school’s Internet connection for two years, if the issue of connectivity cost is not addressed, when the project is completed chances are that the school will not have the resources to maintain the connection. A more systemic approach is necessary, where ICT becomes a priority included in the long-term planning and budgeting of school systems, ensuring the necessary commitment of various levels of society, from government leadership and school authorities to business and society in general.

In summary, several key factors emerge as the main drivers behind sustained, successful integration of ICT in education practices. The first prerequisite is an environment of sustained political and economic stability that allows authorities to focus on issues other than basic survival. This factor might be taken for granted in the developed nations of Western Europe, but it continues to be a major concern in some Balkan nations and in the CIS. Another key driver is widespread appreciation by national and regional authorities of the importance of ICT skills in improving economic and social prosperity in an increasingly information-based world. This appreciation is necessary to build consensus within and among governments on the need to commit resources to ICT in education. The various and robust EU ICT programmes are good illustrations of this. Once consensus is reached on the value of ICT, governments must commit to forming the organisational structures required for effective planning, co-ordination and execution of ICT education efforts.

Perhaps the most obvious key driver is the availability of resources — both financial and human — needed to start and sustain ICT education programmes. In many cases, local government resources for ICT in education are augmented through partnerships with industry, other governments and NGOs. When all of the relevant drivers come together, they can then promote the creation of ICT education content and materials in local languages and generate opportunities for teachers and schools administrators to access training in order to maximise the effectiveness of ICT as an educational tool.

CASE STUDY: EUROPEAN SCHOOLNET

European Schoolnet (EUN) is an international partnership of 23 EU member states and European Free Trade Association (EFTA) countries as well as partner countries in central Europe, in co-operation with the EC.² Its goal is to “provide insight into the use of ICT in Europe for policy-makers and education professionals...through communication and information exchange at all levels of school education using innovative technologies, and by acting as a gateway to national and regional school networks” (see www.eun.org/eun.org2/eun/en/index_eun_corporate.cfm). EUN also seeks to establish public-private partnerships and build long-term partnerships with companies and organisations committed to supporting educational innovation. Presently, some of its corporate partners are SUN Microsystems, Intel, IBM and Apple.

This consortium offers a number of learning programmes and online communities for teachers, students and school administrators, such as the educational portals eSchoolnet, the educational place for kids and teenagers Zap, EUN School Managers Centre (EUNSMC), European Schoolnet’s News and the EUN Community. The site also provides links to a number of EU projects addressing various aspects of ICT learning including Virtual School, myEUROPE, the European Network of Innovative Schools (ENIS), Comenius Space, eSchola, eXplora, European Treasury Browser (ETB), Celebrate, the European Schoolnet Validation Network (ValNet) and others.

eSchoolnet is an educational community featuring e-learning news, online training, European curriculum resources, school practice ideas, collaborative school projects, online learning communities and a virtual magazine (see www.eun.org/eun.org2/eun/en/index_eschoolnet.html). The collaborative tool, Virtual School, is a Web site created by teachers from different European countries that contains learning resources on various educational subjects. The School Managers Centre (SMC) addresses the

²Partner countries in Schoolnet are Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Israel, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Switzerland, Sweden, and UK.

needs of school administrators featuring, among other things, a growing community of European principals online. Safe is a project that addresses issues of Internet safety in schools, while the European Treasury Browser aims to build a “Web educational resource metadata networking infrastructure for schools in Europe.”

Some of the EUN projects aim to create and promote innovative approaches in the use of ICT for learning in the European countries. One such example is CELEBRATE, a 30-month, EUR5 million project supported by the EC, which aims to give EU schools access to a large-scale pilot of an online content repository, a collection of “learning objects” (LOs) and components that can be used to create LOs and to explore a methodology for using them for educational activities and services. A pilot database has been developed where schools can contribute and receive LOs. CELEBRATE includes 22 public and private sector partners, and in financial terms, this is the largest project yet undertaken by European Schoolnet.

The European Network of Innovative Schools (ENIS) is another EUN project, a network of more than 400 schools in national “networks of innovation” in 19 countries established for the purpose of disseminating best practices, encouraging further innovation and experiencing new organisational and pedagogical solutions.

Project EUN-CLE aims to create a multilingual international collaborative environment for young people and to bring together seamlessly a substantial quantity of multilingual content and services. Considering the multitude of official languages spoken in Europe, this is a valuable aspect of the services a regional initiative like European Schoolnet can offer, and it will be even more important when “smaller” eastern European languages join the EU.

The greatest value of EUN may be that it has conducted research and produced content, which could benefit all European countries. It has also created a place where educators can exchange ideas and experiences and learn from each other. This regional approach emphasises the European dimension of education as well.

Being a large-scale, regional initiative, the European Schoolnet has been able to consolidate resources and expertise in e-learning from a multitude of European countries and position itself well for promoting ICT in education in Europe. EUN has helped build a more viable European e-content market by establishing cross-border means for sharing content. This is particularly important for members of smaller language groups, which are spread across few national borders.

These economy-of-scale effects have also played a role in the countries that have developed their own national networks. Comprehensive national initiatives have been able to attract big players and to negotiate from a stronger position. Such networks should be able to negotiate better prices for equipment and connectivity, as well as create a more viable market for online educational content. Moreover, this comprehensive net of regional and national networks has offered educators a higher level of support in their efforts to integrate ICT into their work, as well as a sense of community and a place where they can share and learn from each other.

A lot more needs to be done, however, to level the digital gap among the various EU countries, let alone some of the much poorer Eastern European countries. The introduction of modern ICTs in education demands a dramatic shift in the way we have traditionally thought of education and the approaches used. It requires a change in curriculum and teaching methodologies, which in turn requires extensive and long-term teacher training. Education is a long-term process, and the effective integration of ICT in education requires a long-term strategy and commitment.

CASE STUDY: SCHOOLS ONLINE

The projects of Schools Online are examples of smaller-scale public-private partnerships. Driven by Silicon Valley funding sources, Schools Online embarked on an ambitious endeavour of “connecting the world, one school at a time.” It worked in partnership with other international organisations, such as World Links for Development, iEARN, SchoolNet Africa and Ritsec, as well as local NGOs, education authorities and Internet service providers (ISPs). Schools Online worked around the world, but in Europe it focused on Bulgaria, Macedonia, Russia and Spain. In Macedonia Schools Online partnered with several local NGOs – Svest, a young Macedonian organisation and IMOR, the local iEARN network.

From the very beginning the project gained the interest of the Macedonian president and the Macedonian Telecommunications Company, the main ISP in the country. The Internet business unit of the Macedonian Telecommunications Company, MtNet, was interested in establishing a large-scale, long-term collaboration with the Ministry of Education for the purpose of connecting Macedonian schools to the Internet. The Ministry of Education leadership, however, did not show much interest, and the following administration was openly hostile to the idea. As a result, the Schools Online project was mostly designed and implemented independent of the Ministry of Education, in direct dealings with participating schools. Thus, the Education Ministry missed an opportunity to establish the beginnings of a national schoolnet and take advantage of the interest of an initial outside funder and a major ISP.

Nevertheless, Schools Online and its partners managed to create a small network of schools (seven elementary and four high schools), and provide equipment, connectivity and initial professional development for teachers. Significant changes could be observed in teachers within a year of their participation. Some who started from no or very basic ICT skills at the beginning of the school year were conducting basic lessons using ICT as a tool by spring. A Yahoo Groups site is currently being used as the network’s “portal,” and the project has made considerable progress, but its full utilisation as a learning community still has a long way to go.

Small efforts were made to begin creating online content for teachers in Macedonia, where there is almost nothing aimed at developing tools. Considering that Macedonian is a very “small” language with a limited geographic footprint, and that the standard of living in the country is relatively low, it is often not commercially viable to provide locally specific content unless big players such as government or international organisations subsidise these kinds of products.

Hit by the fall of the American stock market, Schools Online has since pulled out of Macedonia. However, the local NGO Svest was able to obtain a grant from the Balkan Youth Foundation and continue efforts in other elementary schools in the country. The Ministry of Education (under a different administration) has been supportive of the project, acting as a full partner and providing the equipment (in fact, another donation from a Western European government) for nine new elementary schools. Macedonian Telecommunications is the other partner, providing free Internet connection through ISDN lines. The role of Svest is to provide programme management, professional development and support for the teachers and students in the network. Efforts are being made to encourage teacher participation in the Web group created for the purpose, as well as to offer related educational resources on the Svest Web site.

Incremental efforts such as this one have certainly made a difference in the education technology landscape of Eastern European and CIS countries. However, they tend to be short-lived due to a number of factors:

- Donors do not plan for the long-term; projects are usually limited to a small number of schools, often deepening the digital gap within the country in question.
- Technology connectivity is still relatively expensive in less-developed countries and schools cannot afford to sustain these efforts on their own after donors leave.
- Not enough attention is given to educating educators about the benefits of technology and the methods of its integration into the teaching process.
- Very little education content in the native languages is available online and small projects cannot stimulate a real market for content providers.
- School administrators and other education leaders have a low level of education technology awareness and, as a result, they do not consider this issue a priority in their planning and budgeting.

Without a comprehensive national strategy and commitment to the issue on all levels, efforts are bound to remain erratic and unsustainable.

CONCLUSION

In the last few years, most educators have faced the question of how to effectively use ICTs for learning. Developed countries have been able to address the issue and have gone farther in integrating ICT in their education systems and processes. Developing countries still struggle, limited by lack of resources, underdeveloped telecommunication infrastructure and, potentially, some educational and cultural factors.

Since primary and secondary education in most Eastern European and CIS countries is still largely state-funded and managed, it will take government awareness and commitment of the kind seen in some EU countries for more schools to gain access to the Internet and, furthermore, for Internet technologies to become fully integrated in school life as effective educational tools.

In some Eastern European countries, education reform processes are moving some of the control over schools from centralised authorities into the hands of local governments, which may change the dynamics and allow progressive municipalities to have a positive influence over the development of ICT resources in schools. This may, however, deepen the digital gap between schools, as municipality administrations are bound to command different levels of resources, entrepreneurship and commitment to advancing education in their communities.

Public and private partnerships on the international, regional, national and local level will be crucial for the development of more sophisticated structures and processes which would address current education technology needs across the region. Schools from developing countries should be offered the opportunity to join existing EU structures and resources, so that they can take advantage of what is already available, and to build their local networks on existing best practices models. Only through well-developed strategic partnerships among governments and industries will the educational technology “map” be more evenly developed, preparing European youth for the global information society before us.

