



UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

ICTs FOR SECONDARY EDUCATION

SPECIALIZED TRAINING COURSE



UNESCO INSTITUTE
FOR INFORMATION TECHNOLOGIES IN EDUCATION



MOSCOW 2005



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UNESCO
UNESCO Institute for Information Technologies in Education (IITE)

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ICTs for Secondary Education. Specialized training course

Acknowledging the main urgencies and trends in the prior UNESCO IITE Position Paper *Information and Communication Technologies in Secondary Education* (http://www.iite.ru/img/upload/Position_paper.pdf), this ICT training course concretises the main lines in a comprehensive rationale both at the level of policy-makers and school leaders, teachers and students.

It also outlines the learning tools that guide both teachers and students to the new learning skills, its needed awareness and learning attitudes. These are necessary for the new citizens of the new knowledge society and knowledge economy.

It exemplifies a line of exercises, project templates, and didactic measures around ICT-based learning tools.

Finally it sketches scenarios for integrating WWW-based learning communities in secondary education.

The course consists of five modules. Modules 1 and 2 focus on the policy-makers and school leaders. Modules 3, 4, and 5 address the specific mind-change for the heads of schools and teachers.

It is strongly recommended that the policy-makers follow all five modules to have, in the end, a full understanding of the whole chain.

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The opinions expressed in this course are those of the authors and do not necessarily reflect the views of the UNESCO Secretariat.

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INTRODUCTORY NOTES

In line with the “new learning approach”, the target audience has a chance to make up its mind based on the inspiring new perspectives given in the course in combination with personal experience and group discussions.

- The course content must be conquered through experimentation, reflection, and conceptualization.
- The instruction material is a start to rethink learning methods and approaches. Clearly identified learning objectives will help the target audience elaborate the skills on the subject after the course is finished. The overall idea is that ICTs are essential for the *future* of students and, therefore, we must adapt schools to ICT methods and thinking. The only way here is to do like this: to learn it is to *do* it.

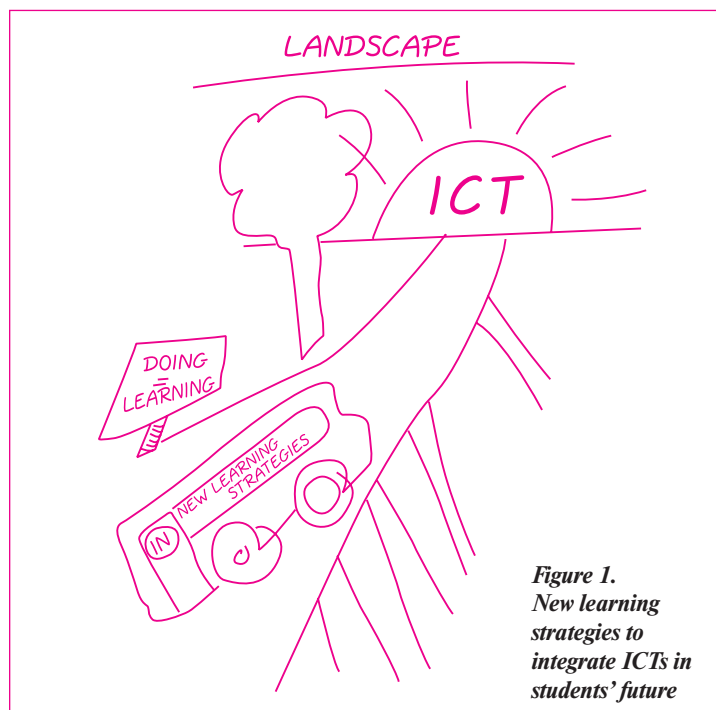


Figure 1.
New learning strategies to integrate ICTs in students' future

Aim of the training course

The goal of the training course is that you as an education practitioner (teacher, school manager, or policy-maker) develop affinity with the coming integration of ICTs in school life.

Please do not expect it to be a “waterproof” cookbook that guarantees you will find solutions for diverse practical situations. It is a panoramic overview of the mountains, valleys, and turbulent rivers that will take you in unknown directions. In fact this course helps you start learning like your students are supposed to.

It is the task of the training course to sketch the conceptual outline of how traditional teacher-oriented schooling will gradually evolve in learner-oriented education, transform en route for a community where students and teachers manifest a culture for continuous learning, and add understanding.

Please note that the course and subsequent training modules deliver a course template rather than a full curriculum. A complete curriculum would defy the message of the earlier studies that showed that ICTs are not a ready-fixed menu; they are a generic approach to revitalize existing

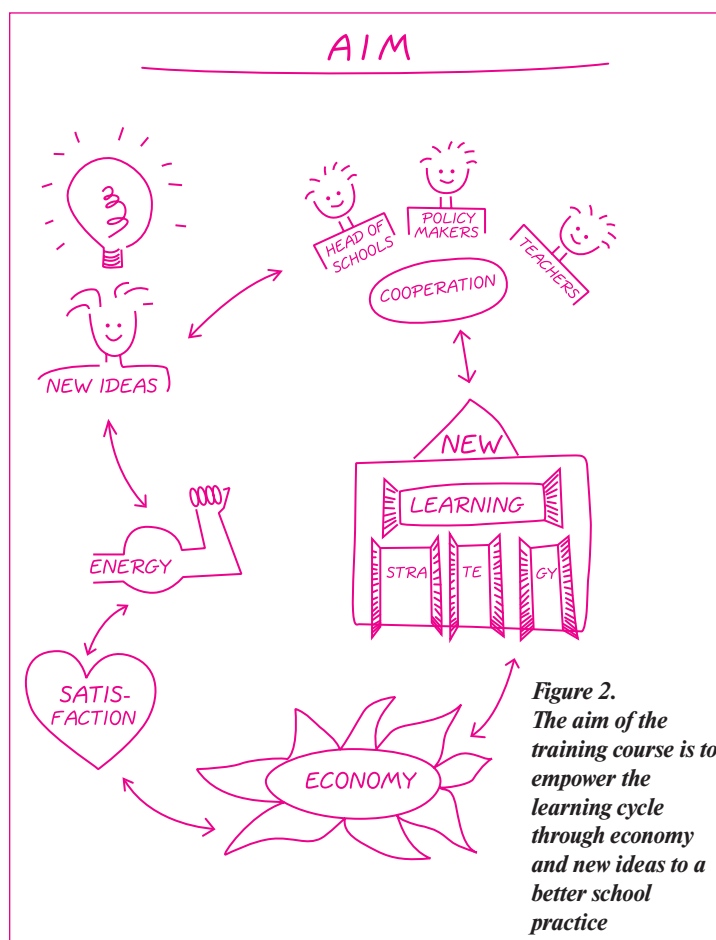


Figure 2.
The aim of the training course is to empower the learning cycle through economy and new ideas to a better school practice

INTRODUCTORY NOTES

school practices: on the one hand, ICTs possess an immediate attractiveness; on the other, they complicate the educational process. To be precise, ICTs show numerous solutions to improve learning; however, they bring numerous unforeseen problems to teaching as well.

The goal of the training modules is to clarify that secondary education is vital in upbringing of future citizens. The materials of the course illuminate how new learning methods emerge, how schooling institutes attempt to accommodate these trends.

Content epitome

Evergrowing teachers' desire to use ICTs in everyday practice is based on the assumption that they can improve the classroom performance. It is a matter of sketching the contours of teaching in secondary education for the next generation. The training course is built on the recent findings that due to social, economic, and technological developments the alternative learning scenarios must be considered. Gradual integration of ICTs is the best way out: play with new ICT tools and feel their effects on your thinking, imagination, and, finally *on your way of learning and teaching*.

Target audience

The course is meant for educators of all levels starting from schoolteachers up to high-level policy-makers. The training course is especially important for those who are unfamiliar with the web-based and self-oriented learning yet.

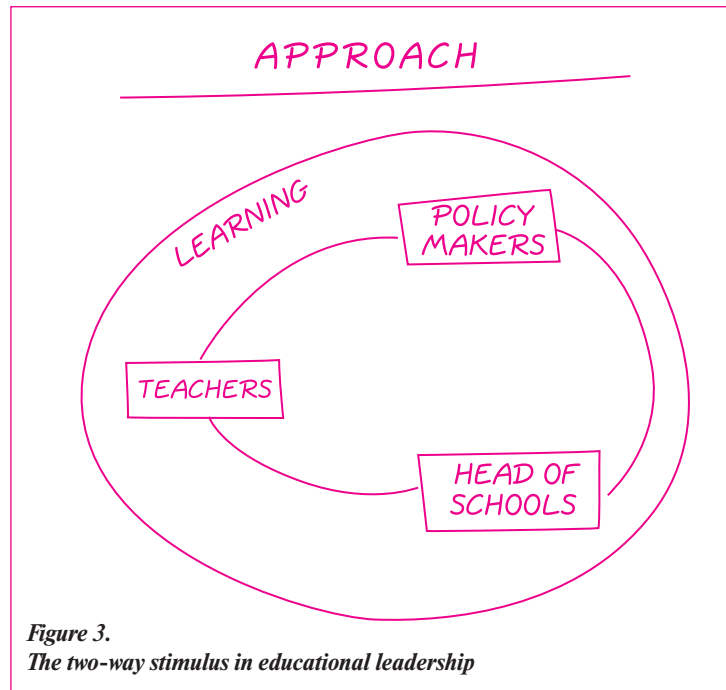


Figure 3.
The two-way stimulus in educational leadership

Level of preliminary knowledge of participants

Basically the ICT potential for educational renovations is understood as an open mind to explore and discover. In order to follow the links to several web pages reading English is recommended.

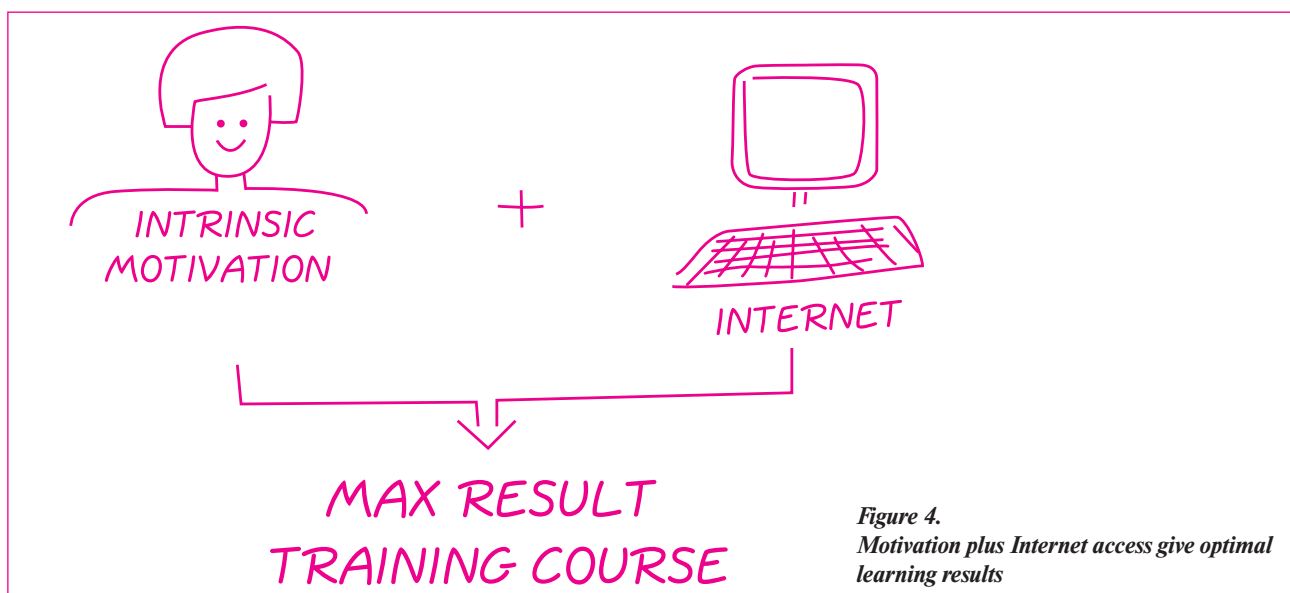


Figure 4.
Motivation plus Internet access give optimal learning results

Brief description of the training course modules

Modules 1 and 2 present the state-of-the-art and beyond from a policy-maker's point of view. Modules 3, 4, and 5 disclose the state-of-the-art from a teacher's point of view. These modules are important for policy-makers to shape a clear understanding of what will happen in daily life.

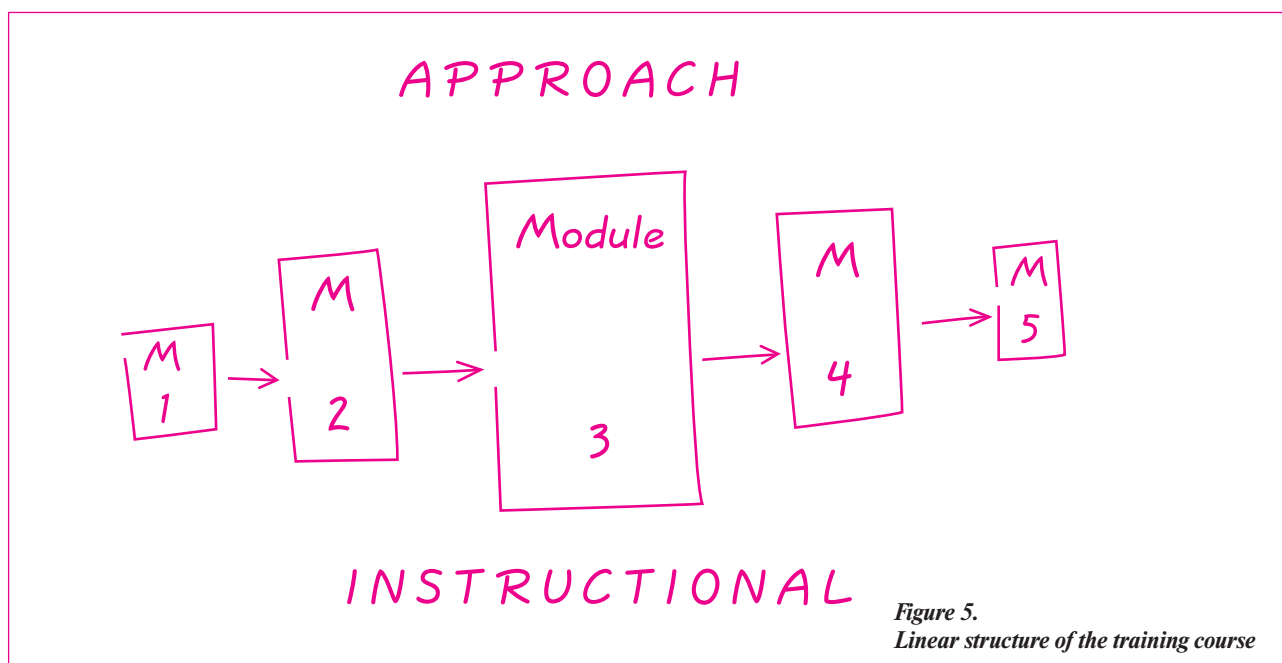


Figure 5.
Linear structure of the training course

Module 1. Road map toward “Learning Schools”

Teachers are key players to arrange learning. Quite logically the teacher training is the solid moment to start the innovative process. So far the paradigm has assumed that teachers must be taught as they are supposed to teach. The dilemma of bringing teachers and future teachers to a new didactic method, like integration of ICTs, means that they themselves have been taught in plenary, discursive, non-ICT supported ways.

Module 2. Education in information age

What is the role of education for a society development in Information Age? What ICT means are required in education to meet the claims of a modern society? What are the main features of ICT-mediated teaching and learning? What is the place of ICTs in the overall spectrum of modern didactic methods? What are the main features of teachers' ICT competence to provide appropriate knowledge and proficiency?

Answers to these and many other questions of modern education development are the subject matter of the course and Module 2, in particular. It delivers an in-depth review of new strategies and tactics that aims at the learning progress for successful involvement of new generations in Knowledge Society.

Module 3. Use ICTs to learn

Once you find you are no stranger any more in your computer system, you might use the computer to learn something different, for instance, about ... *learning*. The doors to enter are “Interest/curiosity” plus “Asking questions”. Learning can no longer be viewed as a ritual that a human engages in during the early part of his/her life only.

Module 4. ICTs help teachers learn

Exactly because of the actual mismatch between traditional teaching methods and the predominant learning methods, which take the advantage of ICTs, teachers have a chance to learn from this new trend in-depth. The traditional way of teaching is the product of a long evolution, and indeed is quite rewarding and efficient for the uni-

form classroom-based learning. Its basic paradigm implies that teaching is *giving* the knowledge and learning – *receiving and reproducing* it.

We do have alternative models for learning. They rest on the idea that learning needs an *active* rather than a *receptive* approach.

A more fundamental alternative paradigm is that knowledge essentially can't be transferred; it needs to be conquered through experimentation, reflection, and conceptualization.

Module 5. ICT projects in education

Any explicit collaborative work that aims at improving conditions for learning with the help of ICTs can be listed here. The purpose is not to make a full inventory of possible approaches; even the most important ones won't be listed. The goal is to bring you as a part-time cybernaut in the right spirit to come across appropriate projects and partners so that you may find exactly the needed one for your classes. The examples given will be diverse so that you will soon see what direction your project may take.

Requirements for training delivery

General

Having ICT tools available during the training session is the starting point of the course. However, we realize that it is not always possible. Therefore, the training material is developed in such a way that the course is applicable when the Internet is inaccessible.

Instruction material

Instruction material is a basis to rethink learning methods and approaches. Fundamental idea is that the implementation of ICTs in secondary school requires a “new learning approach” (Modules 1–2).

For this part of the training module to have ICT tools is not absolutely necessary.

Another part of the training course (Modules 3–5) focuses more on the hand-on experience using the Internet. However, this module can be used without Internet access, as a preparation for future activities of the participants after the training course is done.

Exercises

The exercises are a part of the course.

When Internet access is required the following icon opens the exercise:



In Appendix 4 the participants can find an overview of the results of search actions. It can be helpful when the Internet is unavailable.

Assignments

The assignments assume the Internet is available. However, if it is inaccessible, the participants should work out the scenario on paper. It is then the task of an expert to be a paring partner and replace the Internet in the best possible way.

Evaluation of training outcomes

After this training course the participants are able to:

- Recognize and disseminate the main urgencies and trends of ICTs in secondary education;
- Use new learning skills, knowledge, and attitudes to comply with new-coming knowledge societies and knowledge economies;

- Start to develop scenarios to integrate ICT tools in educational practice;
- Implement a curricular line of exercises, project templates, and didactic measures of ICT-based learning tools;
- Understand the relevance of web-based communities.

Recommendations for the training organization

- The training organization should provide a qualified moderator able to guide the mental process of the target audience. He/she must facilitate the target audience with the learning environment described in Modules 3, 4, and 5.
- Prior knowledge of ICTs is welcomed.
- If necessary, a moderator must be able to demonstrate the Internet access to the information in the module.
- The moderator must be a member of web-based learning communities/organizations listed in the course. Prior to the course, he/she should update the web links/information and help the target audience with the links to the situation at the moment.

Time requirements

- Modules give the state-of-the-art and further directions in combination with assignments.
- It is up to the training organization to balance the assignments regarding the time available and specific goal of the training.

Meaning of icons

In order to have a quick look at the exercises the following icons will recur throughout Modules 1-5.



Study the material



Write down



Discuss



Search on the Internet

MODULE 1. ROAD MAP TOWARD “LEARNING SCHOOLS”

1.1. Teachers’ Attitude



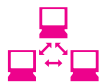
Teachers are key players to arrange the learning. Quite logically the teacher training is the solid moment to start the innovative process. So far the paradigm has been that teachers must be taught as they are supposed to teach. The dilemma of bringing teachers and teacher students to a new didactic method, like the integration of ICTs, is the fact that they themselves have been taught in plenary, discursive, non-ICT supported ways.

The process of intensifying teacher attitudes to use ICTs in the learning process grounds on the fact that alternative assessment methods being developed nowadays predict classroom performance of pre-service teachers. E-communities are becoming widely used to discuss staff development and teacher training. An example of such organization is EDEN: European Distance and E-learning Network (<http://www.eden-online.org/eden.php>).



Make a list of

- The most important new skills that teachers must learn.
- The most important attitude a teacher must acquire.
- The most important priority of a teacher regarding a class.
- The most important priority of a teacher regarding an individual learner.



Explore EDEN: European Distance and E-learning Network, <http://www.eden-online.org/eden.php>.



Write down your first impression of the service.

- Does this service offer you specific help to (re)structure secondary education with ICTs?
- How does it approach teacher training?

1.1.1. ICTs in Secondary Education: UNESCO IITE Position Paper



Acknowledging the main urgencies and trends of the UNESCO IITE Position paper *Information and Communication Technologies in Secondary Education* (Kinelev, Kommers, Kotsik, 2004) (http://www.iite.ru/img/upload/Position_paper.pdf), this course concretize the main lines in a comprehensive rationale. The learning tools guiding teachers and students to the new learning skills are outlined, as well as needed awareness and learning attitudes. These are necessary for the citizens of new knowledge society and knowledge economy.



Two main learning strategies are:

1. Learn facts and figures.
2. Learn to apply existing knowledge to solve unknown problems and situations.
Which one benefits most from the drill and practice of ICT learning tools?



Given the successful industries and smaller enterprises have to be highly flexible in the coming years, it is clear that schooling must make students ready for this process. Please write down your role as a teacher in future knowledge economy.

1.1.2. Learning Cultures



Central notion is the evolving culture of learning that is shaped by ICT tools and methods. In order to enable you to experience the shift of the opinion on what you consider the appropriate learning and teaching, please consult the advisory resources of Instructional Development Centre (IDC) at Queens’ University (<http://www.queensu.ca/idc/idcresources/handouts/main.html>).

Its mission is to provide services and programmes to support the instructional development activities of individual teachers and academic units; and to encourage university policies and practices that promote good teaching. Its learning culture is still free from typical ICTs and may resemble you before reading this course.

However, we predict your sensation as you consult the same web site after reading this report being slanted by the exposed ICT learning culture.



Look at the following situations:

- A. The teacher is giving a lecture. The learners listen and make notes.
 - B. The teacher is keeping order in the classroom. The learners make exercises.
 - C. The teacher is coaching. The learners are working on a project in groups.
- Which situation is the best to stimulate the learner to be an active learner?
 - Which computer programme do you know that supports situations A, B, or C?



Explore <http://www.queensu.ca/idc/idcresources/handouts/main.html>



How do IDC resources provide services and programmes to support the instructional development activities of individual teachers and academic units?

1.1.3. "Learning Teachers"



ICTs are a nice mode to mobilize teachers' creativeness and make their didactic practice more flexible and ingenious. One of the new teachers' roles is that of a facilitator: a person who fosters and stimulates a learner. Networks of teachers stimulate the exchange of best practices, and are of multicultural character and self-appraising. Teacher training is crucial for laying a road map toward "learning schools" via "learning teachers". The dominant paradigm so far is that teachers need to be taught likewise they are supposed to teach later. The dilemma of bringing teachers and would-be teachers to a new didactic method, like the integration of ICTs, comes from the fact that teachers themselves have been taught in traditional ways for many years.

Intensified teacher's desire to use ICTs in the learning process nowadays is sustained by the fact that alternative methods of assessment are developed to decide whether to permit teachers to work on the basis of their expected classroom performance.



Which is the best way to stimulate learners?

- Good grades
- Attention
- Making a link to a learner's interest/real life situation
- Punishment
- Competition



This course focuses on teacher training, and the road map toward "learning schools" via "learning teachers". The dominant paradigm so far is that teachers must be taught like they are supposed to teach later. Discuss the consequences for you as a learner. Describe the change in the attitude that is expected from you as a learner.

1.1.4 New Roles in Teaching



E-communities become quick and popular ways to discuss staff perfection and teacher training. Alongside with the role of ICTs as a learning tool their potential role in the teaching process has come into focus. Remarkably, so far the ICT support for a teacher has not been focused on the didactic integration of cognitive learning tools; more interest has been paid to WWW-based learning management systems. Its main asset is the Internet-based functionality to deliver the “just-for-you” content “just-in-time” and to promote communication between the learners. Due to the ubiquitous nature these systems have contributed more to higher rather than secondary education so far. Much more challenging is further integration of cognitive learning tools coupled with a learner and a teacher.

The overall spectrum of didactic methods now includes the learner as a deploying personality who needs games, experimentation, negotiation, crises, and reflection in order to learn genuinely. ICTs are no longer an instructional means to provide prerequisite learning activities; they offer an exploratory space where the learner is in charge.



Think of a teacher’s role that is helpful to the learner.
Think of a teacher’s role that challenges the learner to be creative.



ICTs are not only an instructional means to provide prerequisite learning activities; they offer an exploratory space where the learner is in charge. Write down a list with pros and cons of ICTs as a learning tool in secondary education. How can the architecture of the building contribute to further integration of cognitive learning tools coupled with a learner and a teacher?

1.1.6. The Role of a Teacher



Teachers have been polarized in their acceptance of new technologies. Whilst some have enthusiastically integrated computers and the Internet into the classroom, others have been cautious in their welcome, and yet some have rejected the technologies. There is a level of justifiable cynicism based on the previous experience of computer-based applications, such as Computer-Assisted Learning. Ironically, some enthusiasts have inadvertently damaged the reputation of ICTs by poor classroom practice – using the technology for the sake of its novelty.

With the inevitable proliferation of ICTs in classrooms, the role of a teacher must change, and here are four key reasons why this must happen:

1. The role of a teacher must change because ICTs will cause certain teaching resources to become obsolete. ICTs may also make some assessment methods redundant. In ICT environment, online tests can easily be used, instantly providing a teacher with a wide range of information associated with the learner’s score.
2. The role of a teacher must change in the sense that it is no longer sufficient for teachers to impart content knowledge only. It will be crucial to encourage critical thinking skills, promote information literacy, nurture collaborative working practices, and prepare children for a new world.
3. The Internet is a network of networks providing opportunities for inquiry-based learning where teachers and students are able to access the world’s largest information archives.
4. Teachers must begin to reappraise the methods by which they meet children’s learning needs and match curricula to the requirements of a human thought.



Give four reasons for a teacher to change his/her role and attitude.

Think about such issues as online testing, a teacher as a mentor, the Internet as the largest information archive matching curricula and requirements of human thoughts.

1.2. Providing Quality in the Usage of ICTs for Education



Global economic competition urges to mention “human resources” and demand of new competencies.

Should resources be invested in ICT activities or would better results be achieved if resources were invested in some other aspects of education system? Application of ICTs and their effect on the improved quality of education can be considered only in view of overall strategic goals of education development.



What is a good measurement of the level of learning?

- The grades that learners achieve.
- The attitude that learners have acquired.



Write down how your country participates in the global economy. Think over the following:

- Who is responsible for improved quality of education and strategic goals of education development?
- How can one combine these two responsibilities?
- Who should take the initiative in your country?

1.2.1. The Change in Education



In spite of massive technological progresses, the practices of education have remained almost unchanged for the last two centuries. Inspired by the machine paradigm of Industrial Society, education was viewed as an industrialized way of “delivering” knowledge. Now, when learning and education extend into cyberspace, and the rise of a Knowledge Society is announced, we seem to be unable to break away from the traditional practices, into the practices that value community, interaction, context, organic processes, complexity, change, and many other attributes that radically separate our era from that of our Industrial Age ancestors.

Global economic competition has brought to the fore the critical importance of quality of human resources and the demand for new competencies in today’s knowledge society. It is a need that is likely to be articulated in the country with a well-developed educational system of the industrialized world, rather than in a developing country that has not yet reached the goal of universal primary education.



What were the most important changes in the past two centuries in education? Think about materials, the place of the school in the life of the learner, how the school supplanted apprenticeship.



Make notes about the current position of your country. Has education remained unchanged for the past decade? How does the global economic competition change the decisive importance of the quality of human resources? Do you see opportunities beyond the current state-of-the-art?

1.2.2. Quality of Education



Strategies to introduce substantial educational changes and improve its quality have been a concern of educational policy-makers for many years. The problem of the quality has progressively shifted its focus from input to outcomes in terms of learning achievements. The educational system, schools, and individual students are under increasing pressure of reforming. Considering how to implement the reforms education policy-makers, planners, and managers face two major questions.

The first is: should resources be invested in ICT activities (either to improve existing ones or to introduce new ones) or would better results be achieved if resources were invested in some other aspects of education system, such as school buildings, textbooks, teacher training, or number of teachers? Given the contemporary worldwide emphasis on ICTs, it is unlikely that it will be dismissed as an area that does not merit further consideration and investment.

Thus, the second question arises: what kind of ICTs, what usage, and in what conditions is likely to impact the quality of education in schools? This question might be answered after we define what the quality of education is, which further makes us choose a particular aspect of education that will be the focus of attention (Kinelev, Kommers, Kotsik, 2004).

Since education has many purposes, components, and competences, questions regarding its quality may reasonably touch any aspect of a system, each being important: infrastructure, school buildings, administration, teacher training, education materials, teaching, and student achievements. These elements are interrelated, and serious deficit in one is likely to have implication for the quality of others. Policy-makers traditionally privilege a linear and sequential approach, while evaluations based on the lessons from the past suggest that it is a multifaceted challenge.



Mention the main purposes/components and competences in education.

Differentiate the levels of education, ages of the students, problem-solving skills, endurance, motivation, etc.

1.2.3. Application of New Technologies



In this situation decisions on applications of new technologies and their effect on the improved quality of education can be considered in view of overall strategic goals of education development, including the following aspects:

- Not limiting the application of ICTs exclusively to the learning process. Use of the technologies in school administration and management as well as in local community can save time, improve the performance of staff, and allow them to get more committed to overcome students’ learning problems;
- Providing teachers in the context of pre-service education and prolonged professional development with the opportunity of not only mastering the ICT competence to be applied in education, but also of contributing to the development of methodology and educational information environment. Special attention here should be paid to distance methods of teachers’ vocational development;
- Using new technologies to encourage communication, networking, exchange of information and experience among teachers, students, and schools at national and international levels;
- Introducing the ways to use ICTs based on the idea of commonly available technological resource centres;
- Harnessing the potential of this use in order to create easily accessible services which are designed to help and advise teachers in their daily work;
- Strengthening joint efforts with governments, educational authorities and teachers’ organizations, businesses and industries to ensure availability of adequate ICTs at every level of education;
- Developing research and information exchange on the impact, role, and limitations of ICT applications in education.



Make a mind-map of the decisions you face concerning the application of new information technologies and their link to the improved quality of education in view of overall strategic goals of education development.



Study the mind-mapping methods (<http://www.mind-map.com/EN/index.html>), and download the tools from <http://www.visual-mind.com/wv.htm?0016>.

Please include the aspects mentioned above.

1.2.4. UNESCO Medium-Term Strategy 2002–2007



UNESCO Medium-Term Strategy 2002-2007 (31C/4) stresses that ICTs play a significant role in UNESCO field of competence. ICTs open up new horizons for progress and exchange of knowledge, education and training to promote creativity and intercultural dialogue.

ICTs can help strengthen social cohesion of individuals and groups within a society. Nevertheless, the growing digital divide is actually leading to greater inequalities in development, which exclude entire groups and countries from potential benefits of digital opportunities in the networked societies and guide to a global gap between those who are “online” and those who are “stand-alone”.

Bridging the digital divide between developing and developed countries and within the countries becomes a prime strategic challenge throughout UNESCO’s activities that strengthen national capacities and professional attitude of a human being to create a new content of education, enlarge access to information, foster scientific research, and share scientific knowledge and information through networking, communication media, and information systems.



Two examples:

- Commercial companies sponsor schools and offer ICT tools for free in exchange for goodwill or advertising.
- Libraries offer Internet access at a very low price.

What effect on a school system might be?



How do ICTs lead to greater inequalities in your country?
Think of solutions to address this problem.

What do you expect from UNESCO?
What other organizations could assist?

Summary



Information and communication technologies are already a vital factor in sustainable development of education. Secondary education is a decisive stage, however learning and studying at this age has the impact on new members in the community of knowledge society.

This course is a plea for educational policies that promote further and sustain ICT infrastructure in secondary schools. It signals that school institutions face the need to become Learning Organizations.

This course goes more in-depth to new strategies and tactics at the didactic level to progress in learning in order to contribute to the new generation’s participation in a Knowledge Society.

The most specific effect of new ICT facilities is a catalytic one – not only in the continuous evolution of the innovative teaching-learning processes of traditional secondary education. More important are the ICT effects on contextual factors like restructuring of classroom-based learning and its complement to home-based learning, vocational training, the most important being the coming Web-based Learning Networks and, subsequently, Learning Communities.

Most likely is the introduction of Web-based Communities for Teachers. As teachers are in many cases the top experts in local school settings, it seems an interesting option to let them refresh and operate the content expertise and didactic methods via participation in larger Web-based Teacher Communities.

School ICT infrastructure and software facilities combined and participation in Learning Networks are expected to be a critical factor in a longer-term sustainable innovation of education.

The first-order effect is the change of the teacher’s role, once information access becomes widely available.

The second is the new learning environment at school that allows learners to participate in distributed learning communities.

Resulting from this synergy will be an ongoing process where teachers and students work together, partly face-to-face in the same physical location, partly in the virtual learning communities.



Which approach at what moment is necessary to support the new learning paradigm?

- Top-down: political decisions influence the education of people.
- Bottom-up: learners take the initiative.

Final Assignment of Module 1

After having tutored you as a receptive learner, we will now confront you with more complicated questions, which will help you comprehend practical impact and potential pitfalls of ICT integration in the years to come.

- *Teachers may find best answers to improve their didactic repertoire.*
- *Head teachers are requested to extrapolate the underlying questions in order to become better coaches for their team members. Please be aware that you will mentor your team during the period of complex evolution in learning practices.*
- *Policy-makers will think about the scenarios of managing budgets and continued schooling. Please observe carefully what real problems the teachers and school leaders need to overcome.*

In Module 1 we made an inventory of the new skills teachers and students need when using ICTs in learning. We explained that recent learning theories consider active learning better than mere reception and memorization.

1. Plan an in-service training workshop for teacher trainers who want to retrain mature teachers facing new challenges like ICTs and project-based school practices.
2. If you can take a sabbatical for half a year, what training programme would you choose to get ready for the next five years at school? Orient yourself to the WWW, for instance, <http://www.educationschoolssearch.com/>.
3. Most likely you teach in various subject domains and, in any case, your main course will contain different types of subject matter to be studied. Please identify the topics that rely mainly on “facts and figures”, and others relying on “understanding and problem-solving”. Please sketch the main ICT tools and methods that you have met in Module 1, and how they fit two types of learning. Please imagine how you will implement it in real classroom setting.
4. Given a teacher can’t enforce the optimal learning style of students the question is how to coach such development. What would you see as feasible interventions in the traditional school programme in order to make students more active and autonomous learners? Please take into account the linear versus the concentric (spiral curriculum). Could you, please, expand your current ideas on the issue of sequencing domain content across the available time in the first years of the secondary school period?
5. What assessment do you estimate are needed for grading the students’ learning attitude?
6. Imagine that you write a recommendation report to your Minister of Education. What is your crucial advice and what pragmatic measures would you include in order to make its implementation feasible?

MODULE 2. EDUCATION IN INFORMATION AGE

2.1. Develop Affinity



What is the role of education for the society development in Information Age? What ICT means are required in education to meet the claims of a modern society? What are the main features of ICT-mediated teaching and learning? What is the place of ICTs in the overall spectrum of modern didactic methods? What are the main features of teachers' ICT competence to provide appropriate knowledge and proficiency?

Answers to these and many other questions of modern education development are the subject matter of this module. It delivers an in-depth review of new strategies and tactics aiming at learning progress for successful participation of new generations in Knowledge Society.

Please note that this course and subsequent training modules deliver a course template rather than a full curriculum. A complete curriculum would defy the message of the earlier studies that showed that ICTs are not a ready-fixed menu; it is a generic approach to revitalize existing school practices.

The goal is that you as a practitioner (teacher, school leader, or policy-maker) develop affinity with the coming integration of ICTs in real school life. The dilemma exists that, on the one hand, ICTs possess the immediate attractiveness; on the other, they complicate the educational process. To be more precise, ICTs show numerous solutions to improve learning, however they bring numerous unforeseen problems in teaching as well.



Make a list of pros and cons of the integration of ICTs in real school life. Keep in mind that ICTs are not a ready-fixed menu; it is a generic approach to revitalize existing school practices.

2.1.1. How to Learn



As the new knowledge society and multicultural, multi-ethnic society demands a continuous evolution in education, it is clear that the problems of teacher’s new roles are no valid excuse to “wait-and-see”, forcing a teacher to learn him/herself first of all.

The course as curricular outline is the best we can bring forward to help you further integrate ICTs in your teaching practice. Afterwards we envisage that you will initiate the learning processes of ICT usage among your colleagues.



The course coaches you to start learning with ICTs. How can you benefit from your colleagues who have the same learning intention?

2.1.2. Knowledge Development



So far, teachers have been trained as solo performers in front of the “audience”. One of the elements behind learning in Information Society is that learning is a collaborative process.

Slowly education shifts from a process of knowledge transfer to one of knowledge development. It doesn’t mean that the present prefixed curricula are in doubt; it means that learning is revisited into a much more energetic process where teachers and students work together in so-called Learning Communities.

ICTs are a catalytic element; it is neither the reason nor aim of education. It is a means that speeds up innovation, as there are urgent external factors like the cybernetic society, and the need to master and understand the dynamic changes in new infrastructure.



Education shifts slowly from a process of knowledge circulation to one of knowledge development. Make up your mind on how to learn about ICTs. Imagine that no one around you knows anything; so, don’t hesitate, start phantasizing how you can use computers for your benefit. Think over how a computer actually works. Use one of the underlying models:

1. Washing machine
2. Chemical factory
3. Farm
4. Box full of sand



Each alternative is close to the correct one. Now think how the computer as a washing machine can help students to study a certain topic.



If you choose the sand box metaphor and query WWW you will find excellent examples like <http://depts.washington.edu/sandbox/Research/main.htm> or http://www.colorado.edu/physics/phet/nsp/podolefsky_and_adams_metaphor.pdf.

2.1.3. Shape Societal Evolution



One step further is to acknowledge that education should not only *follow* societal evolution, it should *shape* it. The way we teach and learn is crucial in that. We do not claim that this Curriculum Outline will survive for more than three or four years. It will become out of date as the evolution of formal education is gaining speed at the moment. So, please enjoy our examples and join the bandwagon. Your students will appreciate it like you do.



Please write down your expectations of how you will approach your students' learning after you have taken this course.

2.2. The Underlying Rationale for the Training Course



This paragraph intends to explain the underlying rationale of the *ICTs for Secondary Education* training course. Evolution of Information Society entails dramatic changes in production and business activities, as well as in an extensive social context. Information Society is not only about digitized information or electronic networks. The transformation of Information Society can be understood only if we view it in a broader context where bits, networks, and knowledge have a social meaning. To comprehend the results of technological change we must study the social dimension of Information Society.



Write down how people learn using the telephone. Secondly, how do youngsters learn using the mobile phone?

Please give two examples of how your students will work and learn with mobile phones in ten years from now.

2.2.1. Expectations



Rapid development of the information sphere of society is drastically altering work and employment, producing new occupations and jobs. More and more people are drawn in Information Society as learners, workers, and consumers. People all over the world have high hopes that new technologies will lead to healthier life, greater social freedoms, increased knowledge, and more productive livelihood. It won't be an exaggeration to claim that succeeding generations will face the challenge of adjusting to a new social environment, wherein information and scientific knowledge will replace matter and energy as pivotal factors and will define the society's strategic potential and prospects for its development. In the developing countries the most likely scenario is when information progress goes smoothly together with agriculture and agro-industry.



Please ask yourself how a farmer can ease his work using computers. More important, how can young farmers set up their business using computers? (Think about choosing the right fertilizers, recruiting labour force for harvesting, predicting the weather, and finding new customers).

2.2.2. Networks for Economic Partnerships



Information technology is the most attractive tool and infrastructure for the younger generation to facilitate the awareness, actual craftsmanship, and business for local communities. In order to make this happen, the traditional certificate-oriented curricula should migrate toward gaining locally relevant goals, skills and, most important, establishing networks for economic partnerships.



Please give three reasons why it is a good idea to let a car engineer talk why physics is needed to repair cars. (Think about students' hobbies, dreams about future, and need to apply physics in reality.)

2.3. The Change from Knowledge Transfer to Development of Expertise



Education slowly moves from *knowledge transfer* to the *development of expertise*. It doesn't mean that old truisms are no longer valid; it is the new way we prefer to learn new things as actively and flexibly as possible. This is a particularly essential process as new teachers have been subjected to traditional teaching for years. Now it is necessary to look critically at the new media landscape and pick up its most valuable gems; they must help us build a new learning culture.



A good example of a change in the curriculum is the everyday use of a calculator. A calculator having an official part/role in the mathematic curriculum becomes a common practice. Extra attention is paid to the students' ability to:

- Use a calculator to make a calculation.
- Estimate the outcome in round figures in order to check the outcome.
- Learn different strategies to solve a problem.
- Translate certain situations into a formula that can be solved with a calculator.

Which ability deals with the transfer of expertise, which one deals with the development of expertise?

2.3.1. Knowledge as a Product



Education for the emerging societies requires ICTs to facilitate large-scale learning needs for social and economic development. For the first time in history, information and scientific knowledge are not the means to improve the society but main products of the economy. Moreover, knowledge is a major asset and product of the society on which continued economic well-being and social development depend. ICTs are in the mainstream of these developments. ICTs and Information Society deal with the creation, acquisition, sharing, dissemination, delivery, support, and recognition of knowledge. ICTs are the means to provide an access to and engage in the continuous learning that becomes necessary for successful participation in the society development of all social groups. ICTs have become a critical tool for professional training; the sooner the learners know how to use ICTs, the easier they can find their way to master the newest methods of data acquisition and its transformation to knowledge.



Identify domains in your culture where it is necessary that employees can find their way to master the newest methods of data acquisition and transformation to knowledge.

2.3.2. Scientific and Technological Progress



Scientific and technical progress as well as the global spread of technologies developed in the most advanced countries of the world constitute one of the main arguments in favour of the leading role of education in the 21st century. The level of technological progress is indicative nowadays not only of the economic power and living standards of a particular country, but of the place and role of this country in the global community and the scope and prospects of its economic and political integration in the rest of the world. At the same time, the level of development and application of modern technologies in different countries is determined not only by their material resources, but, to a large extent, by the degree of society’s ability to produce, absorb, and employ new knowledge. The achievements, in turn, are tightly linked with the level of education. These processes are mostly driven by information and communication technologies, where scientific knowledge and information increasingly establish new patterns of growth and formation of wealth and present possibilities to reduce poverty more effectively.



Television has a major impact on the way people live and what they expect of life. TV is an important marketing tool. It directly shapes the opinion of millions of people. Some examples:

- I look at my favorite music clips and want to wear the same clothes as the stars.
- I like watching quizzes. I learn a lot and some questions inspire my interest.
- I follow my favourite soap every day. The main characters use computers. Now I see how this improves their lives. I also want to use a computer.
- I follow a course on television and learn the basics of computer usage.

Which examples contribute to the economic growth?

2.3.3. Learning from Wide Open Information Resources



Learning is a process of growing awareness of various (competing) realities. ICTs are a facility for teaching and learning, having gone through various stages before they acquired the catalytic function of today. Learning from wide, open information resources can be successful only if a learner masters methods and tools to use the interconnection to the full.



Which activities fit in the new learning society? Please mark as many as you like and formulate your arguments.

- Going to a forest in autumn to collect material for a project.
- Taking typing lessons.
- Listening to the radio in a foreign language.
- Doing a project with another school.
- Watching the news on television.
- Making a phone call to your friend.
- Being the coach of the local football team.
- Organizing a party for your friends.

2.3.4. Acquired Skills and Attitudes



One of the central notions around the questions if and how ICTs should play a role in education is that ICTs as a facility requests young people to acquire skills and attitudes allowing them to benefit from ICTs. “Computer literacy” was the quintessence to adjust curricula until the early 90s. As ICT functionalities progressed, e.g. expert systems, simulations, multimedia, as well as virtual reality recently, the key question appeared how to integrate ICT capacities for learning in regular didactics. So far only the text processor, spreadsheet, and database have penetrated the didactic arena. Gradual adoption of the constructivist paradigm of learning has allowed teachers to see how learners may convey a highly personal learning process like *interiorisation* of concepts and problem-solving strategies.



At the History lesson the students look at their town. They have to find relevant buildings and other remains from the ancient times. The students use mobile phones with video and GPS (Global Positioning System) to identify locations and record buildings to meet the final objective of the project: a web site about their city.

Make a list of the learning goals of this project. What is the role/function of the teacher?

2.3.5. Constructivism



A more obvious dimension for didactic ICT support is a spectrum of meta-cognitive tools to represent knowledge like concept, mind, and cognitive mapping. Its underlying paradigm is that learners’ sustainable and generic learning progress depends on adequate imagination of foreground and tacit knowledge. Intuitive knowledge was regarded primitive, undesirable, even erroneous that should be kept out of the didactic procedures. Constructivism accepts intuitive knowledge as essential before formal learning may be built. Conceptual representations in concept mapping procedures have been introduced in diverse subject fields. Its main procedure is to elicit the student to schematize conceptual entailments in order to guide thinking to the borders between the known and the unknown.



Constructivism accepts intuitive knowledge as essential before formal learning may be built. Making a mind map is an efficient way to use background knowledge as an input for the learning process.

- How can the teacher use the mind-map technique for himself?
- How can the teacher use the mind-map technique for the students?
- In traditional education, the teacher would give his own schedule to the students, with the assignment to learn this by heart. Testing would check if a student can reproduce the schedule of the teacher. What are strong and weak points of this approach?
- Make a mind-map of your foreground and hidden knowledge in relation to ICTs in secondary education. Please use the tool suggested before.

2.3.6. Information Access via the Internet



The need of using ICTs in learning clearly manifests itself, as the information via the Internet has become abundant, learners and teachers need tools of adequate selection and navigation in order to keep the balance between noise and silence in their search. Though secondary education traditionally orients to strict curricular content specifications and national final examinations, there is an ongoing trend to invest in students' capacity to learn independently and authentically. This trend requires ICTs as the infrastructure and cognitive support tools.



Discuss specific domains like Mathematics or Chemistry, Language etc., how the Internet provides the learner with new possibilities. Identify if this is a direct translation of the traditional learning methods into the Internet world or new possibilities are explored indeed.

2.3.7. Mobile Learning



Salient element of ICTs for education is the new generation of mobile phones. They contain a microprocessor and memory more powerful than the PCs we had on our desktops a few years ago. Alongside with phoning they have full capacities of e-mailing, database and document management, web browsing, a video camera, GPS for navigation, MP3 player and, most of all, full integration of these functions. The question to us as educationalists is what does this technology bring extra for the 'sake of learning'? I already hear your complaints: "It brings only noise to the learning situation!"

"... Please switch off your telephones during my lecture".

This is the regular command before lessons start today. The key for an honest answer is if we want education to stay as it is or we want more and better learning to take place. Media research so far has shown that ongoing educational practices can hardly be improved if the goals remain as they are. However, the context of education is changing very rapidly. So, there is no need to try and revise the existing practices; we require ICTs to transform education into a new wide spectrum of learning opportunities. A good example of the existing innovative practice is the assignment at the History lesson: make a web site of your city. A telecom company sponsored the project to test the Universal Mobile Telecommunication System network.



Look at your teaching domain. Think of a way to use ICTs to innovate existing practice. Link the commercial companies who might be interested to participate in your initiatives.

2.4. Knowledge Economies, Policies, and Multiculturalism



One of the factors that trigger education to change rapidly is the coming knowledge economy and evolving multicultural societies. What does it mean? In the Knowledge economy expertise is a *side effect* rather than an *input resource*. In other words, it is not enough to provide students with knowledge and to hope they can live with it for years. No, the criterion is not to *possess* knowledge. We must be able to *generate* knowledge (both conceptual and practical) before we can actually contribute to the network of knowledge players: no business without playing at the strategic, tactical, and operational levels. An outstanding example of how knowledge economies may flourish educationally, socially, and economically is Finland where, for instance, Nokia could develop its core business from making rubber boots to becoming player No. 1 in the mobile phone business. Paper mill machines where paper passes at more than 100 miles an hour is another exclusive achievement that rests on highly effective corporate learning culture. The global education problem can't be solved with conventional means like building classrooms and training great number of teachers.



People and organizations are more willing to change if they are convinced that an existing situation can't continue because it will cause enormous troubles.

Have a look at these arguments and formulate your own opinion:

- With modern techniques money can be easily duplicated.
- Counting money is time-consuming.
- Transport of money is expensive and dangerous.
- Production of coins is expensive due to the high price of raw material.
- Storing coins takes a lot of space.
- The global economy is handicapped by too many national currencies.



Electronic paying systems are taking over the cash payments. Look around you. Is it an accepted way of payment in your country?

- Who are the early adopters?
- Who benefits most?
(Think about acceptance, reliability, security, connection, and efficiency.)

2.4.1. Challenges of the 21st Century



The keywords in the educational system of the future are: production of knowledge, geographical and temporal independence, pedagogic and structural innovations. Building a new society heavily relies on the introduction of ICTs in education. The leaders of almost all countries striving to have the citizens ready to respond adequately to the challenges of the 21st century have professed the desire to transform their countries into learning economies and learning societies, inasmuch as the information society needs competent knowledgeable citizens.



One of the challenges of the 21st century is to (please mark the correct one):

- Reduce the use of paper;
- Provide people with the up-to-date information regardless their location and time of the day.



Formulate and choose several assignments that help your students become competent knowledgeable citizens. Please include the underlying suggestions for the procedures your students must apply:

- Accomplish the assignments using a word processor.
- Print your work on paper.
- Send your homework by e-mail.
- Look at the school homepage to find the latest information about your schedule.

2.4.2. Educational Policy



The era of new ICTs does not eliminate the most difficult problems that the world of education faces now, which have to be solved irrespective of whether the new technologies are adopted or rejected. Nevertheless, training and development, social and professional requirements, globalisation of communication, economy, and political projects of building a new society profoundly rely on the introduction of ICTs in education. The alternative is to lag behind these developments chronically and, in effect, fail to meet the challenges of the 21st century.

The main features in the educational system of information society are production of knowledge, geographical and temporal independence from knowledge acquisition, pedagogic and structural innovation in teaching-learning process. To provide this the educational policy must ensure:

- Up-to-date pedagogical competence in the information society;
- Integration of new pedagogic opportunities;
- Equal and flexible access to education;
- Effective and flexible structure and organization of education.

Presently, tremendous efforts are undertaken on behalf of most governments to modernize their countries' educational systems based on ICTs perceived as a key to such modernization. Some countries consider ICTs to be a vital component in upgrading the quality of education through changes in curricula, mastering of new training skills and wider scope of knowledge. In other countries ICTs are applied mainly to ease the access to education for various groups of population or are used for the narrower purpose of facilitating self-education through programmes broadcasted via radio and television. Yet, some countries emphasize the reliance on technologies as the means to transform the educational environment or satisfy specific needs of different categories of students.



Search on the Internet: ICT renewal in education at the governmental level. (Consult Appendix 4 for the first results.)



Enjoy and share the information you find.

2.4.3. The Learning “Contexts”



Attempts to improve education through the use of ICTs suffer from the absence of sound educational paradigms that could support genuine renewal, indeed. The renewal can be contributed by pointing out that beyond the delivery of information, that is, of “content”, we must systematically take into account the interaction and activity, learning “contexts”, completely renovated social and cultural environments that education is calling for and ICTs are now capable of delivering. No matter which aspect of ICT use currently prevails in this or that country, it appears on the whole, most national governments that plan to introduce ICTs in the educational system must:

1. Take into consideration specific national economic, social, and cultural conditions;
2. Borrow from similar plans and experience of other countries (particularly those with a comparable economic and social framework);
3. Ensure matching of the desired scale of ICT introduction in education and available technical, financial, and human resources;
4. Develop comprehensive action plans for various levels and agents within the educational system;
5. Take into account the consequences of ICT applications as experienced by various categories of students, educators, educational systems, and society as a whole.

Sensible choices of policy can’t be made without assessing the current situation, specifying the goals to be reached, projecting the means to attain them, implementing the strategies, and evaluating the results. The concern of policy-makers, thus, is twofold: to reach a better understanding of the validity of education in its own specific dimensions and to help in defining appropriate strategies for a change.



In many organizations, including the government, ICTs play an important role in internal and external communications.

- Mention three main benefits for the organization. (Think of reduced paper flow, increased efficiency, new interaction scenarios, etc.)
- Mention three ways the applied approach will influence the opinion of people regarding ICTs in education.

2.5. From Hierarchy to Heterarchy



Multiculturalism is not only a diversity of ethnic backgrounds in the society. It is the evergrowing diversity in mentality, ideology, and beliefs. Hierarchy was an excellent mechanism to prune the diversity, thus reduce the complexity. Once your status in the hierarchy was clear, every meeting with other persons was determined as for your behaviour, opinions, intonation, and the way of speaking to other people. May be, sitting next to your car instructor you are fully sensitive to his/her suggestions, though an hour later it may be your student in the sports club and next year/s it may be your lawyer in the court.

It is not only rich perspectives for social life that follow this change to heterarchy; it is a much more complex process of interdisciplinary works like large projects. In the mid 20th century it could be one top engineer designing the bridge and other workers had to obey this expert whose main concern was that the bridge would not collapse the first hundred years. Designing and building a bridge nowadays requires at least 15 fields of expertise before it is completed: an urban planner, a traffic engineer, a sociologist, and various experts in sub-fields of engineering. Who has the overall supervision of this team? In most cases, it is a formal chairman who is particularly no expert in bridge building.

The real process of giving and taking is concurrent, where no one has the a priori authority: the expertise evolves from the interaction. One can say that knowledge in this process exists *between the team members* rather than *in the team members*.



It is not only the teacher but a team of experts (including the students) who are involved in the implementation a new learning process. Who would you like to invite in your team? Please mark the appropriate ones:

- Sociologist
- Psychologist
- Publisher
- Teacher
- Curriculum developer
- Musician
- Business strategist
- Economist
- Doctor
- Architect
- Artist
- Sportsman

2.5.1. Reform in Didactics



If there is no external reason to transform schooling ideologies into the ideals like flexible learning, lifelong learning, and knowledge creation rather than knowledge reproduction, there is no reason for ICT integration in school either.

For more than two centuries learning as a top-down and teacher-centred process has become interdependent; the introduction of new media in the school will pay-off only if it is carefully linked to an adequate reform in didactics.



In your school all teachers are trained according to the traditional rules of education. The school will implement ICTs.

- You are offered an extra training. Teachers, who have taken the training based on the traditional rules of education theory, organize it.
- You are offered the time to explore new ICT tools.
- You are working with new learning material, where ICT tools are a part of the curriculum.
- The head of your school invites you to develop a new learning material.

What option would you choose? Mention the pros and cons.

2.5.2. Producing Relevant Understanding



Finally learners are to be evaluated to the extent of producing relevant understanding rather than demonstrating common understanding by others.

Epistemological analyses don't underpin this position solidly; it is promoted by new qualifications urgently demanded by the evolving knowledge economies.

The knowledge economy needs players in the "knowledge game" who can't be selected based on their actual knowledge only. They must have the capacities to synthesize newly developed ways of functioning as well as the cooperation skills, being involved in large networks of specialists, and to reformulate important trends in any relevant sector of the society and economy.

For such highly needed citizens, knowledge is not an end product or raw material; it is the mentality that expertise manifests in specialists. Like in large technical and social processes there is a need to combine various disciplines. Knowledge workers have the capacity to mediate in expertise domains; self-learning and allowing others to learn are the key processes. Media and communication facilities will play an ever more important role.

The goals of the training course is to clarify that secondary education has a vital task of preparing the next generation citizens as well as of showing how new learning methods will emerge and how schooling institutes will attempt to accommodate these trends.



What is important for you being a teacher in the attitude of your students?

- Smart
- Subservient to you
- Interested
- Motivated
- Convinced what is right and wrong



What is important for you being a teacher in the attitude of your colleagues?

- Smart
- Subservient to you
- Interested
- Motivated
- Convinced what is right and wrong

2.6. Learning Needs Context



Another important notion is the phenomena of contextualisation. Human thinking and performance rest on the fixed conditions, thus have a certain bandwidth. You can explain the phenomena to the colleagues, though it may be totally different in a group of teenagers.

So, how do we want youngsters to learn? If we want them to succeed in answering questions sitting at an examination table, the today's schooling and doing homework may be quite optimal. However, if the criterion is to be better prepared for still unpredictable situations, there are much better learning methods to be imagined.



Describe a case from your practice where you, for the first time, came up with a solution without specific instruction from a teacher/educator.

2.6.1. Collaborative Learning



Primarily individuals manifest their work among other people most of the time. So, the collaborative learning shouldn't be seen as ornamental or done for the sake of social skills. If a team is the target of expertise, the learning should happen in a team activity. Quite unexpectedly, it was the computer that frightened us, pedagogues, with its anti-social effects, though now it evolves as a super-social tool. Example is a chatting student; the excitement of communication dominates the content.

Web-based communities will be proposed throughout this course as a promising way to let learners learn with an optimal degree of self-determination and interplay with other learners that have a similar or complementary interest. As we are at the beginning of the new era, solid predictions and recommendations are hard to make.

The best we can do is to invite you to join our thought experiments and undertake small steps of integrating them in real practice.



Write down three scenarios how a web-based community could help you to further develop ideas and initiatives after finishing this training course.

2.7. ICTs and the Quality of Education



It is a mistake to think that new ICTs applied will automatically raise the quality of education. The crucial lesson from the past ten years of experimenting with new learning tools in secondary education is that educational ICT media are a temptation for the traditional test regimes at schools. We must conclude that “learning by assimilating the teacher’s knowledge and preferences” is the most appropriate and efficient approach to attain traditional schooling criteria, not necessarily the learning modalities of tomorrow (Kinelev, 2003).

It goes without saying, that the emergence and successful development of the societies are impossible without the improved quality of individuals’ education, consequently, the improved quality of education of a given society as a whole.

As there is no universal formal definition of the term “quality” in education, we can include the following abilities of an individual:

1. Keeping abreast with the modern ideas and discoveries in the areas of science and technology;
2. Acquiring skills required by the latest technologies and the market;
3. Developing one’s resources through self-education.

So, scientific knowledge and professionalism as products of quality education must facilitate a successful participation of an individual in the development of evolving societies.



Imagine you are the director of a company in the modern knowledge society.

What would you consider the most valuable in your new employees?
Could this be a parameter for the definition of “education quality”?

2.7.1. Necessary and Sufficient Conditions of Education Quality



Necessary and sufficient conditions can be identified in the process of improving education quality allowing to gain the important final objective of education. The necessary conditions would include such educational components as:

1. Well-equipped classrooms and lecture halls;
2. Professionals in managerial positions at the educational institutions;
3. Qualified teaching and technical personnel;
4. Easy access for students and teachers to quality textbooks and professional literature, as well as to modern teaching aids and supplementary information.

Sufficient conditions are related to a person’s ability to transform knowledge and skills received into education, i.e. into customized system of ethical, cultural, and professional values, and into the ability to apply this system in various areas of intellectual and practical activities.

Sufficient conditions of education quality are defined by a person’s ability to meet the demands of the contemporary society (Kinelev, Kommers, Kotsik, 2004).



Please draw a circle around the codes A, B, C, and D that are correct in the cells of the matrix below.

- Scenario A: The teacher has been working at school for over 20 years, the student works very hard to reduce the amount of homework.
- Scenario B: The teacher uses ICTs in his free time. He/she shares the experiences with his students. Students respond to him/her with new questions and scenarios. They are the members of web communities.
- Scenario C: The teacher has just finished his/her education and is focused mostly on keeping order in the group and sticks to the textbook to be sure he/she makes no mistake.
- Scenario D: The teacher is quite committed to his/her job. However, the students refuse to work. The teacher is convinced that he/she will finally find a way to inspire students' interest.

The students are The teacher is	Intrinsically motivated	Extrinsically motivated
Intrinsically motivated	A	B
Extrinsically motivated	C	D

2.7.2. ICT Role in Providing Education Quality Conditions



The unique role of information and communication technologies in improving education quality is based on their ability to facilitate necessary and sufficient conditions effectively to receive quality education. Modern level of ICT development provides the following:

1. Broadens opportunities of students and teachers to gain the access to educational and professional information;
2. Improves operational ability and managerial effectiveness of specific educational facilities and the educational system in general;
3. Facilitates integration of national information and educational systems in the global network;
4. Considerably assists the access to global information resources in the areas of education, science, and culture.

At the same time it is worth mentioning that the present level of ICT development permits their successful application in education to release the creative potential of a student thanks to a more efficient organization of students' cognitive activities through the use of computers having very important didactic characteristic of individual classroom work keeping its entirety undisrupted via programmed and adaptable curricula.

ICTs have brought about the dramatic changes for the educational technologies in obtaining knowledge, converting knowledge into education, and applying education in practice.

Moreover, when we speak about the role of ICTs in education, we must proceed from the understanding that they not only facilitate educational opportunities but assist an individual in perfecting his/her perceptions as well.

Modern ICTs provide learners with richer information objects, such as images, videos, complex structures of knowledge, and their combinations available via the Internet or other intelligent computer networks. ICTs radically extend the possibilities for visualization, including visualization of the invisible, visualization in changed colours and shapes. Colourful images of architecture, sculpture, or painting, grouped thematically and accompanied by well-written texts and beautiful music have a strong emotional effect on a student, develop his/her artistic taste, simultaneously enabling a student to learn more about culture, art, and nature.

The words of O. Wilde: “For the good we get from art is not what we learn from it; it is what we become through it”, are worth mentioning here.



Think of your History studies in the past. Which topic would benefit most from the use of ICTs in your opinion? Think of your situation now. In your opinion, which goal and topic you are dealing with at the moment would benefit most from ICT usage.

2.7.3. Interiorisation of Physical Objects



At the same time we should take into account that cyberspace, as another educational milieu, is developing in parallel to education as a means of preparing students to life.

The seminal works of Vygotsky, Piaget, and Bruner gave rise to the term “interiorisation of physical objects”, which suggests we create “psychic” equivalents of the latter as “conceptual” models to be further used to construct variants of our own internal reality or virtual realities. Cyberspace prompts a reverse process, which can be called exteriorisation: models of the physical world constructed in the human mind are let out into cyberspace.

So, we should proceed from the understanding that it is necessary to develop a particular perception of individual’s habitat, which comprises objects of the physical world and the ideas of these objects in the human mind, as well as the system of ideas in information space. Thus, ICTs do not merely enhance intellect; they designate new dimensions of the human mind, produce an orderly system of a new global culture, and open up vast and exciting perspectives of their use in improving the quality of education.

It should also be stated that if the first approach to human interaction with the environment arose through many centuries of our species’ evolution, the second approach has introduced amazing changes into human consciousness in a brief period of a few decades.

We can only guess what the nature of these changes is, what the scope of their impact and future implications is. So, we can only hope that we are right suggesting that one of the most complicated problems to be solved in the evolving societies is that of a human being in the changing world (Vigotsky, 1962, 1978; Piaget, 1952, 1970, 1955; Bruner, 1973; Bruner and Haste (eds.), 1987).



Cyberspace is a word from the ICT world. It links to the words cybernetic (means computer-driven) and space (means area). Cyberspace is a computer-driven area, a so-called virtual reality.

Playing computer games is popular among young people. Developing a game can be a creative challenge. Why would we need the virtual space for learning?

2.8. Quality Indicators



A problem of defining the quality of education arises when we choose the aspect of education that will be the focus of attention. If the focus is on the outcomes of education, another problem appears, since there is no general agreement on what the purposes of schooling should be.

For some, the role of secondary education is fostering students' cognitive, moral, and social development. For others, secondary education is a means of promoting social cohesion and nation building. For many others, it is a preparation of an individual for the world of work.

This brings us back to the question of education quality and possible approaches to its measurement. One of such approaches leads us to an appropriate system of indicators for education quality to be developed and based on the abovementioned necessary conditions (UNESCO IITE, 2002).



Make a list of quality indicators that are:

- Objective (can be measured in figures and facts);
- Subjective (feelings, well-being, motivation, long-term impact, etc.).

2.8.1. System of Indicators of ICT Usage in Education



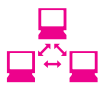
In the contemporary discourse on education effectiveness the word “quality” is frequently mentioned. More detailed consideration shows that the systemic analysis and quantifiable measurement are applicable only to the indicators describing necessary conditions for the quality education. In the area of ICT usage in education these indicators constitute several groups, including:

1. State documents regulating ICT usage in schools;
2. ICTs in curricula;
3. Hardware of educational institutions;
4. System and educational software;
5. Access to the Internet and global communications;
6. Training and upgrading of educational personnel in computer competence (UNESCO IITE, 2002).



In what way are the indicators related to each other?

- Can you find a specific order or dependency?
- Which indicator(s) specially addresses the teacher’s task?
- Which indicator has or should have no relation to the role/task of a teacher?



Search the Internet for “quality indicators of educational systems”. (See Appendix 4 for first results.) What effect on your attitude and learning curve could be if you can access information found for “quality indicators of educational systems”?

2.9. Economic Aspects



The request for quality indicators of educational systems can hardly be isolated from various economic aspects that go together in terms of teaching load, equipment, and innovation support.

As for the sufficient conditions of the quality education, they can be considered only as a result of interdependent integral development of economy, sciences, technology, and culture, where ICTs play a fractional role. This narrative requires a more detailed deliberation and can’t be seen as a result of indicative approach.



Suppose tourism is an important source of income for your country. Most tourists speak English; they expect good service and high quality of food and environment.

- Does such situation influence the quality indicators?
- How?
- Think of another scenario that influences the quality indicators.

2.9.1. Schooling Concepts



One of ICT effects in secondary education is to what extent ICTs facilitate the achievement of prior (traditional) goals as assessed by national and foreign comparative studies.

Another aspect of the same question is to what extent ICTs in secondary education facilitate smoother transition from schooling to the labour market.

Yet another aspect is how long ICTs facilitate the continuous evolution from the existing schooling concept to the schooling concept that fits the learning needs of tomorrow's society, especially if we mean Information Society.



Describe the changing role of a teacher and the changing role of a student. Do you see any similarities?

2.9.2. The Catalytic Function of ICTs



It may be clear that the interpretations mentioned above do not necessarily converge in implementation; a high scale of ICT use to achieve traditional learning goals may hamper the catalytic function in the evolution of schooling paradigms. Through ICT applications in education the humankind seeks to respond to the challenges of the 21st century integrating national information educational systems into the world's network, a network that will considerably facilitate an access to global information resources in the sphere of education.



What are practical features that make ICT applications easy to integrate in the web environment? (Think about language, technical issues, copyright, responsibilities, cooperation, values, standards, etc.)

2.10. Overall Developments



The penetration of ICTs into educational settings requires, in principle, the formulation of new ethical, psychological, legal, and moral aspects of applying them in learning. ICTs offer wonderful opportunities for our fellow human beings, but the dark side of a human nature finds its way to cyberspace, too. The full spectrum of reprehensible or outright debased moral behavior is represented online: aggression, violence, crime, deception, brutality, rudeness, and so on.

The global nature of ICTs not only opens up broad opportunities for dissemination of knowledge but simultaneously increases the risk of conflict between values and standards espoused by different cultures. For such global information community to become a reality, an effective mechanism of information exchange must be developed to inhibit the erosion of national and cultural identity.

The past century has clearly demonstrated that in the great history of times and peoples, no culture or nation is small – only together they constitute the supreme value of the world civilization and the basis for the sustainable development of the world community.



Nation-oriented education, like in History curricula, will be responsible for multicultural consciousness and learning. Think of two reasons why it is important that students are aware of History from the perspective of another country as well.

2.11. Self-Organizing Learning Communities



Like tourism, culture, industry, and politics, the education must extend learning partnerships. Open and Distance Learning has a long tradition, which we see in Open Universities and “learning by correspondence”.

A more drastic evolution is the migration toward self-organized learning communities. In contrast to the institutional learning networks it is the unpredictable interaction and development of mutual learning demands that determine how a learning community develops.

Crucial is a pragmatic need of learning, not the need of a higher education certificate. Looking at a regular secondary school certification, it is apparent that the web communication focuses on examination items of the last few years. However, the survival of a synchronous learning community has a higher impact; its members experience a learning need and will undertake discussions much more fundamental compared to arbitrary cornerstones, like entrance and final examinations.



Find a practical learning need benefiting from the participation in a self-organized learning community. How do you deal with such issues as:

- Information overload;
- Finding the right combination of knowledge;
- Reliability;
- Planning and timing;
- Privacy.

2.11.1. Three Dimensions for Learning Networks



Three dimensions are brought forward as an organizer for the emerging Learning Communities and so-called Learning Networks:

1. Learning scenarios will be embedded in communities of practice, less orchestrated as top-down delivery processes like in the traditions of schools and corporate training. Mobile and online learning is likely to benefit from new flexible paradigms that bring the learner back into the centre. Key function of mobile learning is to find the right partners in learning.
2. Student learning is continuously shifting toward project- and problem-based learning, in which mostly curricula and teachers facilitate the process. Learning by playing (simulations and meta-modeling) is one of the methods to make students curious about underlying processes and meaning. When it comes to cultural sciences like Geography, History, and Art, it is the existential motive rather than the certificate criterion that will soon motivate how and what learners intend to learn.
3. Participating in virtual realities is a growing opportunity to make learners be on alert and better prepared for complex jobs. Mobile learning in the light of these evolutions will change institutional learning practices dramatically.



Look at three dimensions that are brought forward as an organizer for the emerging Learning Communities and so-called Learning Networks. The dimensions are learner-driven. Describe your role as a teacher in each dimension.

2.12. Lifelong Learning



Lifelong learning has become a key subject in the dialogue of social partners, as well as between the social partners and governments. Partnerships of governments, social partners, enterprises, a wide range of institutions and representatives of civil society increase the effectiveness and resource base, as well as improve the equity outcomes of learning and training programmes.

Education experiences a gradual shift from teacher-centred education and training to individual learning. Rapid growth of information available and individual's need to use it selectively to create knowledge have accelerated this shift.

Individuals use the workplace, ICTs, and the Internet as sources and media for their learning more and more. Such learning tends to be informal. Therefore, recognition and certification of informally acquired skills and knowledge become central in the policies that endeavour to enhance individuals’ motivation to learn, improve their access to further learning opportunities, and reward them for the qualifications gained.

Main priorities of the international community are to pursue cooperation policies that promote universal access to basic education and skills training, the pillar of sustainable policies for economic and social progress in these countries. Such policies are best pursued in the context of the dialogue and consensus building between governments and social partners.



Important entities around the lifelong learning are:

- Informal learning;
- Learner-centred education;
- Dialogue;
- Consensus building.

Make a list of the most important tasks of a teacher.
How do these tasks fit in the framework of the lifelong learning?

2.12.1. Unknown Directions



This course is designed to help you get the best of the most advanced ICT tools and methods nowadays. The first step for teachers as well as students is to learn how to use computers, WWW, and specific learning tools. Important is that you can use a PC in your environment with Internet access. Secondly, we will introduce you to a group of other teachers having a similar interest.

How to use a computer in your class with the best possible effects? Please do not expect this to be a “waterproof” cookbook that guarantees you will find solutions of diverse practical problems. It is a panoramic overview of the mountains, valleys, and turbulent rivers taking you to unknown places.

In fact, the course forces you to start learning like your students are supposed. It is learning in its purest form: what you learn is a product of your curiosity, the infrastructure around you (WWW-based, we hope), not to forget your students who will try to canoe even faster along the river once you brought them there.



Write down your perception of how your student should approach a learning task?

- Is this approach also applicable to your own learning strategy?
- Do you need to change your approach in order to benefit from this training course?

2.12.2. Think About Constellations



Having introduced the metaphor of panorama and landscape, we will launch a (maybe, too) rigid diagram.

Its goal is to make you think about constellations rather than prefixed agendas and hard criteria. In Table 1 below the evolutionary lines from the missionary goals in the top row percolate down to the more concrete actions of various stakeholders. The chronological dimension is from the left column to the right one. The left column starts in the mid-80s when students and parents brought computers to school.

Table 1. Four evolutionary dimensions for ICT integration in education over five stakeholders

		Envisaged final goals in a certain period of ICT adoption			
		ICTs supporting the traditional curriculum contents and methods	Finding (new) learning content on WWW to extend and refresh the curriculum	Developing a natural desire for learning, curiosity and making analogies between apprehended topics	Joining (external) WWW-based learning communities
Stakeholders	Policy-makers	Stimulating WWW-connected computers at schools and promoting publishers to add courseware to traditional book methods	ICTs get the political attention. Ministries hesitate on how to promote teacher skills and attitudes	The urgency for knowledge economies breaks through. ICTs are seen as critical factor	Globalization, 24 hour economy, and the growing multicultural society force authorities to take the citizen as a client rather than a patient
	School leaders	Re-schooling teachers and stimulate the electronic formats for course materials	National final examinations prevent schools to promote WWW-based learning	Doubt about the validity of national uniform examinations	Initiating “knowledge circles” where various fields of expertise are represented
	Teachers	Apply ICTs for traditional functions like transfer of information, testing, tracking student progress, etc.	Some teachers discover wide resources on the WWW but have difficulty to integrate them in their lessons	Developing portfolio methods in order to mirror students’ competences and stimulate creative study attitudes	Searching and joining WWW-based communities of teachers to share and generate new ways of conveying students
	Students	Fascinated by the media, trying to control it (hacking), and perceiving a polarity between the adventure of the media versus memorizations for the traditional tests	Typical “school-like” learning material is not widely available on WWW. Instead of that an immense attraction of games, jobs, and sites for adults only	Rising feeling that learning is a manifestation of personality and should be authentic. There is a growing conflict between assessment and learning styles	Learning before and after institutional learning is favoured. During secondary school they already participate in freshmen courses of universities
	Parents	They are quite diverse in the perception of the added value of ICTs. As soon as authorities suggest it be beneficial for learning, parents will invest in hard- and software	The economic prospect of WWW access breaks through, however it is hard to imagine how it will help their children attain certificates	Continuous learning in “free time” becomes normal. Employers hesitate to further invest in corporate training	Parents search backwards their learning history and try to join communities of alumni and revitalize their learning appetite
		ICT skills, buying hardware, software, and subscribing to a WWW connection	Gaming, bargaining, searching for new jobs and better life conditions	Apply learning tools to stimulate critical learning skills	Integrating WWW-entertainment and joining communities in the intellectual school learning
Concrete steps for achieving the final goals					

2.12.3. Joining WWW–Based Learning Communities



Depending on the local and regional conditions, we estimate that at this moment (2005) the fourth column has been partly covered. However, extrapolating what happened in last 15 years we expect the full matrix can be witnessed in real education, though not in its full manifestation.



Study Table 1 carefully.

- Draw conclusions and form your opinion about your position and role according to Table 1.
- Do you agree with the envisaged final goals and concrete steps to achieve the final goals?
- How does it relate to the situation in your country?

2.12.4. The Role of Institutions



It is hard to classify the bottom-up versus top-down forces. Partly it is so as the technology has an unpredictable role and speed, as well as because its human actors have diverse agendas that are not always best protected by rational strategies; for instance, the role of institutions. An important motive to develop a school is to let it survive amongst many threats around:

1. Declining numbers of students;
2. Growing regulations and measuring effects lay stress on students, teachers, and managers;
3. Secondary schools are more or less bound to city quarters, which tend to shift in their demographic population;
4. Parents get more qualified and tend to get involved in the success of schooling, which may soon lead to a threatening decline in the status of teachers.

General fear and sometimes antipathy of teachers in accepting ICTs was to a large extent driven by extrinsic motives like the threats above. As now ICTs show their positive prospects (like making students more autonomous) it is expected that attraction will become stronger than allergy.



What is the most important threat in your surroundings?

Describe how this threat can be halted with the help of the following:

- Giving extra information;
- Renewal of the educational system;
- Social point of view;
- Adding extra technical solution.

2.12.5. Driving Forces



The driving forces behind further implementation of ICTs in education are:

1. Continued speedy technological progress, like that of mobile devices and telecommunication services now, alleviating the dynamic participation in learning networks.
2. Further expansion of the need for knowledge economies. It means that the third wave arrives. The first wave was mechanization, the second wave was the automatization, and the third wave is the human-machine-human combination to improve creative tasks. Creative goes beyond the search for unique or optimal solutions; the elegance and esthetics of human expressions will be revalued like in design.
3. Further liberalization of educational institutions, with autonomy of budgeting, student acquisition, but with an intensified battle against legal conflicts on such issues as social tolerance, equal access to everything, and ever more complicated balance between ideological and “objective” intellectual concerns. After two decades of rationalizing of educational goals and contents, we expect that the existential factors of teachers and students will flame up again like in the late 60s and early 70s when the autonomy of student unions was established.
4. A continuous requirement to balance between cultural and ethnic assimilation and accommodation. The multicultural society has arrived in well-saturated parts of the world. The metropolises in Western Europe still struggle against the need to adapt the language of minorities to the local language and the balance between identity and the reaction to provocative signs and clothes. Here the media have a catalytic function: it speeds up the awareness of global conflicts, as well as one’s knowledge about others’ background, which is helpful, at least, to understand each other.



In the process of further implementation of ICTs in education the media have a catalytic function.

- Describe the catalytic function for each driving force behind ICTs in education.
- Can you conclude that there is one general valid description or each driving force has its own function?

2.12.6. Role of ICTs in Secondary Education



The limitation of the ICT impact is in the fact that the schooling content, methods, and assessment criteria are rather inert to the continuous changes of real life.

Potentially ICTs are a very powerful dimension to transform the way the young generation prepares for further studies. Students should invest in learning skills and attitudes, driven by intrinsic motivation. The fields of education, schooling, learning, and training have to do with learning, mainly.

However, they are different cultures; their actors, infrastructure, and procedures like education and assessment have been developed as a certain social and economic situation demanding a transfer from experienced adults to a younger generation. The same is the case for primary, secondary, and higher schools: they have different orientations, especially if it comes to the integration of ICTs.

The nature of secondary education has been a subject of evolutions during the last two centuries. Pivotal was the step toward accepting the idea that school was a direct key to social mobility. As universities became more accessible via large social regimes, secondary school was the arena where didactics played a more crucial role: students were supposed to continue learning because of parents' high expectations rather than students' intrinsic motivations as a rule.

Focusing on the role of ICTs in secondary education, it becomes clear that it can't be measured by the results obtained at school only as a criterion of being prepared for the national final examination. ICTs potentially offer a powerful dimension to transform the way the young generation gets ready for further learning. Education, schooling, studying, and training – everything has to do with learning.



Please remember and describe the moments in your schooling career where new media became crucial for the way you learned later. Have you felt an inconsistency with your colleagues, or did it reveal difference in teaching styles?

2.12.7. New Secondary School Paradigm



The reason why primary and tertiary levels of education, especially, have higher prospective to migrate with ICT potentials is exactly in the fact that the schooling sectors are more autonomous. At the same time it is evident that once the standardized final exam has been offered, an enormous scale of restructuring emerges if ICTs are fully accepted as a support mechanism for secondary education. The reason is that the most sensitive phase to attain learning skills is the years between 11 and 16.

A clear indication backing up this thesis of the developmental psychology and didactics is the new secondary school paradigm observed. Its underlying message is that students must invest in learning skills and attitudes, driven by intrinsic motivation and curiosity rather than by pressure of covering a large number of subject domains in order to pass a final examination.



The intrinsic motivation and curiosity to explore new domains are essential to follow the above presented study guidance. Often there is a grey area between intrinsically and extrinsically motivated learners.

- Mention a few elements that can help increase the extrinsic motivation of a learner.
- Mention a few elements that can help increase the intrinsic motivation of a learner.
- What could be the role of a teacher?
- What could be the role of a peer group?

2.13. ICTs for Learning, Learning to Use ICTs



The ideal way to use your computer is by playing. If a tight agenda, formal obligations, and worries don't constrain you, it is the right state to start learning. Feel as if you are on a nice holiday no one asks you questions ("What are you doing here?" and the like), and you try to find out what a computer can do.

If you have never used the computer before, ask a young person in your environment to demonstrate how it works. This is natural in the cyberculture; don't ask yourself why a person would do that to you. Be friendly and admire that she/he helps you. Quite often the person who tries to help you is no real expert. However, by explaining he may learn more than he knew before.

We call it "learning by teaching". Soon you will start experimenting yourself and find out what a file, a folder, a link, a shortcut, etc. are. You will learn what it is to click an icon once, drag it, double click, or click with the right or left buttons. Once you have opened Windows Explorer you may go to any public WWW site. If you still want to learn more how to use Windows, you may open sites helping you in this.

You can find a beginner course at <http://www.learnthat.com/courses/computer/windowsxp> and an advanced course at <http://www.informit.com/articles/article.asp?p=29744>.

Essentially you learn more when you try. Important is that you re-experience learning, like sitting at the lesson of a foreign language that you have never spoken before. Leave aside the status you have gained before; if you open your mind you will learn everything you need. Moreover, there is always a person in your neighborhood who knows a bit more than you. Lay off your scruples and ask him/her. Most people like to be consulted as they re-establish their self-esteem. By the way, this is exactly the atmosphere you will hopefully find in your classes of any subject you teach.



Give your opinion about this strategy.

- Have you ever started a new experience this way before?
- Can you think of a learning situation outside the traditional schooling system during your holiday that has improved your knowledge?

Final Assignment of Module 2

1. In Module 2 we have claimed that teachers must have a relaxed period for playing with ICT facilities and experimenting with the new type of learning that targets at students as well. Simultaneously it was stated that real learning must be a self-organized process, where only the learner decides what and how to learn.
2. Please sketch a workshop for teachers to learn about ICTs in a free and active way. What roles do you recommend for the workshop leader?
 - Instructor
 - Coach
 - Mentor
 - Colleague
 - ICT expert
3. The famous statement of McLuhan is “the medium is the message” (McLuhan, 1964). It implies that ICTs mainly bring ICTs to the mind of students and not so much the content carried by the ICT programmes. Do you agree with this consequence? If not, please make clear that education is an exception to this law.
4. Communication, knowing what you know/don’t know, mapping your intuitive notions, and knowing how to find true experts – these are crucial competencies needed in Information Society and Knowledge Economy in the long run. Please describe at what preferred moments in the secondary school curriculum one must explicitly pay attention to these competencies.
5. In *The Road Ahead* Bill Gates mentioned the relevance of education and the way computers will change the learning environment (Gates, 1996). Since then the role of the Internet has grown immensely. Please reflect on the phenomenon of Open Source software, like Linux, compared to Microsoft Windows from the perspective of Learning Communities.
6. In further development of your answer to the previous question: What is your suggestion on the evergrowing impact of testing and certification? What is the best way to prevent teachers to teach for the test instead of teaching a subject area in itself? Do you see a parallel between authentic testing with student project portfolios and Open Source software? Include the earlier distinction between intrinsic and extrinsic in your argumentation.
7. What measures must ICT teachers take in order to prevent their students from information overload?

MODULE 3. USE ICTs TO LEARN

3.1. “Interest/Curiosity” Plus “Asking Questions”



Once you find yourself no stranger any more with your computer, you might use it to learn something different, for instance, about... *learning*. The doors to enter are “Interest/curiosity” plus “Asking questions”. People of all ages, of any profession, in every place, and in different environmental contexts are continuously learning, thus constituting the learning society of the 21st century.



Think of your three colleagues.

- Ask yourself: do they intend to make their students better learners?
- If not, then what is their motive to teach?
- Would ICTs help them transform from teaching to coaching?

3.1.1. A New Kind of Literacy



The issues of teaching and learning are of importance to the evolving Information Society. The development of modern ICTs is creating an environment of rapid and ongoing changes. Such environment requires a fundamentally new approach to education. A human being demands new skills and understandings and must develop the facility to enhance these skills and understandings on a constant basis. In other words, humanity must embrace and promote a culture of lifelong learning.

ICTs exceed the traditional framework of the education process. Learning can no longer be viewed as a ritual that he/she engages in during the early part of a human life only. ICTs are used to cross age, time, and space barriers to bring lifelong learning to all.

People of all ages, of any profession, in every place, and in different environmental contexts are learning continuously. Thus, they constitute Learning Society.

The amazing standards and prospects offered by ICTs in learning and teaching show that humanity is on the threshold of a new stage of the educational revolution which will entail a dramatic shift in every sphere of human existence. These circumstances and new social demands, a new world community shaped by new ICTs and models of action call for new literacy for Information Society.

The new literacy provided implies the creation of new technology to obtain scientific knowledge, new pedagogical approaches in teaching and learning, new school curricula and methodological materials for teachers and learners. This is to awaken a student’s intellect, shape an individual’s creative potential and mentality, and develop a holistic world outlook of an individual to let him/her gain a foothold in Information Society (Kinelev, 2003).



Information Society calls for new kinds of literacy.

- Can you illustrate how citizens can survive without ICTs in ten years from now?
- If you compare ICT literacy to learning the alphabet, what are the differences and similarities?

3.1.2. Primacy of Human Personality



Thus, it will be a mistake to think that new ICTs applied automatically raise the quality of education. In order to exploit their opportunities effectively, such fields as computer psychology, computer didactics, and computer ethics must be better developed, explored, and employed by educationists.

It is worth keeping in mind that in spite of a variety of information sources and teaching technologies that transform information into knowledge, there is only one way to convert knowledge into education. Such conversion takes place in a person’s consciousness.

It is the most interesting and sophisticated interaction going between the mental and cyber spaces. A human personality is born and develops as a result of this interaction. It allows us to contend that no two educations evolving as a result of this interaction can be treated as completely congruous, inasmuch as no two human personalities are the same because each individual is unique.

The priority of a human personality was the main result of the past century. The primacy of a human personality is the main imperative of the 21st century.

Here, we expect education to play a vital role, to give multi-modal representations for articulating prior stages in one’s experiences and perceptions, and to restructure them into the actual state of life. Restructuring experiences can be seen as a metaphoric umbrella for learning in general, especially as a part of the constructivist paradigm (Kinelev, 2003).



Write about your personal experience related to the transformation of information into education.

3.1.3. Learning and Teaching Become a Process of “Developing”



WWW-based media, like multimedia and virtual realities, allow learners to participate in high-tech environments. It seems opportune, however, to give extra attention to the fact that we know through long-lasting traditions, that “receiving the right information” is only a small first step to learn a topic actually.

The WWW provides the “just-in-time” and “just-for-you” information. It also allows students to work closely with their peers, even with those in other countries, belonging to different cultures and participating in different types of courses.

From a multicultural point of view, this access and communication are quite vital to make progress in bridging various parts of the world. Of course, these global facilities help teachers become a “learning organization” very much.

New dynamic programmes being available now help learners get aware of prior knowledge, analogies, discrepancies, and omissions. Conceptual schemes have proved to be elegant and efficient to share and negotiate knowledge. Especially, in case the topic concerns moral values, belief systems, and existential stories, the concept maps have an added value for learners, teachers, and co-students.

Secondary school learning is the age of attempting to understand complex processes in Natural science and Humanities. Constructivism is a paradigm that highlights the learners’ wish to “build” their own concepts.

Addressing the question how students can actually prepare themselves for the 21st century, we require additional didactics in order to motivate the new generation to invest and participate in technology, hence, stimulate economies and improve infrastructures. It entails the question what new skills and attitudes we may expect to appear in the teachers of tomorrow.

As an overall thesis it may be stated that the knowledge economy of this century can’t be attained by “teaching subject matter from the shelves”; learners must excavate and exploit new concepts as creative acts: learning and teaching become a process of “developing” rather than “transferring” knowledge. In this respect it is fundamental to sketch architectures for “interest-based learning communities for learners” and “networks for mutually learning teachers”.



We expect that large organizations like

UNESCO: <http://www.unesco.org/>

OECD: <http://www.oecd.org/>

UNICEF: <http://www.unicef.org/>

The World Bank: <http://www.worldbank.org/>

will further demonstrate initiatives to propel the WWW-based mechanisms.

3.2. WWW: The World Wide Web



Now, being an experienced teacher you might be less interested in learning, as you have been immersed in the learning theories for many years already.

So, let's assume you have some practical need like "How to get rid of mice" or "What is the cheapest way to camp in New Zealand?" Firstly, you may use a general search engine, like the listed in Table 2 below.

Table 2. Most common search tools for the Web

Google	http://www.google.com/	Over 3 billion search keys. Claims over 4 billion but about 1 billion are incompletely indexed (i.e. can't be full-text word searched). Unindexed pages are retrieved if your search matches their titles or other pages linking to them
Teoma	http://www.teoma.com/	Claims to have 1 billion fully indexed, searchable pages and 1 billion more partially indexed
Yahoo	http://www.yahoo.com/	Shortcuts give a quick access to dictionary, synonyms, patents, traffic, stocks, and encyclopedia
Alta Vista	http://www.altavista.com/	AltaVista's mission is to provide an access to information on the global community and set standards of search technologies and ways people find information



Explore the search engines. Investigate the search engines in your language and/or use the most common search tools for the Web listed in Table 2. Identify what you practically need at the moment. If you like to know the suggestions given by *Google* to the two questions, please turn to Appendixes 1 and 2. There are the monitoring sites that will help you find the best search engines at the time; for instance, <http://searchenginewatch.com/>. Special sites are there like *Ask Jeeves* (<http://www.ask.com/>), with a special version for children (<http://www.ajkids.com/>).



Try out the questions above and see where you finally land. Be aware that you will soon meet very interesting information having nothing to do with your initial question. We call it "serendipity" (if you like to know more about the background of serendipity, please question WWW). Compare it with the search for an old photo album on your grand parents' attic. You don't find it, instead you find an old violin, that later turns out to be a Stradivarius US\$ 1.5 million worth.

3.2.1. WWW as Source for Learning



Back to learning: WWW hides a lot of information. In fact, much richer and more accurate than all school books contain altogether, though with a lot of incorrect data and misinformation.

Students must learn how to handle this wide spectrum of results. The first step, however, is that they experience the WWW scope.

By the way, they won't be so fascinated like you and me, as they have never lived in the period when the information taught was scarce, and you had to pay for it.



Do you think WWW is a valuable resource for learners? Will they still follow your lessons? Think about the time when your teacher kindly requested not to look through a new reading book for a picture.

3.3. Finding Learning Material on WWW



Before starting this element, it is better to present an opinion rather than send you a bunch of web site addresses. Using ICTs is not the best way to emulate traditional ways of learning. For instance, if you want to get ready for a certain test, you better study the tasks close to the test.

If you want to learn according to your interest, don't try to get extra reward from succeeding tests; mastering the topic is a reward in itself.

That said, you may start searching for training materials on the web. A more global way is to search via search engines or questioning sites like *Ask Jeeves*.



Having arrived in another part of the world, you might be interested in finding the local language courses, i.e. Japanese. Use the questioning sites *Ask Jeeves*. Ignorant of any training institutions *Ask Jeeves* brings you many suggestions. See the result in Appendix 3. How does this affect your attitude to learning?

3.3.1. Guiding the Learners’ Attention and Social Reinforcement



The answer to the query “how to learn Japanese” is divided in two parts. The first part lists the sites of the institutions that you have to pay, otherwise Ask Jeeves won’t advertise them. Below the line are the sites pretending to have Japanese lessons for you. After you have tried several, you may find out that these WWW links provide course content rather than practical learning exercises.

So, the first conclusion is that a learning content is not the same as a learning environment. The second – you need a supervisor, a guide, co-students, interactive exercises, etc.

Unless you are a very talented and disciplined student you will not succeed in learning. You will soon discover that the classical classroom is not so bad for guiding your attention and social reinforcement.

Once you feel attracted to go through some formal courses on ICT skills and procedures, you may consult the underlying web sites in Table 3.

Table 3. Training and assessing ICT skills via the Web

Name	Url	Description
The computer driver license helps and assesses your computer skills	http://www.ecdl.com	ECDL helps raise a general level of computer skills of a society and provides access for all to Information Society
Free learning material on how to use a computer and its applications	http://www.er.uqam.ca/merlin/xw999998/eng/eformation.htm	Gives you a general data on what you should know before using a computer. It shows the operations with the keyboard, mouse, floppy disks, and software environment
Special training courses for teachers: Word processor, Spreadsheet, Database, Presentation, E-mail, and the web browser	http://www.tta.gov.uk/php/read.php?sectionid=115&articleid=358	The QTS skills test in ICTs is intended to ensure that everyone qualified to teach has a good ground to use ICTs in a wider context of their professional role as a teacher
Etc.		



How important is it for the learner to have an access to the opinions of others?
 Would a quality label be helpful?

3.4. Educational News Services via WWW and/or E-Mail



In order to stay informed on recent and coming events, we recommend you consult a number of web sites regularly, which will benefit you with a newsletter every week or month. Table 4 highlights the examples.

Table 4. Prominent news channels on educational development trends

Name	Url	Description
Educational Technology & Society	http://ifets.ieee.org/periodical/	Educational Technology & Society seeks academic articles on the issues affecting the developers of educational systems and educators who implement and manage such systems. The articles discuss the perspectives of communities and how they are interrelated
International Engineering Education Digest	http://www.ijee.dit.ie/digest/IJEE Digest.html	Issued every three weeks or so, covering developments in engineering education internationally. It is delivered electronically to some 30,000 engineering educators worldwide
The Technology Source	http://ts.mivu.org/	Peer-reviewed bimonthly periodical published by the Michigan Virtual University is to provide thoughtful, illuminating articles that will assist educators as they face the challenge of integrating information technology tools into teaching and managing educational organizations
Education Week on the Web	http://www.edweek.org/	Informs about major organizations involved in education
Educational News, Commentaries & Reports	http://www.educationnews.org/	Free online subscription and the portal to other educational news sites
The Teachers' Corner	http://www.theteacherscorner.net/	The place for Primary & Intermediate Teacher Resources with lesson plans and the Teachers' Lounge
IDEAS Web Site	http://www.ideas.wisconsin.edu/	IDEAS site provides an access for Wisconsin educators to high-quality, highly usable, teacher-reviewed web-based resources to develop curricula, content, lesson plans and grow professionally.
U.S. Department of Education	http://www.ed.gov/	Promoting educational excellence
Etc.		



The pages mentioned by now are in English. Discuss and write down the possibilities to set up a web site in your language to assist teachers.

3.5. Educational Material via Web Portals



Rather than direct you offering a long list of commercially available courseware, we make you an independent searcher in the portals for learning purposes. A portal is a concisely shaped entry to the best possible (as the authors currently believe) collections of learning material.

A good strategy is to start a wide fishing query through one of the best search engines available now (*Google*) and ask for “educational portals”.

The second approach is better as we make the recipients less dependent. So here is the way to proceed finding the best and widest collection of learning materials via the web. The query “educational portals” brings other important portals that allow you to look for even better course modules under these sites every week (see Table 5).

Table 5. Portals to educational material

Name	Url	Description
Educational Portals and Starting Points	http://eduscapes.com/tap/topic21.htm	Starting Points and Portals. Subject Directories and Thematic Starters for Educators. Subject Specific Resources
The Gateway to Educational Materials	http://www.thegateway.org/	“One–stop, any–stop” access to lesson plans, instructional units, and other education resources on the Internet
Gateway to Educational Materials	http://www.geminfo.org/	Consortium effort to provide “one–stop, any–stop” access to substantial but uncataloged collections of Internet–based educational materials
Spartacus Educational	http://www.spartacus.schoolnet.co.uk/	Free online learning material for History teaching and portal to other high quality subject areas like English literature, Geography, History, Science, and Media studies
Maths Online	http://www.univie.ac.at/future.media/moe/	Multimedia learning units on mathematical subjects for secondary school, high school, college, and university
Etc.		



We don’t provide you with all possible good information outcomes. Much better is to make clear how to retrieve any sort of information by yourself, which can be compared with: (1) sending fish to developing countries versus (2) teaching them how to catch fish. Write down the examples from your own experience.



Continue your search for material on the Internet to assist you in learning Japanese.

3.6. Special Domain Learning Materials



Alongside with the standard curricular domains for secondary education, specialized fields are introduced, mostly on a project basis. Ideally the project teams must find crystallized materials that help survive through difficult stages in the group work and arrive at valid conclusions or reports as indicated in Table 6.

Table 6. Exemplary websites with specialized curricular domains

Name	Url	Description
Office of the United Nations High Commissioner for Human Rights (OHCHR)	http://www.unhchr.ch/html/menu6/2/training.htm	Contains materials supporting general human rights education efforts; it includes information on the Decade, a list of international and regional instruments dealing with human rights education
NASA Space Link	http://spacelink.nasa.gov/Instructional.Materials/	Educational materials and information related to NASA Aeronautics and Space Research
National Homepage	http://www.skywarn.org/educational.asp	Educational material for spotters, teachers, and the media on meteorology
National Center for Chronic Disease Prevention and Health Promotion	http://www.cdc.gov/tobacco/educmat.htm	Information on the malicious effects of smoking
American Society of Hematology	http://www.hematology.org/education/	Reference and teaching tool accessible for physicians and hematology students
Human Genetics Educational Material	http://research.marshfieldclinic.org/genetics/Educational_Material/EMaterials.htm	Educational information on human genetics for the public at large
Centre for Quantum Computing	http://cam.qubit.org/articles/index.php	Quantum physics allows for fundamentally new modes of information processing. It requires the existing theories of computation, information, and cryptography to be superseded by quantum generalizations
Free learning material on Health Education	http://www.healthcentre.org.uk/hc/pages/learningmaterial.htm	Association for Medical Education in Europe – worldwide association for the interested in medical and health care education
Etc.		



Table 6 gives the examples of web sites with specialized curricular domains.

- Visit some web sites.
- Try to find new sites in different domains.
- How can you communicate your results to your colleagues?

3.7. Finding Inspirational Educational Practices



As a professional you have the journals, meetings with other teachers, etc. However a fast-spreading method to update and refresh your knowledge and creativity is via special news platforms on the web.

The first step you are likely to make is to consume this information. There is nothing wrong with that. But we know from the Latin saying “Qui docet dicit”, which implies “those, who help others learn, learn mostly themselves”.

So, we may predict that once you have experienced a wonderful moment of being inspired by a colleague, you can’t stop articulating your own “best practices” to the colleagues all over the world. Don’t hesitate, the famous “prophets” like Maria Montessori finally became school reformers because they were keen on their own pragmatic successes, not because they had a particularly rich theoretical understanding.



Identify the people who became school reformers in your culture.

- Make a list of the conditions in the economic situation at the time.
- Be inspired by the information on the Internet and make an outline of a possible way to reform secondary education (see Table 7 for more links).

Table 7. Inspirational educational practices

Name	Url	Description
About teaching, learning, and educational leadership	http://www.about.com/education/	Sharing practical expertise on how to optimize your teaching; primary, secondary, and tertiary levels
EducaNext fosters collaboration among educators and researchers	http://www.educanext.org/ubp	This site enables you to: <ul style="list-style-type: none"> – participate in Knowledge Communities; – communicate with experts in your field; – exchange learning resources; – work together on educational materials: textbooks, lecture notes, case studies, simulations, etc.; – deliver distributed educational activities: lectures, courses, workshops, case study discussions, etc.; – distribute electronic content under license
Online Learning in the 21st century	http://www.ncst.ernet.in/vidyakash/portal	Focuses on the importance of incorporating new technologies in the educational field
WWW–tools for education	http://magazines.fasfind.com/wwwtools/	Administration, awards, cheating, communication, evaluation, games, many topics, online resources, publishing, searching, social issues, subject areas
Etc.		

Final Assignment of Module 3

- Given the earlier recommendations, please sketch how you would configure an ICT-compliant secondary school from scratch. Be critical on its inner architecture for the sake of flexible spaces for project groups, plenary teaching, and individual study spaces.
- Be explicit assembling a teachers' team. What complementary accents should they represent in order to guarantee the variety of subject areas and ICT skills?
- What computer systems would you recommend? Think about the complexity of planning the roster and room allocations. Reflect on pros and cons of each type of equipment. Please take into account at least five types of devices:
 - Desktops
 - Laptops
 - Tablet PCs
 - Personal Digital Assistants (PDAs)
 - Communicators and smartphones
- Make an outline of the basic regulations for teachers and students on how to reconcile flexibility with minimum planning in advance.
- Describe an average day at this school. Take into account the following:

- Ratio between plenary, group, and individual study activities;
- Interactions between stakeholders in and around the school: parents, external experts, artists, and technologists;
- How long do students need to play a more responsible role in the group learning?
- What is the freedom for individual teachers to arrange the learning according to personal preferences, team teaching, etc.?
- Describe if and how the school will develop in the first five years. What constraining factors will hamper this school to evolve further? Which actors will finally be limiting: teachers, students, parents, school managers, school inspector, examination boards, employers, etc.?



MODULE 4. ICTs HELP TEACHERS LEARN

4.1. Knowledge Must Be Satisfied



Because of the actual mismatch between traditional teaching methods and predominant learning methods taking advantage from ICTs, teachers have a chance to learn in-depth from this new trend. The traditional way of teaching is a product of a long evolution, quite effective and efficient for uniform classroom-based learning, indeed. Its basic paradigm suggests that teaching is *giving* the knowledge and learning implies *receiving* and *reproducing* it.

We do have alternative models for learning. They rest upon the idea that learning needs an *active* rather than a *receptive* approach.

A more fundamental alternative paradigm is that knowledge essentially can't be transferred; it must be conquered through experimentation, reflection, and conceptualization.



Three models of teaching are described:

- 1) Teaching is *giving* the knowledge and learning implies *receiving* and *reproducing* it.
- 2) Learning needs an *active* rather than a *receptive* approach.
- 3) Knowledge essentially can't be transferred; it must be conquered through experimentation, reflection, and conceptualization.
 - What was the main learning strategy during your education?
 - Write how it affected your learning attitude.
 - What was the influence of the teacher on your enthusiasm about the subject?

4.1.1. Reformulate Best Practices



Theories on how the teaching methods should anticipate and convey this learning process are scarce. Rather than drawing alternative teaching scenarios from scratch, it seems better to let experienced teacher reformulate best practices into course lesson sketches so that they may inspire the colleagues around.

After the successful practice the sketches can be formalized into templates for a broader reuse. The creative development of attractive sketches benefits from collaborative efforts of the members from various disciplines and styles.

Importantly, the educational outcome in practice determines if it is labeled as failing or successful. Social pressure and animosity often hamper institutional teams, we propose web-based communities as adequate for developing new teaching practices.



Write down one or two domains where you, as an experienced teacher, could reformulate best practices into course lesson sketches so that they may inspire the colleagues around.
At the end of this module, develop sketches and discuss them with your colleagues.

4.2. Virtual Web-Based Learning Communities



Web-based communities are in their early days. Quite successful ones are in the so-called common-interest groups. Sharing experiences and opinions and demonstrating successes are its core, mainly. Where a *conference* is the format for scientific exchange, *best-practice communities* are the right formats to optimize professional qualifications. Table 8 lists the communities of general meaning to those specialized in sharing the teaching expertise.

Table 8. Generic and specific web communities for mutual learning of teachers

Name	Url	Description
KnowNet	http://www.theknownet.com/	KnowNet's goal is to work together with communities of knowledge and practice to develop architectures and processes to realize – in intranets and communities – the vision of an encompassing, expressive, and active web of knowledge, work, and communication
Distance Learning and Education	http://groups.msn.com/Distance LearningandEducation	An open community to speak about a learning tool of the future. Universities, colleges, and businesses are turning toward this economical and efficient way to train
Under MSN there are 3295 teaching groups already	http://groups.msn.com/browse?catid=287	<ul style="list-style-type: none"> • Teachers Cafe (3251 members) • Burit Melayu Malaysia (1502 members) • World Teachers (1731 members) • Distance Learning and Education (384 members) • Special Education Teachers Community (150 members), etc.
Providing training, information, and resources for the teacher training community	http://www.tta.gov.uk	The Teacher Training Agency's purpose is to raise standards by attracting able and committed people to teaching and by improving the quality of training for teachers and wide school workforce
Etc.		



Generic and specific Web-Based Communities for Teachers can be found on the Internet. Table 8 gives some examples.

- Experiment/search on the Internet or look in the Appendix 4.
- Reflect on different services provided by the links.

4.3. ICTs to Learn to Teach



Teachers' education as well as in-service (re)training of practicing teachers is vital for further integration of ICTs in schools. Now ICTs are a very welcome facility to stimulate and convey the teachers' continuous learning.

ICTs are not isolated factor. "Staff mobility" and "technical support staff" are equally important. It is worth mentioning that ICTs are a catalyst: they stimulate many aspects of innovation, give incentives, make people curious, and spread good (as well as bad) ideas around very quickly.

As far as the didactical aspects of ICTs are concerned, they are useful bringing forward the main lines and providing the scenarios how to migrate toward full implementation in practice. The skills expected from would-be teachers are the skills of decisive and well-proportioned integration of ICTs in their teaching.

As gaming and web-browsing are inherent elements of students' learning, it is the teacher's art to make smooth transitions from playing with ICTs to integration of this playing for the sake of learning of more formal curriculum elements, like formal memorization and apprehension needed in Math, Physics, and Science.

During these processes the teacher must have the skill to evaluate the quality of interaction and the quality of learning dialogues quickly, so that they can guide the students to good courseware option and learning tools.



One of the new challenges for teachers is to evaluate the quality of interaction and the quality of learning dialogues quickly, so that they can guide the students to good courseware and learning tools.

- What methods of tracing good learning material do you use?
- How often do you consult a person instead of a WWW-based search tool to find it?

4.3.1. What Teachers Must Learn First



Teachers must have the search skills and be aware of the recognized computer libraries. They must familiarize students and parents with these choices that the latter will make on their own later on.

Finally they need to join and actively contribute to Web Communities for Teachers in order to make prior pragmatic actions explicit and enrich them with the ideas of the colleagues.

After specifying new learning skills and approaches for students in ICT-based schools it will become clearer what exactly teachers must learn first.

The first rule is that teaching can always be improved through systematic work, openness of the colleagues, and, primarily, the willingness to self-educate. The underlying sites are exemplars of many inspiring places where a teacher can study nowadays.

Remarkably, the settled (popular) teachers' organizations have web sites focusing on formal traditional presentations and articulating the high standard of a teachers' organization, while the "newcomers" have to settle down and launch vivid and well-balanced sites of good didactics that have the atmosphere of a real community.

Table 9. Teacher web sites as a precursor to learning by community participation

Name	Url	Description
Teacher Education	http://educ.os42.com/	It is an offspring of the Australian site “Teachers on the Web”. It contains theories, topics, resources, updates, and many links to the web sites for beginners.
The Journal: Teaching and Teacher Education	http://www.sciencedirect.com/science/journal/0742051X	It is a scientific journal that expresses in a very clear language the resultant comparison of the efficiency of various teaching styles, the crises in teaching phases, continued professionalism, etc.
The TEMAT database site	http://www.temat.org/home.shtml	It was developed to support professionals who design and implement programmes for pre- and in-service K-12 Mathematics and Science teachers. It highlights the key elements critical to the design and implementation of effective professional training programmes with numerous links to relevant reviews of materials and practitioner essays.
Etc.		



Teachers’ web sites as a precursor to learning by community participation can be found on the Internet. Table 9 gives the examples.

Experiment/ search on the Internet or look in the Appendix 4.
 Reflect on different services provided by the links in Table 9.

4.4. Curricular Integration



The context of the training course is the growing group of secondary school teachers facing an increasing need to revitalize curricula and teaching methods, as well as the actual situation that the World Wide Web has already stored more educational materials than traditional libraries. In contrast to the decade before it is no longer a valid argument to the question if a vast amount of publisher-owned student books can be bypassed.

Secondary school curricula mainly focus on the examination criteria in the basic subjects, as well as the entrance exams for higher education. In this sense ICTs are instrumental, being no goal by themselves. However at the same time it is the overall opinion that students should be able to use ICTs during their study. They should have flexibility to demonstrate this skill in various course domains and in the long run in their jobs or continued learning. We assume that students are supposed to convey projects that explicitly aim at using ICTs. Wherever the students apply ICTs they must manifest the appropriate attitude of politeness, avoiding the danger of damaging others’ privacy and security. In order to gain these skills and mentality the students must have a certain level of understanding of underlying algorithms and data structures. Evidently, we have just started exploring the balance between ICTs as means versus a curricular goal.



In your opinion, do you have enough understanding of the WWW related to your job and continued learning?

- Make a list of your strong and weak points and indicate how to move forward.
- At the end of this module, revise your opinion and discuss it with your colleagues.

4.5. Course Development Around ICT Skills



The personal computer is penetrating the daily life. This is the reason why a shorter time must be spent to master an operating system and its applications like Word and the Internet browser. More time is required to know how to stay focused during querying, reporting, and publishing on the WWW.

Rather than explicit instruction, groups of students (of three or four) will undertake project activities and will compensate for the lack of certain skills. It is, therefore, desirable to assemble groups of diverse compositions so that mutual learning may take place.

A desktop has been accompanied (and partly supplanted) by a laptop and, in its turn, by a PDA (Personal Digital Assistant), or a mobile telephone. As media have become a commodity, their interfaces have become user-friendlier, demanding less explicit efforts to be introduced.

One of the logistic advantages of the PDA is that computer classes can't be overbooked. The time will come soon when students will personalize computers at schools: they will always have the documents, bookmark lists, and shortcuts on them. Once a PDA is synchronized, the documents relevant for studies will be ready for mobile use, though unconnected. PDA's usage will be propagated among peer groups like the ambience of youngsters learning to use a mobile or operate a TV.

The process of learning and curricular topics to be mastered will dictate the direct instruction.



More time is needed to know how to stay focused during querying, reporting, and publishing on the WWW. As media have become a commodity, their interfaces have become user-friendlier, demanding less explicit efforts to be introduced. PDA's usage will be propagated among peer groups like the ambience of youngsters learning to use a mobile or operate a TV.

- Reflect on these developments.
- What is the current situation in your country?
- What is your vision of a PDA in the classroom?

4.6. Generic Learning Tools



Learning in the era of lecture rooms meant listening, understanding, and remembering. The stage of understanding was often left untouched deliberately and students were anxiously trying to reproduce what was just formulated by a lecturer.

The late 70s and 80s brought more views on active and experience-based learning. However this was hard to reconcile with classroom-based learning.

Learning tools nowadays stimulate learners to play a more active role in their learning. In fact, it is based on the paradigm that a learner is the key actor, not a teacher or an external expert, in learning.

Planning, monitoring, estimation, design, construction, evaluation, and reflection – these are major elements of learning tools’ application.



Dwell on the most stimulating tools/learning environments you have experienced. Describe your role, the role of a teacher/expert, your fellow students etc., the tools, results, duration, environment.

4.6.1. Tools Aren’t Goals



In contrast to the learning material, the tools are no goal. The real goal is the process of finding out what is the best way to learn for you in a certain situation. After the *tool* is explored, the *method* should come in focus.

A nice analogy can be made with the TV and its programmes. The TV is a tool to satisfy several needs and stakeholders. From an advertiser’s point of view, TV is a wonderful tool showing to a customer how good and pleasant it is to *buy* and *enjoy* a new product. From an audience’s point of view TV is an excellent tool allowing to *experience* what is happening in the rest of the world. From a movie-maker’s point of view TV is an excellent tool too, as it *elicits new genres* like a soap opera – a wonderful combination of a programme attracting housewife’s attention and appetizer transmitting commercials like what soaps to buy.

In other words, the medium is a trigger of new methods, habits, desires, and imagination. As long as it works, the stakeholders will shift their priorities and might think of introducing new media as it may conquer another empty spot, like nowadays users have got fascinated with downloading of entertainment elements via the Web.



How can TV be used as a tool in education?

- How can students benefit from the fact that TV is at home as well?
- How do students benefit from the combination of TV and WWW?

4.6.2. Learning Tools



Let's have a look at what learning tools have penetrated the field of educational computing the last two decades.

1. Memorization and mastering of skills: the so-called practice-and-drill programmes have become popular, though they still aim at basic skills like spelling, numbering, topography, and second language learning. Its overall framework is “direct instruction”: a teacher attempts to optimize the information transfer and feedback of the actual process in the student’s mind. A clear example of this paradigm among others can be found on the site of Science and Technology Unit by the Saskatchewan Education Institute (http://www.sasked.gov.sk.ca/docs/info_pro/instipr.html).
2. Student-computer dialogues in the text have been explored since the late 70s as an extrapolation of the Elisa system. Many people reported about a highly personal conversation even when they knew that the partner was a computer programme. Tutorials are conversational learning dialogues where the computer tries to build up a model and understand the student’s misconception. A large number of projects in Intelligent Tutoring Systems have showed how incredibly difficult it is to make this approach successful. The ACM publication by Beck, Stern, and Haugsjaa gives its basic rationale on the web page <http://www.acm.org/crossroads/xrds3-1/aied.html>.
3. Common applications like text processing, spreadsheets, databases, presentation tools, etc. have become a part of curricula in elementary, middle, and higher schools. Microsoft has launched a special site to propagate training material (<http://www.microsoft.com/Education/TLDownloads.aspx>).
4. Tools for reasoning and diagnostics: the expert systems were introduced in the mid-80s initially to help students find correct conclusions. Later it proved to be an excellent tool to make implicit knowledge and its incoherence explicit.
5. Simulation systems were the acknowledged learning tools in the early 80s as well as till the 90s when it was found out that simulations are excellent tools to make students express intuitive ideas. Though, the formal knowledge on a certain domain must be presented before.
6. Hypertext, hypermedia, multimedia, and, nowadays, virtual reality make the learning environment more realistic as if you are in a different world. Still to be explored is to what extent realism versus abstraction must be present in various stages of learning. In studying medical diagnoses and interventions it has been proved that a visual image created by an artist entails greater understanding than its ultimately realistic representation.
7. A wide spectrum of computer-supported tools for collaborative learning has emerged. Its basic premise is that during face-to-face communication humans manifest only a small part of their cognitive repertoire. If both human partners have a computer at their disposal more in-depth interaction and synergy become possible.
8. Searching, combining, and reconfiguring of knowledge on the Web have become a critical application for learning as well as for corporate knowledge management. Data mining based on Bayesian methods of adapting one’s initial question to the available information in the system might become a learning tool as well. A student’s mind and extensive web resources may be mutually refreshed so that one’s knowledge becomes more explicit and accessible to those who are accepted as our tutors or peer students.
9. Finally, there is an ongoing tradition in alternative knowledge representations that are quite complementary to (linearly) spoken or written text. “Concept mapping” is its clearest implementation. Its essence is that learners and designers are invited to sketch their main ideas graphically in terms of nodes and links. The nodes are imagined as concepts and the links – as semantic relations. In this case the tool is a medium to provoke a desired process.



Learning tools that have penetrated the field of educational computing the last two decades are: student-computer dialogues; common applications like text processing, spreadsheets, databases, presentation tools, etc.; tools for reasoning and diagnostics; simulation systems; hypertext, hypermedia, multimedia, and, nowadays, virtual reality; computer-supported tools for collaborative learning; searching, combining, and reconfiguring of knowledge on the Web; “concept mapping”.

- What type of learning is well known at the moment in your country?
- List your experiences with the tools mentioned above.
- As for the tools that you haven't practiced yet, how would you like to learn more about their capacities?
- What do you see as a promising tool?

4.7. Simulations for Learning via Experimentation



Only with the advent of a computer we can again pay full attention to learning by experimentation. Supposedly, the attitude of a student is to develop into inductive thinking: what happens if I change the circumstances? The attitude of the simulation software is: why not? And, if this is your input, then you may expect such outcomes of the model. A good introduction to learning via experimentation is the use of small-scale models manifested in graphic feedback. Below there is a recommended list of some simulations fitting in the secondary education domain.

- Science Simulations – <http://www.enc.org/weblinks/classroom/simulations/>
- Simulations in Education – http://www.school-resources.co.uk/simulations_for_educational_purp.htm
- Examples of Educational Simulations – <http://www.roleplaysim.org/papers/cache/Simulations.html>
- Interactive Educational Simulations – <http://www.simulations.com/index.htm>
- Modeling and Simulation Tools for Education Reform – <http://www.shodor.org/master/>
- Simulations for Schools and Charities – <http://www.stsintl.com/schools/>
- Educational Simulations – <http://www.eot.org/resources/educationalsim.html>
- Games2Train: Serious Training in a Game Environment – <http://www.games2train.com/site/html/index2.html>
- Workshops by Thiagi: Freebies and Goodies – <http://www.thiagi.com/freebies-and-goodies.html>
- Gamesbygrube.com – <http://www.gamesbygrube.com/>
- Game Hot Links – <http://www.thiagi.com/links.html>
- Master Tools – <http://www.shodor.org/master/>
- K-12 Resources – http://www.strategicstudies.com/eduOnline_k12.html
- Fish Bank Simulation – <http://www.unh.edu/ipssr/FishBank.html>
- SIM Rock Cafe! – <http://library.thinkquest.org/50061/>
- Educational Simulations – http://www.biosgroup.com/solutiontools/educational/educational_intro.html
- Computer Animation – <http://www-viz.tamu.edu/courses/viza615/97spring/history.html>
- Dynamic System Modeling Using Computer Simulation – <http://members.tripod.com/~ozpk/comppmod>



A good introduction to learning via experimentation is the use of small-scale models manifested in graphic feedback.

Explore <http://ozpk.tripod.com/0000simulation>.



Please express how this can be helpful to your students. How does it contribute to your curriculum?

4.7.1. Explore the Unknown



As students progress in learning via simulations, it is attractive to specialize scientific thinking through scenarios of “critical incidents” like the applied in training of security and calamities (Learning via Learning from Simulations and Critical Incidents, <http://www.jibc.bc.ca/cisc/main/AboutSims/simsLearning.htm>).

Its didactic value is that by exploring the boundaries of linear models a student develops a critical awareness of “first principles”, thus stimulating the learning in more complex domains at a later stage. Here meta-cognition is at stake: learning how to cope with latent and lacking knowledge.

The message is to let students feel that education can bring them many examples, but the real learning needs encourage them to explore the unknown. See the recent book by Clark Aldrich for a comprehensive overview (Aldrich).



As students progress in learning via simulations, it is attractive to specialize scientific thinking through scenarios of “critical incidents”, like the applied in training of security and calamities. Explore <http://www.jibc.bc.ca/cisc/main/AboutSims/simsLearning.htm>



How can this site be helpful to your students? How does it contribute to your curriculum?

4.8. Simulation Tools for Educational Leadership



While the entire educational institution is targeted at learning, it is not so much the educational organization that is a subject to learning. Similar to the education field are health care, public transport, and governmental authorities. Teachers may become school leaders and must upgrade the leadership skills.

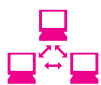
SimuLearn Virtual Leader (<http://www.simulearn.net/>) allows you to role-play at a series of key meetings. Many factors will determine your relationship with other characters and ability to complete a work, but of the greatest influence will be three elements of Three-to-One leadership: power, tension, and ideas. The advantage of learning via simulation is that you can build upon earlier intuition and arrive at a critical position where progress can be made only if you enforce a phase of deductive reasoning and reflection. Collaborative gaming tools are a next step as they suppose each group member masters a basic understanding of the key ideas and underlying model. An example of the underlying vision in the Virtual Leader Interface is the following: “... When people with power speak, others listen. When they support ideas, other people support the ideas. They exemplify credibility to their position and partners. Power is either formal or informal. Formal power is best understood by a job title while informal power can be demonstrated either by a recognized expertise or recognized alliances. People who exercise power well do the following:

- Partner with authority
- Partner with competence
- Introduce ideas
- Challenge opponents
- As an authority, confer credibility to another ...”

Teachers, who face the integration of ICT measures in their students’ learning, must have a chance to educate themselves this way in a topic area where they feel really “novice”.



SimuLearn Virtual Leader allows you to role-play at a series of key meetings. Many factors will determine your relationship with other characters and ability to complete a work, but of the greatest influence will be three elements of Three-to-One leadership: power, tension, and ideas. Explore <http://www.simulearn.net/>



KnowNet (<http://www.theknownet.com/>) is small software and a company of web services. It was founded in 2000 to research and develop new architectures, ideas, and Internet software for collaborative knowledge development in learning. KnowNet’s goal is to work together with communities of knowledge and practice to develop architectures and processes to realize – in intranets and communities – the vision of an encompassing, expressive, and active web of knowledge, work, and communication. The core mission is to understand the clients’ needs and practices and to produce excellent and usable systems to meet the demands. The secondary mission is to develop, alongside with these applications, the real-world experience needed to help shape a truly useful and interactive global web within the standards’ development process. KnowNet works on the principles of co-design, collaborating with clients to understand the structures and meanings of their professional communities, and to develop and customize systems to meet individual and organizational demands. There are many portals to discover better sites with educational resources, however so far we have found no portal to guide you to best-fitting learning networks. The book of solid background on learning communities is by Rena Palloff and Keith Pratt (Palloff and Pratt, 1999, 2003).



Come up with more examples where simulations have an added value.

Final Assignment of Module 4



Design a plan for your further career in ICTs for education.



What are the most urgent skills and understandings that you still need to master?



Why do you need to gain the critical mass to change your teaching practice?



How would you expect WWW-based teacher communities to work?
Do you expect teachers to share didactic templates, exercises, etc.?



Does video-conferencing via the WWW allow teachers to be invited to deliver a specialized lecture for the colleagues at a distance?



How can we start a mechanism of incentives for teachers to share expertise and resources? Do we need a virtual bank to register the proposed teaching services, thus offering teachers vouchers for others' expertise in future?



Demonstrate your ideas and plans on the teacher-sharing sites, like:

Teacher Sharing Site – <http://www.mccracken.k12.ky.us/miscellaneous/sharing.htm>

Teachnet – <http://www.teachnet.com/t2t/>

Educscape – <http://eduscapes.com/tap/topic113.htm>, etc.

MODULE 5. ICT PROJECTS IN EDUCATION

5.1. The Right Spirit



Any explicit collaborative work that aims at the improved conditions for learning with the help of ICTs can be listed here. The task is not to make a full inventory neither to list the most important ones. The goal is to inspire you as a part-time cybernaut with the right spirit to find the appropriate projects and partners exactly for your classes. The examples given will be diverse for you to decide what direction your project might take.

It is important to know that almost each big ideological organization has its own educational web site. Many of them clearly anticipate school-based learning practices.

Examples are listed in Table 10.

We offer the heuristic to consult the Web via your favourite search tool and find a wealth of educational ideas and materials to be included in your lessons and projects.

Another aspect is that these organizations often link schools in different countries that may result in real face-to-face exchange programmes.

Table 10. Educational projects initiated by large world organizations supported by ICTs

Name	Url	Description
Greenpeace	http://www.greenpeace.org/international_en/	Greenpeace is a non-profit organization with a presence in 40 countries across Europe, the Americas, Asia and the Pacific
Amnesty International	http://www.amnesty.org/	Amnesty International is a worldwide movement of people who campaign for internationally recognized human rights
World Health Organization	http://www.who.int/en/	The World Health Organization, the United Nations specialized agency for health, was established on 7 April 1948. It's objective, as set out in its Constitution, is the attainment of the highest possible level of health by all peoples
Medecins sans Frontieres	http://www.msf.org/home-uk.cfm	Medecins Sans Frontieres was born out of the exasperation of a group of French doctors working in desperate conditions of the Biafra War in the early 1970s
United Nations	http://www.un.org/Pubs/CyberSchoolBus/index.html	880 schools in over 80 countries registered for the <i>World Summit Event for Schools</i> (http://cyberschoolbus.un.org/wsis/about.asp) on ICTs and human rights
UNESCO Education Network	http://unesco.edna.edu.au/index_projects.html	At each World Conference many projects are started. Current projects of particular relevance to the Australian education community are linked on the indicated web page
Etc.		

5.2. “Cool Projects” as Announced by Microsoft



Browse this Microsoft Classroom Teacher Network archive to see how creative teachers can enhance the learning experience for their students by integrating new technologies into classroom activities. For the latest classroom resources please visit Innovative Teachers:

<http://www.microsoft.com/education/?ID=InnovativeTeachers>.

Art: A Reflection of America (831 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/ArtInAmerica.ppt>

“How is a piece of American art a reflection of (or reaction against) the events, attitudes, or issues in America at the time it was created?” That is the question that Kathleen Doherty poses to her 9th grade students at The Bromfield School, Harvard, MA, in this Unit of Work. Students demonstrate their findings to the class in the form of a PowerPoint presentation, a newsletter, or a web page.

Biographies Come to Life (1.1 MB PowerPoint file):

<http://webace/education/PRESENTATIONS/BiographiesComeToLife/BiographiesAlive.pps.ppt>

Judy Blake and Teresa Bateman, Brigadoon Elementary School, Federal Way, WA, help students develop an understanding of what a biography is by having students read a biography of a well-known individual, take notes about his/her life, write a rough draft about him/her, create a PowerPoint presentation about him/her, and then make their PowerPoint presentation for others.

Attaining Computer Literacy Through the Core Curriculum (105 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/Integrating.ppt>

Jeff Skelton is the computer literacy teacher at Hedrick Middle School in Lewisville, Texas. This is the third year that he has worked with core curriculum teachers to integrate technology in the classroom. Students in the 6th, 7th, and 8th grades devote 10 weeks each year to accomplish their learning objectives.

Bats and Sound (282 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/BatsSound.ppt>

Vickie Hayes teaches 3rd graders at Lakes Elementary School in Lacey, Washington. Her 3rd graders learn new scientific concepts through a fun lesson about bats and the role sound plays in their lives. Vickie began teaching with technology 19 years ago and feels it helps her students build self-confidence while improving skills in writing, critical thinking, collaboration, and research.

DNA Technology Research and Short Story Project (155 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/DNA.ppt>

Ned Granville teaches 9th grade honour's Biology and 11th and 12th Grades Advanced Placement Biology at Roswell High School in Roswell, Georgia. In “DNA Research and Short Story Project” students research the latest technology in DNA fingerprinting and then use this information to produce a newsletter about DNA technology (using Microsoft Publisher), a PowerPoint presentation on DNA, and a short story using DNA fingerprinting to investigate a crime.

Student Electronic Portfolios (70 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/ElectronicPortfolios.ppt>

Dennis Barbata is a Computer Science teacher and Technology coordinator at the Oak Grove High School in San Jose, California, where he recently created the Information Technology pathway, one of nine pathways that students follow throughout their four years of high school at Oak Grove. He also created Project EagleWeb in which students write web pages for small local businesses.

Global Environmental Issues: Air and Water Pollution (428 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/BITTEN.ppt>

Hank Bitten developed this lesson plan for his honours level students at Indian Hills High School in Oakland, New Jersey. Students work in teams to research air and water pollution and present their findings to a public audience.

Global Internet Projects (254 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/glinternet.ppt>

Susan Silverman designed this lesson plan to expand the horizons of her 2-grade class at Clinton Avenue Elementary

School in Port Jefferson Station, New York. The Global Internet Projects take her classroom beyond its four walls into the global educational community.

The Titanic: A Multidimensional Project (280 KB PowerPoint file):

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/Titanic.ppt>

Quincy Cook and Cathy Walker are the 7th grade teachers at Narrows View Intermediate School in University Place, Washington. “The Titanic: A Multidimensional Project” is their interdisciplinary six-week unit in which students use Microsoft Office 2000 to develop a travel brochure about the Titanic as well as a newspaper reporting on the Titanic disaster. The project can easily be adapted to other historical events.

5.3. “Discovery School” by Discovery Channel



A typical project is “Discovery School” initiated by the US broadcast Discovery Channel. The column at the left side of a homepage shows the available lesson plans. You may click a category and experience the breadth of the topics. The announced age groups, excluding 9–12 grades, imply the project will fit the lower secondary school. The nature of the projects is experimentation, exploration, and imagination of the magnitude of natural phenomena on the Earth and in space. It is a well-chosen domain as teachers often search for specific topics that complement the study book and need visuals for better understanding. You will find ideas how to guide students remaining close to the traditional teacher-led lesson model. This element is rather promising for many teachers who start the new format of teaching.



Please try its effect in your classes via <http://school.discovery.com/lessonplans/>.

5.4. Educational Site of the National Geographic



Though being primarily a publisher of magazines, CD-ROMs, and videos for the consumer market, this company produces significant support materials to help teachers. For the sake of diversity, the flavour of National Geographic with its admiration of nature, we consider these esthetic learning resources highly valuable to gain the quality of the learning culture in secondary education.



Please try its effect in your classes via <http://www.nationalgeographic.com/education/>.

5.5. The Shoa History Links



David Dickerson has made a well-balanced collection of theme-specific links to historical documents, in this case on the Holocaust and Jewish culture. It is an exemplar of how teachers several years searching the Web can compose a basis for the colleagues in future.



Please try its effect in your classes via <http://ddickerson.igc.org/education.html>.

5.6. iTOOLS as Portal to Second Language Training



It claims to give a quick access to the best Internet tools. The domains are: searching, researching, mapping, finance, and language tools.



Please try its effect in your classes via <http://www.itools.com/>.

Final Evaluation of Course Results



Please share your experiences with us:

1. What was your learning progress during this training course?

- Professional: _____
- Personal: _____
- Emotional: _____

2. Did your students, colleagues, and superintendent perceive a change in your teaching approach?

- Yes, lots of people perceive this change.
- Probably, but I don't know it exactly.
- No, I don't think so.

3. How would you convince and support those of your colleagues who would like to build upon your experience?

List some of your activities:

- _____
- _____
- _____

4. What suggestions and recommendations would you give us to improve and update the training course?

Give some of your suggestions:

- _____
- _____
- _____

5. Have you got the plans to coordinate meetings and workshops for teachers with ambitions similar to yours?

List and briefly describe some of your plans:

- _____
- _____
- _____

APPENDIX 1: How to get rid of mice?

How to get rid of mice

How to get rid of mice. Mice are carriers of diseases and germs. ... How to get rid of mice. How to get rid of mice. Mice are carriers of diseases and germs. ...

ctct.essortment.com/howtogetrido_rsuk.htm – 6k

Cached – Similar pages

Get Rid of Mice – for Good

Get Rid of Mice – for Good I have an embarrassing question. ... I wouldn't depend on sonic devices alone to get rid of the mice that are still in the house. ...

www.ivillage.com/home/experts/handy/qas/0,,167098_226783,00.html – 76k

Cached – Similar pages

How to Get Rid of Mice – Mice Control, Mice Traps, Best Mouse Trap ...

Mice while being "nibblers" eating many times at different places, they do have two main meal times...just ... They get much of there water from food products. ...

www.doyourownpestcontrol.com/mice.htm – 15k

Cached – Similar pages

Any ideas on how to get rid of mice?

Click Here. From: Delight (65.101.24.98) Subject: Any ideas on how to get rid of mice? ... Follow Ups: Re: Any ideas on how to get rid of mice? ...

www.vegsources.com/talk/green/messages/2119.html – 34k

Cached – Similar pages

Re: Any ideas get rid of mice? First and Last RULE-# 1 NO ...

From: Cinni (226-130.iocc.com) Subject: Re: Any ideas get rid of mice? First and Last RULE-# 1 NO SURVIVORS!!! ... In Reply to: Re: Any ideas get rid of mice? ...

www.vegsources.com/talk/green/messages/2456.html – 19k

Cached – Similar pages

More results from www.vegsources.com

SoYouWanna get rid of roaches, rats, and other pests? Detecting if you have rodents. If you have rats or mice (which are basically small rats), you should try to get rid of them ASAP. ...

www.soyouwanna.com/site/syws/pests/pests.html 43k

Cached – Similar pages

Get Rid of Mice – Natural Mouse Repellent

How to Get Rid of Mice the Natural Way. Here is your Easy to Use Mouse Repellent Solution. Mice! ... What is Shake-Away and how does it work to get rid of mice? ...

www.critter-repellent.com/mice/how-to-get-rid-of-mice.php – 36k

Cached – Similar pages

Get Rid of Mice in your House or Attic

Unlike other harmful and messy repellents, using Shake-Away Rodent Powder to get rid of mice in your attic or house is safe and easy for anyone. ...

www.critter-repellent.com/mice-1/mice-in-my-house-attic.php – 33k

Cached – Similar pages

APPENDIX 2: How to find holiday destinations?

Budget travel in New Zealand

... It is also possible to camp for free pretty much ... cars are very cheap to get hold of in New Zealand. ... The cheapest way to eat is to buy food from supermarkets and ...

nijnj.essortment.com/budgettravelne_rgpw.htm – 7k

Cached – Similar pages

Cycling reading books magazines newsletters and OS maps – Readings ...

Mountain bike training camp in Nelson, New Zealand. Come training in New Zealand at the Kiwivelo...more ... Learn the art of traveling the cheapest way in Europe ...

www.cyclery.com/directories/readings/results_list?s_on=sndx&s_order=forward – 32k – 4 Jun 2004

Cached – Similar pages

OLC Web Site Latest Additions

Au-pair Programme, London 2004. Probably the cheapest way to study English in London! New 2004 Summer Camp in Monte Carlo, Monaco – Ages 13-21. ...

www.olc-international.com/olc_news/news.htm – 35k

Cached – Similar pages

The soc.culture.new-zealand faq : TRAVEL WITHIN NZ

... a light tent and be prepared to camp if travelling ... are some air fares for Christchurch to Auckland one way: Mt Cook Air/Air NZ cheapest fare is \$124 Unlikely ...

www.enzed.com/faq/b5.html – 56k

Cached – Similar pages

New Zealand!

... and 130k cycling, entertaining a two year old and setting up camp, one is ... Photos from New Zealand. ... When we arrived in Auckland, we made our way to the nearest ...

lively.00freehost.com/ – 14k

Cached – Similar pages

BootsnAll.com – Nelson/Picton, New Zealand – June 1999

... THERE From Wellington, in the North Island, the cheapest and most ... a ride on the boats bow on the way over! ... Many a beer hall and camp fire later, I hope that I ...

www.bootsnall.com/pacifictravelguides/jun99abeltasman.shtml – 17k

Cached – Similar pages

Malaysia – Trail Riding

... off-road motorcycles or scramblers, this new breed of ... able to explore the surrounding areas, camp beside clear ... this is perhaps one of the cheapest way to enjoy ...

www.marimari.com/content/malaysia/special_interests/trail_riding/trail_riding.html – 23k

Cached – Similar pages

Advice on travelling from North island to South Island : Australia ...

... Post # 2 pineapple New Zealand Budding Member 5 Posts ... hostels, not too sure as I usually camp/sleep in ... Although not the cheapest way to go...well worth every ...

www.travellerspoint.com/forum.cfm?thread=1005 – 24k

Cached – Similar pages

APPENDIX 3: Search for WWW-based learning material

Rapidly Learn Japanese

Learn in 10 days or you don't pay! 25 million satisfied incl FBI & CIA

From: <http://www.pimsleurapproach.com>

Japanese Online Show

Weekly Japanese learning web show. Quizzes at end of each show.

From: <http://www.GeorgeAndKeiko.com>

Learn Japanese

Learn Japanese with our award-winning software. 10% off today!

From: <http://www.RosettaStone.com>

Learn to speak Japanese

Amazingly effective course helps you quickly learn your new language

From: <http://www.speakalanguage.com>

Woman earns \$8000+ a week online

Learn how she does it! Positively Powerful Info. aff.

From: <http://www.AcquireCapital.com>

Learn Japanese – Free!

...is to learn the basic rules of Japanese grammar, which is quite simple, and some basic words and greetings. The grammar of a basic Japanese...

From: www.thehaucks.com/learn.html

So You Want To learn Japanese...

So You Want To Learn Japanese. ... So you head down to the library, pick up some books with titles like How To Teach Yourself Japanese In Just 5...

From: www-unix.oit.umass.edu/~thoureau/japanese.html

Learn to speak Japanese the Unforgettable Languages way

Learn to speak Japanese the Unforgettable Languages way...

From: www.unforgettablelanguages.com/frames_a5.html

Japanese-Online – Free Japanese Lessons on the Internet

Japanese. Japanese-online.com offers a free online dictionary, Japanese lessons, discussion forum, and useful links. It is the place to go to...

From: www.japanese-online.com/

Japanese Writing

How to use the tutor. Japanese Character sets. Katakana. Hiragana. Kanji. About this site. This page is meant to ... and for me was the easiest...

From: members.aol.com/writejapan/index.htm

Japanese-Online

ABOUT LESSONS. Lessons 6 and above are written in Japanese kana. Click Here to see how to add Japanese support to your computer! l...

From: www.japanese-online.com/language/index.htm

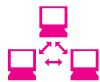
Learn How to Wow in Japanese!

HOW TO WOW Fun, interesting & strange words - New every 2nd week! **GRAMMAR** Get a healthy dose of not-too-difficult Japanese grammar...

From: <http://www.thejapanesepage.com/news.php>

APPENDIX 4: Internet search examples for Module 2

Educational Policy



Search on the Internet: ICT renewal in education on governmental level

<http://www.ifip.org/con2000/iceut2000/iceut09-01.pdf>
Dutch government

http://www.bertelsmann-stiftung.de/medien/pdf/Perspectives_on_ICT_Endversion.pdf
Perspectives of ICTs in German higher education

[http://www.die-gdi.de/die_homepage.nsf/0/4534D651578CCED4C1256ACE0029A614/\\$File/A2-01StammEng.pdf?OpenElement](http://www.die-gdi.de/die_homepage.nsf/0/4534D651578CCED4C1256ACE0029A614/$File/A2-01StammEng.pdf?OpenElement)
Global ICT skills offensive to bridge the digital divide between North and South

http://www.unesco.org/education/secondary_ed/pdf/summary.pdf
Interagency Consultative Group on Secondary Education and Youth Affairs; summary of strategy and development activities

http://www.unesco.org/education/educprog/wche/declaration_eng.htm
World declaration on higher education for the 21st century: vision, action, and framework for priority action for the change and development in higher education

http://www.triangle.co.uk/jit/content/pdfs/12/issue12_1.asp
Technology, Pedagogy, and Education
ISSN 1475-939X
Volume 12 Number 1 2003
SPECIAL ISSUE
Information Technology, Pedagogy, and Practice in Education
Guest Editor: Paul Kirschner

<http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN016045.pdf>
Information technology and communications
– a driver for an effective integration in the European Union
– by Dan Nica, the Minister of Communications and Information Technology
– government of Romania

<http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN016406.pdf>
E-government priority action area

<http://crpit.com/confpapers/CRPITV23Bottino.pdf>
ICTs, national policies, and impact on schools and teachers' development

http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/educ/74435.pdf
Council meeting on education of youth and culture
Brussels, President: Mr. Petros Efthymiou, Minister for education and religious affairs of the Hellenic Republic

http://www.lgfl.net/lgfl/leas/ealing/web/EGFL/Pupil_Support/docs/bsp_gloss.pdf
Creating a learning culture

<http://lawww.epfl.ch/webdav/site/la/shared/import/migration/Gillet.pdf>
Web-based experimentation: the will and the way

<http://wsis-roundtable-ed.iite.ru>

Round Table discussion *Education and Knowledge Societies*, one of UNESCO side events at the WSIS

<http://www.policy-seminar-bkk.iite.ru>

High Level Seminar and Workshop for Decision-Makers and Policy-Makers from Asia and the Pacific *Towards Policies for Integrating Information and Communication Technologies into Education*

<http://www.iite.ru/iite/publications/publications?id=71>

Information and Communication Technologies in Secondary Education. UNESCO IITE position paper providing an in-depth review of new strategies and tactics that aim to achieve learning progress for successful participation of new generations in the Information Society

<http://www.iite.ru/iite/publications/publications?id=93>

Vladimir Kinelev, UNESCO IITE. *The Use of ICT for Capacity Building in Science Via Education*. Lecture on the International Conference on IT-Based Capacity Building in Science

<http://www.iite.ru/iite/publications/publications?id=92>

Vladimir Kinelev, UNESCO IITE. *Keynote Raja Roy Singh Lecture* at the 6th Annual UNESCO-ACEID International Conference

<http://www.iite.ru/iite/publications/publications?id=35>.

Distance Education for the Information Society: Policies, Pedagogy, and Professional Development. Analytical survey including both analysis and a survey of experience from around the world

System of Indicators of ICT Usage in Education



Search on the Internet: quality indicators of educational systems

http://europa.eu.int/comm/education/policies/l/life/report/quality/report_en.pdf

European report on quality indicators of lifelong learning: 15 indicators of quality. Report based on the work of the Working Group on Quality Indicators

http://www.uis.unesco.org/file_download.php?URL_ID=4982&filename=10419543270EFA_report_EN.pdf&filetype=application%2Fpdf&filesize=600553&name=EFA_report_EN.pdf&location=user-S/

The World Education Forum on Education for All held in Dakar in April 2000 sets new goals and targets for the year 2015 together with some mid-term targets for 2005

http://www.uis.unesco.org/ev.php?URL_ID=5189&URL_DO=DO_TOPIC&URL_SECTION=201

Technical guidelines for education statistics comprise a selection of methodological studies and classifications (including the ISCED – International Standard Classification of Education), survey questionnaires, and a glossary of terms and definitions

<http://www.unescobkk.org/index.php?id=1803>

Developing and Using Indicators of ICT Use in Education

<http://www.unescobkk.org/index.php?id=824>

Performance Indicators on ICT Use in Education

http://www.uis.unesco.org/ev.php?ID=5743_201&ID2=DO_TOPIC

Balancing the goal of expanding educational opportunities, particularly at higher levels of education, and ensuring the equity and quality throughout the system are closely linked to how much governments and societies invest in education. The paper compares the countries across Latin American and Caribbean regions in terms of education provision and costs with the perspective of an average school career. This approach can help policy-makers assess whether financial resources are used in the most effective, efficient, and equitable manner. The paper looks forward to the next generation

of school graduates and identifies some of the challenges that countries face in order to attain regional enrolment targets by the year 2010

<http://www.acer.edu.au/research/programs/documents/Rowe&LievesleyAPERAApril2002.pdf>
Construction using educational performance indications

<http://www.iite.ru/iite/publications/publications?id=46>

Basic ICT Usage Indicators in Secondary Education in the Baltic and CIS States. UNESCO IITE Statistical report (English and Russian version). This work is the next in the series of UNESCO IITE programme activities on *ICTs in Education: State-of-the-Art, Needs, and Perspectives* and presents the intermediate results of the Institute's efforts in this field

APPENDIX 5. Web resources

Module1. Road Map Toward “Learning Schools”

http://www.iite.ru/img/upload/Position_paper.pdf

The road map toward “learning schools” goal and scope

<http://www.eden-online.org/eden.php>

<http://www.queensu.ca/idc/idcresources/handouts/main.html>

Module 2. Education in Information Age

ICTs for Learning, Learning to Use ICTs

<http://www.learnthat.com/courses/computer/windowsxp>

<http://www.informit.com/articles/article.asp?p=29744>

Vladimir Kinelev, UNESCO IITE. *The Use of ICT for Capacity Building in Science Via Education*. Lecture on the International Conference on IT-Based Capacity Building in Science. <http://www.iite.ru/iite/publications/publications?id=93>

Module 3. Use ICTs to Learn

<http://www.unesco.org/>

<http://www.oecd.org/>

<http://www.unicef.org/>

<http://www.worldbank.org/>

UNESCO IITE web site: <http://www.iite.ru>

The WWW: the World Wide Web

www.google.com

<http://www.teoma.com>

www.yahoo.com

www.altavista.com

<http://searchenginewatch.com>

<http://www.ask.com>

<http://www.ajkids.com/>

Finding Learning Material on WWW

<http://www.er.uqam.ca/merlin/xw999998/eng/eformation.htm>

<http://www.tta.gov.uk/php/read.php?sectionid=115&articleid=358>

Current WWW Information Systems on Information Technologies in Education. Analytical survey presenting the results of research on Information Technologies in Education conducted during the year 2000 at the request of UNESCO IITE in the framework of *Information Technologies in Education: State-of-the-Art, Needs, and Perspectives* project. <http://www.iite.ru/iite/publications/publications?id=26>

Educational News Services via WWW and/or E-Mail

<http://ifets.ieee.org/periodical>

<http://www.ijee.dit.ie/digest/IJEEDigest.html>

<http://ts.mivu.org>
<http://www.edweek.org>
<http://www.educationnews.org>
<http://www.theteacherscorner.net>
<http://www.ideas.wisconsin.edu>
<http://www.ed.gov>

Educational Material via Web Portals

<http://eduscapes.com/tap/topic21.htm>
<http://www.thegateway.org>
<http://www.geminfo.org>
<http://www.spartacus.schoolnet.co.uk>
<http://www.univie.ac.at/future.media/moe>

Special Domain Learning Materials

<http://www.unhchr.ch/html/menu6/2/training.htm>
<http://spacelink.nasa.gov/Instructional.Materials>
<http://www.skywarn.org/educational.asp>
<http://www.cdc.gov/tobacco/edumat.htm>
<http://www.hematology.org/education>
http://research.marshfieldclinic.org/genetics/Educational_Material/EMaterials.htm
<http://cam.qubit.org/articles/index.php>
<http://www.healthcentre.org.uk/hc/pages/learningmaterial.htm>

Multimedia in Education. UNESCO IITE specialized training course elaborated by the international working group headed by Prof. Andresen (Denmark) within the framework of the IITE training programme.
<http://www.iite.ru/iite/publications/publications?id=25>

Digital Libraries in Education. This analytical survey of UNESCO IITE provides an overview of current technologies for Digital Libraries in Education (DLEs) and their anticipated evolution.
<http://www.iite.ru/iite/publications/publications?id=57>

Internet in Education. UNESCO IITE support materials for educators. The set of materials is addressed to the educators who should be aware of the situation with Internet usage in education; to the teachers and tutors who realize the teaching and learning process widely using the Internet resources and facilities either in traditional or distance forms.
<http://www.iite.ru/iite/publications/publications?id=61>

Finding Inspirational Educational Practices

<http://www.about.com/education>
<http://www.educanext.org/ubp>
<http://www.ncst.ernet.in/vidyakash/portal>
<http://magazines.fasfind.com/wwwtools>

Module 4: ICTs Help Teachers Learn

Virtual Web-Based Learning Communities

<http://www.theknownet.com>
<http://groups.msn.com/DistanceLearningandEducation>
<http://groups.msn.com/browse?catid=287>
<http://www.tta.gov.uk>

ICTs to Learn to Teach

<http://educ.os42.com>

<http://www.sciencedirect.com/science/journal/0742051X>

<http://www.te-mat.org/home.shtml>

Elementary ICT Curriculum for Teacher Training produced by a working party of the International Federation for Information Processing (IFIP) for UNESCO IITE. This book provides you with some very important guidelines on what is necessary for successful traveling across the immense variety of options brought forth with an advent of ICTs.
<http://www.iite.ru/iite/publications/publications?id=38>

Ethical, Psychological, Societal and Legal Problems of Application of Information and Communication Technologies in Education. UNESCO IITE final materials of the research seminar prepared by 23 experts from five countries.
<http://www.iite.ru/iite/publications/publications?id=53>

Information and Communication Technologies in Special Education. Final report of UNESCO IITE international expert meeting held in Moscow by UNESCO IITE on 12-13 April 2002. <http://www.iite.ru/iite/publications/publications?id=54>

Use of ICTs in Technical and Vocational Education and Training. Analytical survey.
<http://www.iite.ru/iite/publications/publications?id=62>

Education, Art and ICTs: Integration for the Development of One's Personality. UNESCO IITE final report and selected materials.
<http://www.iite.ru/iite/publications/publications?id=90>

Generic Learning Tools

http://www.sasked.gov.sk.ca/docs/info_pro/instipr.html

<http://www.acm.org/crossroads/xrds3-1/aied.html>

<http://www.microsoft.com/Education/TLDownloads.aspx>

Simulations for Learning via Experimentation

<http://ozpk.tripod.com/0000simulation>

<http://www.jibc.bc.ca/cisc/main/AboutSims/simsLearning.htm>

Simulation Tools for Educational Leadership

<http://www.simulearn.net>

Module 5: ICT Projects in Education

http://www.greenpeace.org/international_en

<http://www.amnesty.org>

<http://www.who.int/en>

<http://www.msf.org/home-uk.cfm>

<http://www.un.org/Pubs/CyberSchoolBus/index.html>

http://unesco.edna.edu.au/index_projects.html

“Cool Projects” as Announced by Microsoft

Art: A Reflection of America (831 KB PowerPoint file)

<http://download.microsoft.com/download/4/a/c/4ac6fca3-6ff4-4ff2-9d03-90964d858751/ArtInAmerica.ppt>

Biographies Come to Life (1.1 MB PowerPoint file)

<http://webace/education/PRESENTATIONS/BiographiesComeToLife/BiographiesAlive.pps.ppt>

The Shoa History links

<http://ddickerson.igc.org/education.html>

I*EARN's Holocaust/Genocide Project – <http://www.iearn.org/hgp/>:

The History Place – <http://www.historyplace.com/>

The Rise of Adolf Hitler: From Unknown to Dictator of Germany

<http://www.historyplace.com/worldwar2/riseofhitler/index.htm>,

The Nizkor Project – <http://www.nizkor.org>.

International Baccalaureate Holocaust Project – http://cghs.dade.k12.fl.us/holocaust/ib_holocaust.htm

Literature of the Holocaust – <http://www.english.upenn.edu/~afilreis/Holocaust/holhome.html>

Dr Al Filreis – <http://www.english.upenn.edu/~afilreis>

March of the Living Official Internet Site – <http://www.motl.org/>

Matthias Heyl on Holocaust Education – <http://members.aol.com/SMHeyl/index.htm>

Maven – Holocaust and Antisemitism – <http://www.maven.co.il/subjects/idx178.htm>

Responses to the Holocaust – A Hypermedia Sourcebook for the Humanities

<http://jefferson.village.virginia.edu/holocaust/response.html>

Nazi Genocide of the Jews of Europe, 1933-45 – <http://fermi.clas.virginia.edu/~rsl9b/basichist.html>

Shamash (The Jewish Internet Consortium) – The Holocaust – <http://www.shamash.org/holocaust/>

Holocaust – <http://shamash.org/holocaust/>

iTOOLS as Portal to Second Language Training

<http://www.itools.com>

Remarks and Final Conclusions

<http://www.queensu.ca/idc/idcresources/handouts/main.html>

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