One major impediment to the successful use of ICTs to enhance education has been lack of integration: integration into the curriculum, into schools, into policies, and into educational systems as a whole. Early on in the needs analysis phase of our Programme, we found that lack of infrastructure was just the tip of the iceberg. Much of the current use of ICT in the classroom still focuses on the drill and practice type of learning, where computers are seen as tutors, rather than as tools towards engaging students in critical and interactive learning. Though teachers had been trained in the use of ICT and SchoolNet (for some countries), the integration of ICT in the teaching of subjects has been weak due to a number of reasons: (a) absence of systematic management support; (b) lack of ownership by schools; (c) lack of integration into existing curriculum and textbooks; (d) teacher overload and lack of incentives and motivation; (d) lack of ICT-based materials that are truly interactive for teachers to use; and (e) shortage of personnel.

On a wider scale, SchoolNets have accelerated the technology-based modernization of education systems and schools. They have helped address the digital divide by mobilizing the telecommunications and IT sector to reduce telecommunications costs and offer free Internet connections through various arrangements. This has led to an expansion in the number of schools which can make telephone calls and connect to the Internet; lower student-computer and teacher-computer ratios; and better access for teachers and students to computers through more open access areas and local-area/wide-area networking.

SchoolNets - Integrating ICTs in Education, from Policy to Classroom

The project Strengthening ICT in Schools and SchoolNet Project in ASEAN Setting was set up to address these needs. SchoolNets have such transformative potential largely because they combine many different ICT integration elements. They can include nationwide or international networks of schools, teachers, parents and resources; forums; databases; teacher training; interaction among students and teachers; collaborative projects between schools and nations, and much more. Students can become engaged in exploration and simulation. Teachers can use ICTs for administrative and assessment purposes, as well as to enliven their teaching and share resources, inspiration and challenges with other teachers. SchoolNets have networked educators and communities that otherwise have neither the tools nor the time and money to get together to connect for dynamic partnerships.

On a wider scale, SchoolNets have accelerated the technology-based modernization of education systems and schools. They have helped address the digital divide by mobilizing the telecommunications and IT sector to reduce telecommunications costs and offer free Internet connections through various arrangements. This has led to an expansion in the number of schools which can make telephone calls and connect to the Internet; lower student-computer and teacher-computer ratios; and better access for teachers and students to computers through more open access areas and local-area/wide-area networking.

Key Themes

I. One major impediment to the successful use of ICTs to enhance education has been lack of integration: integration into the curriculum, into schools, into policies, and into educational systems as a whole. Early on in the needs analysis phase of our Programme, we found that lack of infrastructure was just the tip of the iceberg. Much of the current use of ICT in the classroom still focuses on the drill and practice type of learning, where computers are seen as tutors, rather than as tools towards engaging students in critical and interactive learning. Though teachers had been trained in the use of ICT and SchoolNet (for some countries), the integration of ICT in the teaching of subjects has been weak due to a number of reasons: (a) absence of systematic management support; (b) lack of ownership by schools; (c) lack of integration into existing curriculum and textbooks; (d) teacher overload and lack of incentives and motivation; (d) lack of ICT-based materials that are truly interactive for teachers to use; and (e) shortage of personnel.

II. On a wider scale, SchoolNets have accelerated the technology-based modernization of education systems and schools. They have helped address the digital divide by mobilizing the telecommunications and IT sector to reduce telecommunications costs and offer free Internet connections through various arrangements. This has led to an expansion in the number of schools which can make telephone calls and connect to the Internet; lower student-computer and teacher-computer ratios; and better access for teachers and students to computers through more open access areas and local-area/wide-area networking.

Project in Action

Seeking to harness the transformative power of SchoolNets, UNESCO Bangkok is implementing the SchoolNet Project, focusing on integrating ICTs within schools, developing content, and facilitating greater knowledge sharing through the SchoolNet network. Co-funded by the ASEAN Foundation and JFIT, the Project is creating equal opportunities in education for the ASEAN countries by:

- Exploring and demonstrating how ICTs can be used in schools to improve the quality of education for all, and better prepare youth for the demands of the knowledge society
- Testing innovative models of ICT use and of ICT-based teacher education teaching-learning methods, and curriculum/materials development in schools and in other places of learning
- Improving connectivity and access to the wealth of educational resources through the establishment of SchoolNet in ASEAN countries

The MOA for the pilot testing of the SchoolNet Project was signed on 15 December 2003 at the one-day “South East Asian ICT Advocacy and Planning Workshop for Policy Makers and National ICT Coordinators” by high officials of eight countries: Cambodia, Lao PDR, Indonesia, Myanmar, Malaysia, Philippines, Thailand, and Viet Nam. Thus far, National Coordination Teams have been established for each country, master-plans identifying entry points in three subjects have been developed, and workshops have been organized.
SchoolNet Toolkit

Laid out in four substantive guidebooks, the toolkit is aimed at policy and decision makers, school managers, practitioners, teachers and principals. Guidebook One provides a general overview, and discusses how ICTs can improve the quality of education. Guidebook Two looks at planning a SchoolNet programme, in terms of infrastructure, training, online content, and curriculum integration, etc, as well as how to integrate change management, how to sustain SchoolNet activities and how to better institutionalize programmes. Guidebook Three is more hands-on and practical. It targets people running the projects – focusing on creating online communities, technological components and professional development. Guidebook Four is for practitioners, setting out the typical processes which they may follow.

Hardcopy: Write to ikm@unescobkk.org

Integrating ICTs into Education: Lessons Learned

This practical guide synthesizes and analyses countries’ efforts to integrate ICTs into their education systems in connection with specific lessons learned, based on the experiences of six Asian countries: Indonesia, Malaysia, Philippines, Singapore, The Republic of Korea and Thailand. Best practices are highlighted, along with the need for further improvements. This distilled knowledge is aimed at providing a key foundation and framework for setting up ICT for education programmes, with lessons grouped into eight thematic sections: (i) broader environmental context, (ii) policy and regulatory environment, (iii) management and financing, (iv) ICT in schools – policy, vision and strategy, (v) technology infrastructure and connectivity, (vi) curriculum, pedagogy and content development, (vii) professional development, and (viii) monitoring and evaluation. These components can provide the basis for the development of tools and blueprints to guide policy formation and programme improvements. The publication also serves as an advocacy tool to gain the support of policy makers and other stakeholders for the appropriate use of resources to support the integration of ICT in Education.

Hardcopy: Write to ikm@unescobkk.org

SchoolNetworking: Lessons Learned

This collection of lessons learned on the operations of SchoolNets provides a synthesis of the rapidly growing body of experiences and innovative strategies from countries in the Asia and Pacific region.

Hardcopy: Write to ikm@unescobkk.org

Integrating ICTs into Education: Analytical Catalogue of Key Publications

This catalogue contains detailed principles and strategies to help educators and other stakeholders use ICTs in ways that can transform their teaching practice, based on experts’ experiences of what does, as well as what does not, make for successful integration of technology in education. The strategies and guidelines also extend to school administrators, local educational leaders and government stakeholders, with case studies describing educational policy reforms with explicit ICT components, as well as government bodies developing ICT-based resources and connecting their national curriculum to technology standards. This issue shares the best of both print and Web publications, as well as CD-ROMs, dealing with: General Principles and Strategies for Integrating Technology in Education and the Curriculum; Integrating Technology into the Classroom and Developing Lesson Plans that Integrate ICTs; Technology Integration into Specific Subjects; Requirements for and Barriers to Effective Technology Integration; Evaluating Effectiveness of Technology Integration; and Successful Case Studies of Technology Integration in Schools.

Hardcopy: Write to ikm@unescobkk.org

Case studies

Case studies on the integrated use of ICT in Education and SchoolNet from six countries, namely Indonesia, Malaysia, Philippines, Thailand, Singapore and The Republic of Korea, describe many lessons learnt, and contain valuable tips and pointers for future projects.

SchoolNetworking: Lessons Learned

COMPONENT 5: Curriculum Integration, Content Development and Knowledge Management

Lessons learned

Based on the experiences of the six countries with respect to curriculum integration, content development and knowledge management under a SchoolNet programme, the following are the lessons learned:

1. Curriculum Integration
   Curriculum integration is a complex facet of SchoolNet operations that requires experimentation and creativity on the part of teachers who, in the first place, should receive adequate theoretical and practical training in curriculum and courseware development, among other topics.

2. Pedagogy and ICT Integration
   As the pedagogy shifts from being teacher-centred to being student-centred, there is a greater need for teachers to structure the learning experience and to provide guidance and supervision.

3. Contents of SchoolNet Website
   The contents of SchoolNets can be rooted in the mandate of the national ICT policy of individual countries and/or the national curriculum.

   To ensure the relevance and educational value of the contents, particularly material in the national language, curriculum development is assigned to professional content developers, or alternatively to subject specialists, qualified teachers, school administrators and students working as members of a team.

Issue: Curriculum Integration

The integration of teaching and learning materials used in the SchoolNet in the national or sub-national curriculum enhances the long-term value and viability of a SchoolNet, while also helping to strengthen the implementation of the national policy on ICT use in education. Typically, the subjects most involved are science, mathematics and language. In effect, curriculum integration has made teaching and learning through SchoolNets more interesting and appealing.

Indonesia: The toughest task for teachers working on SchoolNets was to design and develop ICT-based lessons. To ease the problem, further training in interactive multimedia technology, in addition to training in computer technology and the Internet, was conducted for vocational secondary school teachers. The topics covered included graphic design, sound, video and storyboard, tools and peripherals for multimedia acquisition, and presentation.

Malaysia: Teachers, educators and MOE officials, collaborating as courseware development consultants, have been largely responsible for integrating teaching and learning materials used in the Smart School Network, in the national curriculum. During negotiations for the pilot project agreement, the MOE required a one-to-one matching of courseware with curriculum specifications in response to the teachers’ assertion that anything that departed from the curriculum would not be of good use in the classroom. Courseware for Bahasa Melayu, English Language, Science and Mathematics was developed according to specifications in the national curriculum for these four subjects.

The Smart School Pilot Project also demonstrated that in order to foster greater use of SchoolNet materials by teachers and students, it is imperative that these materials be in line with the national curriculum.

Philippines: Through professional development workshops, teachers learn how to create structured lessons and projects in specific learning areas, such as Science, Mathematics, English, Pilipino (the national language) and Social Studies. They also learn how to integrate lessons across different learning areas in the curriculum, and how to design inquiry-based activities, such as online treasure hunts, Webquests, and telecollaborative projects. Starting in 2003, curriculum integration training for teachers and post-training pedagogical support have been intensified.

This publication can be downloaded from webpage: http://www.unescobkk.org/education/ict/v2/info.asp?id=17377
Integrating ICTs into the Curriculum: Analytical Catalogue of Key Publications

This publication is the first in a new Catalogue Series that will come out twice a year on topical issues dealing with various aspects of ICT use in education. The purpose is to share the best of the wealth of materials available in our library collections, the Internet and other sources, and to alert readers to the contents and where they can be accessed. The series not only provides abstracts synthesizing the content of each resource, but also excerpts substantive and useful parts of the book or electronic document. Each entry provides a distillation of the content in order to give readers the essence of the information, without having to read the entire book, and includes bibliographic details, abstracts, excerpts, and key-words for easy referencing.

This first issue deals with integrating ICTs into schools. Many teachers have been using ICTs as productivity tools, but have never really authentically integrated these technologies into subject teaching. There is a need to learn from concepts, principles, strategies, and experiences as to what makes successful integration of ICTs, and what makes for unsuccessful integration. For this reason, the catalogue contains detailed principles and strategies to help educators and others use ICTs in ways that can transform their teaching practice, based on experts' experiences of what does, as well as what does not, make for successful integration of technology in education. The strategies and guidelines also extend to school administrators, local educational leaders, and government stakeholders, with case studies describing educational policy reforms with explicit ICT components, as well as government bodies developing ICT-based resources and connecting their national curriculum to technology standards. This issue shares the best of both print and Web publications, as well as CD-ROMs, dealing with: General Principles and Strategies for Integrating Technology in Education and the Curriculum; Integrating Technology into the Classroom and Developing Lesson Plans that Integrate ICTs; Technology Integration into Specific Subjects; Requirements for and Barriers to Effective Technology Integration; Evaluating Effectiveness of Technology Integration; and Successful Case Studies of Technology Integration in Schools.

SECTION 2
Integrating Technology into the Classroom and Developing Lesson Plans that Integrate ICTs


Type
Online article

Abstract
This article is aimed at the teacher confronted with emerging technologies but with no experience in using them in the classroom. The author emphasizes the correlation between learning new skills oneself and feeling comfortable enough to integrate them in student activities. For example, the teacher can become familiar with using e-mail, and then confidently devise language-based tasks for the students where they send each other e-mails. Starting with simple technologies and activities is encouraged, while the teacher should base his or her choice of ICT on its particular pedagogical function, rather than on the technical skills it may foster. Children's development of ICT skills will automatically follow as a result of using technology in the class, especially when working together on collaborative projects. In addition, working collectively with ICT on guided projects develops skills such as critical thinking, how to receive feedback, reading, writing and communication skills, and organization and planning strategies.

Finally, like so many discussions of the subject today, this article emphasizes the changing role of the teacher, as he or she moves from instructor to facilitator, while underlining that the teacher still has a vital, if re-oriented, role to play in student learning experiences.

Excerpt
Overview of 6 principles
1. Do not be afraid. Computers might look difficult, but anyone can learn to master them. All teachers can find ways to use ICT in the classroom, as long as they make sure they can cope with it.
2. Make a simple start. Start with very simple ICT-projects in your class. Only projects where you can solve the problems will be a success. Later on, with more experience, your projects can become more complex.
3. Make combinations. ICT projects are not necessarily extra lessons in your curriculum. Think about making combinations with your normal lessons. This will give you better control of the project, and thus it will increase the chance for success. Furthermore, you have a back-up plan. It might also save you time.
In Cambodia, while there is currently some multimedia and ICT in schools, computers in the classroom have not yet been fully implemented. The number of computers is still very low, with just 1,000 computers in schools and education offices across the whole country. Until 1994, computers were virtually non-existent in schools. ICT started being used in 1997 through the private sector. The Government is trying to provide PCs to each school, but the 1,000 computers are used mostly for administration. The MOE is implementing ICTs in 24 offices, for the use of 3,000 managers, but will later extend to 183 districts and a further 2,000 staff. The nation is also using mobile resources to reach the more disadvantaged areas.

Lao PDR started implementing ICT in Education with a variety of international funding agencies. Three ethnic minority boarding schools have been established with money donated by the Vietnamese Government. Each school has ten computers and textbooks for basic computer skills. As yet, these schools lack a connection to the Internet. In addition, two “Smart Schools” have been set up with money from the Malaysian Government. Each school has 20 computers, interactive learning software, courseware based on interactivity for self-paced learning, educational software in English, Internet access and one server. The project will shortly be extended to another secondary school. Four Internet Learning Centres were set up with support from the Jhai Foundation. Each centre has ten computers and a manual for basic computer skills in Lao language for students and for teacher training. Internet access is usually at 56Kbps, but is slower in some areas where they have to use dial-up. Grades 9-10 are taught computers. These services will later be extended to another secondary school with funds from World Links. Later the schools will earn their own income from the centres and become sustainable.

In Myanmar, multimedia has been integrated into schools since 1998. The term “multimedia” here includes audio systems using cassette and head-phones, though most have language labs, videos and VCDs, and computers. Almost all secondary schools are installed with multimedia facilities and 100 high schools were connected to the Internet in 2002 thanks to state funding. The cost of connectivity is very high, but the connection is good. Some schools also have a local network. The Institute of Computer Science was established in 1998. In addition, 455 education e-learning centres have been set up, as well as three pilot smart schools, one of which the Malaysian Prime Minister opened in 2002. There is online learning for non-formal education (NFE). Apart from the audio language labs and video equipment available in all primary and secondary schools, computer-assisted instruction (CAI) is conducted in all subjects, though especially in science and maths. Video CDs and computer CDs for interactive learning have been produced and distributed by the Myanmar Educational Research Bureau (MERB), while various lectures are available on VCDs for high school students. Teachers have also tried to develop their own tools.

In Viet Nam, compulsory computer courses were conducted in senior secondary schools from 1993-1997, but these were stopped from 1998-2001 because of a change in policy. The courses were started up again in 2002 in primary and secondary schools. There is also an optional training course at the junior high level. The Government organises an ICT Olympia of Informatics. Other achievements in this area include the development of EMIS online, heralding a new generation of education management. It is hoped that the e-learning system will help move away from traditional education to a more advanced stage, making education available anywhere, anytime for anyone, and providing flexible, lifelong learning and open learning. Content authoring tools have been developed, and there has been training for content and course developers, administration, and technical staff. As for connectivity, some universities have leased lines, while a few schools have ADSL. By the end of 2005, the Government hopes to have connected half of all secondary schools, and is also setting up LAN in schools. With the target ratio of 20-30 pupils/PC, one million PCs will be needed for the next three years. In the future, each family will have at least one PC. In July 2003, an agreement was signed with an electricity company who wants to
provide fibre optic connectivity free of charge for all universities for the first year. Since the lines already exist, the cost to put in optic fibres is minimal.

Indonesia has also been busy of late improving infrastructure and connectivity. Rolling grants have been provided to vocational schools to build local area networks (LAN) and provide Internet connections for 50 schools. City-wide area networks have also been established in 18 cities, connecting schools in the cities into a network under the WANKota project. A block grant has been provided to 248 schools for the utilization of ICT in schools. The Associated Schools Project Network (ASPNet) connects 24 schools associated with the UNESCO Project through the Internet. Many schools have PCs and modems, and the majority of schools in urban areas also have computer lab facilities and computers connected to LAN and the Internet, most often using dial-up. Around 70% of schools have their own website. Awareness is being raised about the importance of integrating ICTs, but it is still limited.

The Malaysian Government believes that ICT should not only be regarded as another subject in the curriculum, but rather, as tools that teachers and students may use in the learning environment, as well as in their everyday lives. A pilot project was run in 87 schools using the Smart School management system and integrated components. The project ended in December 2002; by 2003, all schools were Smart Schools. The roll-out plan has its first phase from 2004-5: 100 million schools will become Smart Schools, and another 200 will become Smart Schools in 2005. Courseware was developed in four subjects, but the SchoolNet pilot will involve five subjects. The infrastructure for Smart Schools in the pilot project is implemented in three levels: 1) the lab model, of fast backbone with a leased line; 2) the limited classroom model; and 3) the classroom model, with three servers, more computers, etc. The plan is to achieve a ratio of 1:10 of computers to students for the roll-out. Each individual teacher who teaches science and maths in English is provided with a laptop for lesson planning and actual teaching using the courseware provided. All schools are using the Government as their network provider.

In the Philippines, an education modernization programme is being undertaken to equip schools with facilities, equipment, materials and skills, and to introduce new learning/delivery systems that would capitalize on recent technological developments. Over 64% of high schools have a PC lab with 10-20 computers - some with servers, and some with Internet connections. There has been a shift from teaching about technology to teaching with technology. ICT is being integrated in all subjects to improve the overall quality of learning. Most teachers are using ICTs for teaching as well as for administration. Most students use ICTs for learning, yet the overwhelming majority of schools are not connected. Good practices in the Philippines include: the ICT in Basic Education Curriculum (BEC); the DepEd Computerization Programme; PCs for Public High Schools (PCPS); Outsourcing through the Adopt-A-School Programme; Intelligent Computer-Assisted Instruction (CAI) in English, Maths & Science; the Intel Teach to the Future Programme; Orientation of School Heads on Efficient & Effective Management of Technology Environment in the School; and Awards for Excellence on Best Practices in the Use of ICT in Teaching & Learning. As part of Pilipinas SchoolNet, teachers have been developing tele-collaborative projects, many of which are multi-disciplinary.

As for infrastructure and facilities in Thailand, all secondary schools have had computers at a ratio of 1:54 since August 2003. Seventy-one percent also have Internet access. By the end of 2005, all primary schools will be equipped with computers. Successes of note include the MOE-initiated One District, One Dreamed School Project (ODODS) since 2003. This project involves ICT implementation in 921 schools at all levels from administration to e-learning. The IPST project Handheld Technology for Teaching/Learning Science and Maths in 1999 involved seven pilot schools; sensors (probes); data loggers; computer interfaced lab for physics, chemistry, biology; and a graphic calculator for maths.

This publication can be downloaded from webpage: http://www.unescobkk.org/education/ict/resources/JFIT/schoolnet/decrreport/wholedoc.pdf