

# **Strategic Goals for the Use of Information and Communication Technologies at ETH Zurich**

**Approved by the Executive Board of ETH Zurich  
on 16 August 2005**



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

# Strategic Goals for the Use of Information and Communication Technologies at ETH Zurich

## Contents

Executive Summary .....	3
1. Introduction.....	4
1.1 Description of the Process.....	4
1.2 The Structure of this Document.....	4
2. Starting Points .....	5
2.1 Institutional Setting for the Use of ICT at ETH Zurich.....	5
2.2 Global Trends .....	6
2.3 Related Strategy Work at ETH Zurich .....	7
2.4 Related Developments in Other Institutions .....	8
3. Vision and General Guidelines.....	11
4. Strategic Goals.....	13
A Teaching and Learning.....	13
B Continuing Education .....	13
C Research .....	13
D Outreach and Cooperation with Business, Industry and Society.....	14
E Specific E-services for the ETH Community.....	14
F Generic Topics .....	14
5. From Strategic Goals to Implementation.....	16
5.1 Implementation Measures and Responsibilities .....	16
5.2 Finance.....	16
6. References.....	17

## **INSTITUTIONAL STRATEGY FOR THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES AT ETH ZURICH**

### **Steering Committee**

- Professor Gerhard Schmitt, Vice-President Planning and Logistics (Chair)
- Professor Konrad Osterwalder, Rector
- Professor Ulrich Suter, Vice-President Research
- Professor William J. Mitchell, Massachusetts Institute of Technology

### **Strategy Group**

- Professor Bernhard Plattner, Department of Information Technology and Electrical Engineering, Program Director ETH World (Chair)
- Professor Peter Bachmann, Department of Environmental Sciences; Prorector for Diploma Studies (until March 2005)
- Professor Helmut Bölskei, Department of Information Technology and Electrical Engineering
- PD Dr Dorothea Christ, Head of the Rector's Office (until June 2004)
- Dr Andreas Dudler, Director of ICT Services
- Professor David Gugerli, Department of Humanities, Social and Political Sciences
- Anders Hagström, Program Management ETH World
- Professor Lorenz Hurni, Department of Civil, Environmental and Geomatic Engineering
- Dr Markus Knaus, Head of Controlling (Guest)
- Daniel Künzle, Head of the Centre for Higher Education
- Professor Markus Meier, Department of Mechanical and Process Engineering (until April 1995)
- Dr Wolfram Neubauer, Director of the ETH Library
- Professor Felicitas Pauss, Department of Physics
- Dr Sybille Reichert, Head of Academic Planning and Logistics (until February 2005)
- Dr Hanspeter Scherbel, Department of Mathematics; Chair of the IT Experts' Committee (ITEK)
- PD Dr Christian Sengstag, Head of the Network for Educational Technology – NET

### **Editorial Team**

- Anders Hagström, Program Management ETH World
- Dr Barbara Meili, Program Management ETH World

## Executive Summary

In January 2004, the Executive Board of ETH Zurich took the decision to develop an institutional strategy for the use of information and communication technologies (ICT) in education, research and services at the university. The goal was to draw up a framework for the strategic use of new technologies in all of the university's core processes.

The rapid development of information and communication technologies is having a direct impact on all areas of education and research. The amount of knowledge and information that is available is growing exponentially. Radically new models of cooperation, networking and knowledge exchange are emerging. A good ICT infrastructure is indispensable for education and research. It is also an increasingly important advantage in the global competition among universities. Through its strategy for the use of information and communication technologies in education, research and services, ETH Zurich is setting out to position itself as one of the leading universities worldwide in this domain.

The fast pace of development in ICT constitutes a major challenge. ETH Zurich wishes to play an active role in fashioning this development and to promote innovations in ICT through the provision of the appropriate structures and sufficient resources.

**Broadly supported strategy process.** The stimulus for developing an institutional ICT strategy came from the recommendations drawn up after the intermediate evaluation of ETH World at the end of 2003. The Executive Board appointed the ETH World Program Director, Professor Bernhard Plattner, to lead the strategy process. Since March 2004, a project group comprising faculty members and representatives of the administrative units (infrastructure domains) has worked intensely to draft the strategy. Particular attention has been paid to the needs of education and research, and the process has been conducted with close involvement of the ETH Departments. The draft was then sent to the Departments, the infrastructure domains and the stakeholder organizations as part of a consultation process. In addition, all students and staff members had the opportunity to contribute their comments via a web-based forum.

**Promoting individual, flexible learning.** The strategy specifies general guidelines and sets out strategic goals for the use of ICT in all the university's core processes. Through the use of new technologies, ETH Zurich wishes to promote individual, flexible learning and ensure that students actively engage with the subject matter in self-directed learning. ICT resources are used wherever they provide added value for teaching and learning. The use of these resources not only supports students in their studies but also facilitates working at ETH Zurich, independently of time and place.

**Competitive advantage for research.** When it comes to research, the use of ICT constitutes a key prerequisite for success in most disciplines. ETH Zurich wishes to retain and develop its leading position in this field. The university views ICT as a central component of its excellent infrastructure and one which represents a major competitive advantage. This infrastructure has to guarantee access to computing power, communication bandwidth and information, and it has to be developed further in line with the requirements of research. A further challenge is the vast quantity of data generated in a large number of research projects which can be used by the global scientific community.

**Services for business, industry and society.** ETH Zurich wishes to contribute to the advancement of the worldwide scientific community and to the provision of global access to knowledge and information. In accordance with its national mandate and its aspiration to achieve global influence, the university pursues a policy of permitting the broadest possible public access to its teaching materials, learning contents, research results and other services. In particular, ETH Zurich wishes to develop outreach activities and services for business, industry and society with the aid of new technologies. By offering ICT-based continuing education, it wishes to serve existing target groups better and reach out to new ones.

**Communication and e-services.** New technologies also offer ideal opportunities for internal communication and the involvement of faculty, staff, students and alumni. ETH Zurich is developing e-services in all its infrastructure domains in order to further enhance the efficiency of its business processes.

The initial implementation measures and the responsible organization units are outlined in an Appendix. Costs will be incurred through the implementation of the strategy, and it will only be possible to make a reliable assessment of these costs during the detailed implementation planning stage.

# 1. Introduction

## 1.1 Description of the Process

On 13 January 2004, the Executive Board of ETH Zurich took the decision to develop an institutional strategy for the use of information and communication technologies (ICT) in education, research and services at the university. The stimulus for developing an institutional ICT strategy came from the recommendations drawn up after the intermediate evaluation of ETH World at the end of 2003. In a broadly based, moderated process, ETH Zurich was to define the contribution that the use of information and communication technologies could make to the attainment of its strategic goals. The focus was to be on the needs of faculty, students and research staff.

For purposes of developing the strategy, the Executive Board appointed a Steering Committee comprising Professor Gerhard Schmitt (Chair), Vice-President for Planning and Logistics; Professor Konrad Osterwalder, Rector; Professor Ulrich Suter, Vice-President Research; and Professor William J. Mitchell from the Media Lab of the Massachusetts Institute of Technology.

To support and moderate the strategy process, the Board appointed a Strategy Group and named Professor Bernhard Plattner, Programme Director of ETH World, as its leader. The members of the Strategy Group were faculty and senior staff members from the administrative units (the "infrastructure domains"), who were selected according to their roles, experience and knowledge so that they could contribute to the development of the strategy. The Student Association, VSETH, was also invited to appoint a representative.

To ensure broad support for the strategy, the ETH Departments and infrastructure domains were involved in the strategy development process. During the summer semester 2004, a survey was conducted amongst the Departments in order to establish their requirements. The answers provided the Strategy Group with a starting point for drafting the first version of the strategy, which was drafted during the summer and autumn of 2004.

At its meeting on 18 January 2005, the Executive Board asked the Vice-President for Planning and Logistics to consult the Departments, administrative units and university stakeholder organizations on the draft. In addition, students and staff members had an opportunity to comment on the draft via a web-based forum. The deadline for completion of the consultation was 15 April 2005. The suggestions made in the comments submitted were channelled into the draft. The Strategy Group reviewed the final draft at its meeting on 25 May 2005 and took the decision to submit it to the Steering Committee for approval.

## 1.2 The Structure of this Document

This strategy document identifies seven guidelines which, together, form the vision of the role that ICT is to play in the development of teaching and learning, research and services at ETH Zurich. On the basis of these general guidelines, the document defines the strategic goals that are to be achieved through the use of ICT in the core processes at ETH Zurich. These are divided into six thematic areas: Teaching and learning; Continuing education; Research; Outreach and cooperation with business, industry and society; Specific e-services for the ETH community; generic topics.

The initial implementation measures and the organizational units responsible for these are outlined in an Appendix.

## 2. Starting Points

### 2.1 Institutional Setting for the Use of ICT at ETH Zurich

#### 2.1.1 ICT Infrastructure and Services

ETH Zurich also enjoys international recognition for its outstanding infrastructure [1]. The ICT infrastructure had its origins in scientific computing. Over the past few decades, it has developed rapidly, growing in an organic fashion. Today, ICT is used in all areas of the university as a matter of course.

At the end of 2004, ETH Zurich had approximately 9,000 personal computers (PCs, laptops and workstations) for its more than 8,000 staff members, several hundred central and decentralized servers and computers, plus high-capacity data storage facilities. The use of this infrastructure, and also people's dependence on it, is growing steadily.

Workplace computers (from laptops and PCs through to workstations) are maintained primarily by the Departments, laboratories and research groups, often with technical support from the central ICT Services (ID). The central installations – high-performance computers and clusters, central file and backup systems, output stations, and also the installations for the operational information systems – plus the entire computer network, are maintained centrally by ICT Services.

The computer systems in use at ETH Zurich are connected to each other via a high-performance network infrastructure (universal building wiring, switches, routers). ETH Zurich's network is connected via a 10 Gbit/s link to the Swiss Education and Research Network (SWITCH) and is thus also integrated in the international research networks (Geant, GTRN).

Wireless access to the network (Wireless LAN) has been developed since 2000 and currently covers a large portion of the lecture rooms, meeting rooms and public spaces.

Since 2001, ETH Zurich has been promoting the private ownership of laptop computers by students through its "Neptun" project. Since autumn 2004, ETH Zurich has recommended its students to have their own personal laptop by the beginning of the second year of their studies at the latest. In the summer semester of 2005, an estimated 75% of all students had their own laptop. In addition, some 1,000 computers and workstations are provided for students in the form of fixed installations.

In recent years, computer-based simulation and modelling have emerged as a third pillar for science, complementing the two classical pillars of "theory" and "experiment". ETH Zurich invests substantial sums in the Swiss National Supercomputing Centre (CSCS) in Manno for the provision of computing power and the storage capacity required for huge data collections and high-performance applications in various disciplines. These are used by researchers both within and outside the university. The basic infrastructure for accessing the CSCS and also other equally important research resources, such as CERN and further large-scale research facilities, is the SWITCH scientific network. This is complemented in functional and organization terms by Grid infrastructures, which are currently under development.

#### 2.1.2 ICT in Teaching and Learning

The use of ICT in teaching and learning was first promoted at an institutional level from 1986-1991 with the "Information Technology Serves Everyone" project ("*Informatik Dient Allen, IDA*"). Support for faculty was then institutionalized in 1996 with the creation of the Network for Educational Technology (NET). A permanent funding instrument was created in 2000 with "FILEP" - the fund for innovative educational projects.

A wide variety of individual e-learning initiatives has been implemented thanks to these initiatives. Apart from a few exceptions, however, these have remained isolated efforts. The

current status of the use of e-learning at ETH Zurich is described in a separate report by the Academic Committee [2].

Although no institution-wide system has become established to date, e-learning is currently a broadly accepted component of education at ETH Zurich. The use of ICT in teaching and learning thus has an important role to play in this strategy.

### **2.1.3 Promoting Innovation in the ICT field**

ETH Zurich offers different means of funding that are also available for suitable ICT projects. Funding can be provided for research projects ("TH" Research Fund, Innovation Initiative INIT), educational projects (FILEP Fund, cf. 2.1.2) and ICT infrastructure projects (ETH World). The funds are allocated on a competitive basis. This threefold division has now become established and appears to be working in a satisfactory manner.

ETH World was initiated in 2000 in order to advance the use of ICT in teaching and learning, in research and services. This initiative supports and promotes the development and introduction of technologies for communication and cooperation, independently of time and place. The project funding for ETH World runs up until the end of 2005.

In spite of the many sources of funding and support – or perhaps precisely because of these – the use of ICT at ETH Zurich has developed on a strongly fragmented basis. Committed developers conduct excellent work in individual projects but they do this acting as "lone rangers". Perhaps typically for a technical university, most ICT development is strongly technology-driven and pays too little consideration to social aspects. A coherent strategy is lacking.

### **2.1.4 ICT in the Administration**

In 1997, SAP R/3 was introduced as the standard software for finance and controlling, human resources and real estate. Many other applications are still in use in other administrative domains throughout ETH Zurich.

The administrative processes involved in education are supported by applications that have been developed in-house. A range of applications has been developed for the Rector's Office and the departmental secretariats, complemented by web-based applications for students and faculty. The "IT Support for the Administration of Education" project has led to fundamental changes in the educational administration processes. The restructuring of the degree programmes in line with the "Bologna Declaration" could not have been mastered in administrative terms without these applications.

## **2.2 Global Trends**

Information and communication technologies are strongly characterized by global developments. Some of the most important trends can be set out as follows:

- New technologies are developing rapidly, and the pace of development is not set to slow down in future. Just keeping up with developments calls for a constant effort. Institutions that are aiming to achieve a leading position must recognize new technologies early on, assess their relevance and, where necessary, make strategic investments in their introduction.
- Even though the "New Economy" bubble has burst, the digital revolution and the development of the Internet are continuing unabated. Web-based applications are penetrating all the different areas of life.
- Information and communication technologies have had a profound impact on the job market worldwide. They have permitted globalization in the sense that knowledge work can now be outsourced to remote partners. ICT is also opening up new, flexible approaches to work for individuals and is helping to overcome institutional boundaries.

- ICT is additionally contributing to a new internationalization of the education market, and dynamic institutions are taking this opportunity to position themselves on the market. In Europe, the “Bologna Process” is creating increased international competition in education and research.
- ICT has further accelerated the exponential increase in knowledge and information, while also radically changing the way we handle this. Ever-shorter knowledge lifecycles are making lifelong learning essential and also necessitating faster, more direct access to continuing education. It would be impossible to cope with the sheer amount of information without ICT.
- ICT permits radically new models for cooperation, networking, knowledge exchange and the shared use of information resources. The “Open Source” movement has led to the creation of new business models, while “Open Knowledge” initiatives are undermining the established commercial power balance. The “Open Courseware” approach is turning age-old knowledge ownership structures upside down. Peer-to-peer solutions are taking networking and cooperation between individuals out of centralized control, thus strengthening the “Small World” phenomenon.
- ICT devices are continuing to become more efficient, less expensive and increasingly interconnected and are now penetrating all areas of everyday life. Each new field of use is accompanied by an increase in the amount of data and the computing and transmission capacity required. This calls for concentrated ICT resources and for templates to permit the flexible use of common resources across organizational borders.

## 2.3 Related Strategy Work at ETH Zurich

### Mid-Term Strategic Plan 2004–2007

The Executive Board defined the goals for the development of ETH Zurich in the mid-term strategic plan for 2004–2007, dated 18 September 2002 [3]. On the basis of this plan, ETH Zurich is setting out to achieve the following by 2007:

1. ***To be exemplary in education*** – *this to be achieved through being particularly attractive to students in a demand-oriented education landscape; state-of-the-art teaching and learning with an educational offering based on internal, external and interdisciplinary transparency; tiered degree programmes; internationally-compatible degrees; quality assurance by means of coordinated evaluations;*
2. ***To carry out leading-edge research and engage in a knowledge transfer as a nationally embedded and internationally leading research university*** – *this to be achieved through being particularly attractive to the best researchers; the discovery of new areas; strong disciplinary research; the definition and implementation of research in cross-departmental strategic excellence projects; consistent financial support of qualitative growth;*
3. ***To be exemplary in university management*** – *this to be achieved through the provision of optimum support for academic core areas; professional university management of activities and resources; integrated resource planning taking in professorships, degree programmes and services for related scientific areas; and also staff development.*

The key question concerning the strategic use of ICT in education, research and services is thus:

**How can information and communication technologies contribute to achieving these goals?**

### **Information and Communication Technology Concept 2003–2007**

On 22 April 2003, the Executive Board approved an Information and Communication Technology Concept (ICT Concept) for 2003–2007 [4]. The focus of this Concept, which was prepared by the IT Committee (IK) and the IT Experts Committee (ITEK), is on the infrastructure and services maintained by ICT Services, viewed primarily from a research perspective. The ICT Concept thus has more of an operational focus than the institutional ICT Strategy and sets out more detailed goals for certain areas.

### **Bologna Declaration and Study Reform**

For purposes of implementing the Bologna Declaration, ETH Zurich is currently in the process of introducing a three-tier degree structure (Bachelor, Master, Doctor). This study reform places new demands on the ICT infrastructure and services, which will need to be taken into account.

### **E-learning Strategy**

The Academic Committee has commissioned the Center for Higher Education to define an e-learning strategy for ETH Zurich. The development and use of e-learning at the university has been analyzed by way of an input for this strategy work [2]. The Academic Committee will continue the work on the basis of the Institutional ICT Strategy.

### **Continuing Education Strategy**

On 9 September 2004, the Executive Board approved the “Strategy for Continuing Education 2005–2010” [5]. This document sets out guidelines for academic continuing education at ETH Zurich. It identifies considerable potential for the use of e-learning in continuing education at ETH Zurich. Digital learning contents prepared for the Bachelor and Master programmes, for instance, ought also to be used in continuing education. The Continuing Education Strategy additionally states that ETH Zurich promotes the commercial use of e-learning in continuing education.

## **2.4 Related Developments in Other Institutions**

### **2.4.1 In Switzerland**

**EPF Lausanne** has defined its policy on new learning technologies in order to harmonize decisions and coordinate its activities with other initiatives [6]. New learning technologies are to be developed in order to improve the quality of teaching and boost pedagogic innovation. EPF Lausanne is promoting open access to its online learning materials, among other measures. The institution is not prescribing a uniform learning platform but is participating in the endeavours of the Swiss Virtual Campus which are aimed at providing a joint platform.

**The University of Zurich**, in its e-learning strategy of July 2003 [7], sets itself the target of increasing the share of e-learning in its courses to at least 15% by 2007 (3.4% in 2001). The university especially wants to use e-learning in subjects with large student numbers so as to ensure more active participation in the learning process. All e-learning developments are subject to systematic quality management.

The “**Swiss Virtual Campus**” (SVC) programme aims to provide support for the development and provision of web-based courses or course modules at Switzerland’s universities, Federal Institutes of Technology (ETHs) and universities of applied sciences. The SVC courses and modules are developed as integral components of the curricula of the institutions concerned. In the first program phase 2000–2003, a total of 50 projects were

supported and, during the first year of the 2004-2007 consolidation programme, a further 28 projects were added.

## 2.4.2 In Other Countries

### Virtual Models of European Universities

A recent study entitled “Virtual Models of European Universities” [8], contains a comprehensive analysis of ICT use at over 200 European universities. It identifies four clusters that differ through the extent to which ICT is used in education and administration: the “front runners” (16% of the institutions analyzed), the “cooperating universities” (33%), the “self-sufficient universities” (36%), and the “sceptical universities” (15%).

<p><b>Cluster one: 'The front-runners'</b></p> <ul style="list-style-type: none"> <li>• 75% have a formal ICT strategy</li> <li>• Substantial use of online registration for courses</li> <li>• ICT is integrated in the teaching on campus to a very large extent</li> <li>• Substantial numbers of e-learning courses are incorporated in basic academic training and in supplementary training</li> <li>• Very positive attitudes towards ICT among both management, teachers and students</li> <li>• Substantial funding for ICT from the universities themselves</li> <li>• Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education</li> </ul>	<p><b>Cluster two: 'The co-operating universities'</b></p> <ul style="list-style-type: none"> <li>• 63% have a formal ICT strategy</li> <li>• Digital services such as online course registration are not as widespread</li> <li>• ICT is integrated in the teaching on campus to a very large extent</li> <li>• E-learning courses are offered to a minor degree in basic academic training and supplementary training</li> <li>• Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.</li> <li>• Funding consists of a mixture of government funding and funding from the universities themselves</li> <li>• Huge involvement in strategic co-operation with domestic and foreign universities, as well as with other suppliers of education</li> </ul>
<p><b>Cluster three: 'The self-sufficient universities'</b></p> <ul style="list-style-type: none"> <li>• 60% have a formal ICT strategy</li> <li>• Digital services such as online course registration are not as widespread</li> <li>• ICT is integrated in the teaching on campus to a very large extent</li> <li>• A considerable number of e-learning courses are incorporated into basic academic training and supplementary training</li> <li>• Positive attitudes towards ICT, especially among management and students. Some sceptical teachers.</li> <li>• Substantial funding for ICT from the universities themselves</li> <li>• Very low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education</li> </ul>	<p><b>Cluster four: 'The sceptical universities'</b></p> <ul style="list-style-type: none"> <li>• 13% have a formal ICT strategy</li> <li>• Digital services such as online course registration are not as widespread</li> <li>• Limited ICT integration in the teaching on campus</li> <li>• Very limited numbers of e-learning courses are incorporated into basic academic training and supplementary training</li> <li>• Attitudes mixed towards ICT – a substantial number of teachers in particular are sceptical</li> <li>• Funding of ICT is a mix of government funding and funding from the universities themselves. EU funding is also relatively important</li> <li>• Low extent of strategic co-operation with domestic and foreign universities or with other suppliers of education</li> </ul>

When assessed on the basis of a self-evaluation, ETH Zurich does not fall into any one of the individual clusters but displays characteristics of all four categories. It is partly a “front-runner” (Institutional ICT Strategy; comprehensive digital services for educational support processes; funding of ICT developments) but, when it comes to the extent of the use of e-learning, the

integration of ICT in education, the attitude of the teaching staff and cooperation with other institutions, it does not meet up to the criteria of the pioneers.

### **Comparison with North American Universities**

An international comparison with other universities shows that both the problems and the attempted solutions are very similar to those encountered at ETH Zurich. The following are examples from leading North American universities.

The University of British Columbia initiated an “e-Strategy” in 2001 as guiding framework for aligning technology initiatives to the institution’s strategic goals. The e-Strategy steers the use of ICT in the university’s core activities and resources (e-Learning, e-Research and e-Community), in administrative processes (e-Business), and in providing access to advanced regional, national and international research networks (Connectivity).

In 2001, the University of California, Berkeley, also launched a similar initiative, “e-Berkeley”, with the aim of “using the power of the Web to transform the way the university operates”. The projects initiated in the first year of the programme essentially correspond to the goals of ETH World. In the years that followed, the programme had to be drastically curtailed due to reductions in the Californian state budget.

Interesting developments are also taking place in networks and consortia – frequently on an open-source basis. One example of a joint development in e-learning is the “Sakai” project. This is a collaborative venture between the University of Michigan, Indiana University, MIT and Stanford University, together with other partners, for the development of an open-source Learning Management System. Joint projects are also emerging in areas that have not so far seemed suitable for open-source solutions. The “Kuali” project, for example, is developing a financial information system tailored to the needs of higher education institutions.

### **3. Vision and General Guidelines**

The points set out below describe ETH Zurich's vision for the use of information and communication technologies in attaining its strategic goals in education, research and services. These serve as general guidelines for the strategic goals defined in Chapter 4.

#### **3.1 Supporting innovative education**

ETH Zurich uses ICT to support both contemporary and innovative forms of learning, as well as pedagogic concepts and educational offerings. New technologies are employed to enhance the quality of education, i.e. in cases where they provide added value for teaching or learning. The new technologies are used at all levels of initial and continuing education. In order to promote the development of e-learning contents and ensure that these are widely available, ETH Zurich seeks to cooperate and establish networks with partner universities. The systematic use of e-learning will contribute towards making ETH Zurich more attractive for students.

#### **3.2 Further developing leading position in research**

The use of ICT constitutes a key prerequisite for research in a large number of disciplines. ETH Zurich wishes to maintain and expand on its leading position in these fields.

#### **3.3 Improving access to information**

ETH Zurich uses ICT on a systematic basis to improve access to research and learning contents, for both its members and external stakeholders. The aim is to make teaching and learning materials, research results and services available for different purposes in a more efficient manner.

#### **3.4 Securing competitiveness through an outstanding infrastructure**

ICT represents a central component of the excellent infrastructure that constitutes a key competitive advantage for ETH Zurich. This infrastructure has to be maintained and further developed. It includes innovative infrastructure elements that are not yet commercially available. ETH Zurich takes steps to ensure that it has a high-performance, competitive infrastructure, making allowance for the fact that this infrastructure increasingly includes the private equipment of students and teaching staff.

#### **3.5 Strengthening the ETH community**

ICT opens up new channels of interpersonal communication. ETH Zurich makes systematic use of ICT to improve internal communication, to facilitate cooperation, to strengthen community building and to support the participation of all ETH members in the institution's activities and decision-making processes.

#### **3.6 Seamlessly supporting central and decentralized processes**

The ICT infrastructure and services are required to support the decentralized organization and diverse cultures at ETH Zurich. It is important to find the right balance between central and decentralized services, as well as between custom-made and cost-efficient standardized solutions. It is similarly important that all solutions provide seamless support for the core processes, that they use standardized interfaces and that the responsibilities are clearly defined. The tools provided on a centralized basis must be of a high quality and offer good value so as to make sure that users opt to use them not because they have to but because they want to.

### **3.7 Actively participating in ICT development**

The fast pace of development in ICT represents a major challenge. ETH Zurich wishes to play an active role in shaping this development and to promote innovation in this area through the provision of appropriate structures and sufficient resources.

## 4. Strategic Goals

The strategic goals for the use of ICT at ETH Zurich are outlined in the following. The order in which they are set out does not reflect the priority of the goals.

### A Teaching and Learning

- A1 ETH Zurich promotes individual, flexible learning and self-directed, active engagement of students with the subject matter. This also includes the opportunity to communicate and cooperate with fellow students and teaching staff independently of time and place. E-learning is used in areas where it generates added value in teaching and learning, i.e. where it enhances the quality of education.
- A2 ETH Zurich ensures coordinated use of ICT in teaching and learning. This is aimed at reducing the burden on students and faculty, keeping the outlay on maintenance to a minimum and achieving an optimum effect.
- A3 ETH Zurich offers specific pedagogic and technical support for teaching staff in order to ensure proper use of ICT.
- A4 Teaching and learning facilities are adapted to the requirements of ICT and new forms of learning. This is taken into account especially in conjunction with renovation work and the planning of new buildings.
- A5 ETH Zurich wishes to contribute to the advancement of the worldwide scientific community and to the provision of global access to knowledge and information. In accordance with its national mandate and its aspiration to achieve global influence, the university pursues a policy of the broadest possible public access to its learning contents.

### B Continuing Education

- B1 ETH Zurich is developing ICT-based continuing education in order to improve its service to current target groups and to reach out to new ones in a bid to fulfil the learning needs of business, industry and society.
- B2 ETH Zurich uses ICT in a concerted manner to strengthen its position on the national and international continuing education market.

### C Research

- C1 ETH Zurich ensures appropriate access to computing and communication networks as well as to related services.
- C2 ETH Zurich promotes computer-based simulation and modelling as the third pillar of science, thereby seeking to safeguard and further develop its leading position in research.
- C3 Data collections that are made accessible to the global scientific community for shared use constitute an important research resource ("Big Science" phenomenon). ETH Zurich develops regulations and guidelines to govern the handling of the enormous quantities of data generated in this way and to secure access to these over the long term.

## **D Outreach and Cooperation with Business, Industry and Society**

- D1 ETH Zurich uses ICT facilities for outreach activities, for services for business, industry and society and also for cooperation with external partners. It develops new services in order to facilitate access to research results and to the knowledge and competence of its members.
- D2 ETH Zurich makes selective use of ICT-based instruments for marketing and public relations.

## **E Specific E-services for the ETH Community**

### **Provision of Scientific Information**

- E1 An excellent supply of scientific information is one of the most important prerequisites for high-level education and research. The ETH-Bibliothek makes available a comprehensive range of electronic information which is subject to constant further development.
- E2 Dependence on the publishers of electronic information constitutes a substantial risk for free and easy long-term access to scientific information. ETH Zurich takes the necessary precautions to minimize this risk.

### **E-infrastructure and Support for Business Processes**

- E3 ETH Zurich uses e-services to support efficient and cost-effective processes.
- E4 The information systems support the management at all levels (Executive Board, Department, Laboratory, Chair, Infrastructure Domain) by providing adequate current data to provide a basis for decisions.
- E5 The administrative support systems are required to support central and decentralized business processes in a smooth, efficient and effective manner. As far as possible, systems need to be standardized, the number of systems kept to a minimum and their interfaces clearly defined. The individual system components are to be coordinated to ensure that each set of information generally only needs to be captured once.
- E6 In order to guarantee independence from suppliers and manufacturers, ICT systems and applications are to be developed in such a way that individual components can be replaced with a reasonable outlay.

## **F Generic Topics**

- F1 Good information and communication are essential for ensuring that teams deliver their very best performance. ETH Zurich supports electronic communication platforms that simplify and intensify the flow of information, facilitate cooperation, contribute to community building and enhance the participation of all ETH members in institutional decision-making.
- F2 ETH Zurich promotes the ICT competence of all its staff members.
- F3 ETH Zurich promotes the use of ICT to enable all its members to work independently of time and place.
- F4 ETH Zurich promotes standards for workplace computer equipment for different user groups. Standards are set at the appropriate level (Department, Laboratory, Chair). The goal is to improve the efficiency of the organization, the use of funds and support.

- F5 ICT is implemented at ETH Zurich in compliance with all the regulations governing information security and privacy.
- F6 ETH Zurich advocates a reasonable balance between the protection of intellectual property and the privacy of electronic data, on the one hand, and the interests of education and research, on the other hand.
- F7 ETH Zurich ensures that information in digital form (documents, electronic publications, databases) is preserved and remains accessible to future generations.
- F8 ETH Zurich maintains a coherent and comprehensive institutional strategy for the use of information and communication technologies in all its core processes. A review is carried out every three years to establish how well the strategic goals have been attained.

## **5. From Strategic Goals to Implementation**

### **5.1 Implementation Measures and Responsibilities**

Implementing this strategy calls for a whole range of measures. The initial measures required for each of the strategic goals are outlined in an Appendix to this document. These show which specific steps are to be initiated in order to achieve the goals. The organizational unit that holds chief responsibility for implementing the individual measures is specified.

The Executive Board determines the organization to be put in charge of coordinating the implementation of the institutional ICT Strategy and of promoting innovative infrastructure projects. The IT Committee and the Advisory Board of ETH World are to be merged to form a new ICT Committee, and this committee will supervise the implementing organization.

### **5.2 Finance**

Costs will be incurred through the implementation of the strategy. These can only be assessed reliably in the detailed implementation planning. A number of measures will lead to savings in the medium or long term, however. These are expected to relate to organizational issues, in particular, and must be taken into consideration in the detailed planning. This planning must also make allowance for the fact that the cost savings will not always be made at those points at which the implementation costs are incurred.

A separate financial plan is to be drawn up for the implementation work. The funding will be taken from the budget of the organization responsible for implementing the strategy or from the budgets of the units concerned, and must thus be included in these respective budgets. Not only the project costs must be taken into consideration but also the operating costs.

## 6. References

---

- 1 Bodmer, C, Leu, A. Mira, L & Ruetter, H. *SPINE -- Successful Practices in International Engineering Education*. Engineers Shape our Future (INGCH) and Council of the Swiss Federal Institutes of Technology, Zurich, 2002.  
<http://www.ingch.ch/pdfs/spinereport.pdf>
- 2 Gröhbiel, Urs: *Situationsanalyse: Entwicklung und Einsatz von E-Learning an der ETH (Analysis of the State of the Art of the Development and Use of E-learning at ETH Zurich)*. Network for Educational Technologies (NET), ETH Zürich, 2004.
- 3 ETH Zurich. *Mehrjahresplan 2004–2007 der ETH Zürich (Mid-Term Strategic Plan 2004–2007)*, 18 September 2002.  
[http://www.planung.ethz.ch/planung/\\_dok/MJP2004\\_2007\\_020918.pdf](http://www.planung.ethz.ch/planung/_dok/MJP2004_2007_020918.pdf)
- 4 *Informations- und Kommunikations-Technologiekonzept (ICT-Konzept) der ETH Zürich 2003–2007 (Information and Communication Technology Concept (ICT Concept) of ETH Zurich 2003–2007)*. 22 April 2003.  
[http://www.id.ethz.ch/documentation/konzept/ETH\\_Informatikkonzept\\_2003\\_2007.pdf](http://www.id.ethz.ch/documentation/konzept/ETH_Informatikkonzept_2003_2007.pdf)
- 5 *Strategie Weiterbildung 2005–2010 der ETH Zürich (Continuing Education Strategy 2005 –2010 of ETH Zurich)*. 9 September 2004.
- 6 P. Dillenbourg & P. Jermann: *Politique EPFL en matière de technologies de formation (EPFL Policy on Education Technologies)*. CRAFT, École Polytechnique Fédérale de Lausanne 2003.  
<http://craft.epfl.ch/webdav/site/craft/shared/import/migration/StrategieTechnologiesFormation-14-111.pdf>
- 7 University of Zurich. *E-Learning-Strategie für die Universität Zürich (E-learning Strategy of the University of Zurich)*. Zurich, 2003.  
[http://www.elc.unizh.ch/download/docs/EL\\_Strategie.pdf](http://www.elc.unizh.ch/download/docs/EL_Strategie.pdf)
- 8 *Studies in the Context of the E-learning Initiative: Virtual Models of European Universities (Lot 1)*. Draft Finally Report to the EU Commission. DG Education & Culture. PLS RAMBOLL Management A/S, Copenhagen 2004.  
[http://www.elearningeuropa.info/extras/pdf/virtual\\_models.pdf](http://www.elearningeuropa.info/extras/pdf/virtual_models.pdf)