Switzerland

Country Report on ICT in Education

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1 THE EDUCATION CONTEXT

1.1 EDUCATION REFORM

Reform processes are underway on various levels of the education system at present. The key political goals in education are to safeguard Switzerland's competitive position, to assure the quality of the education system, to assure permeability between different types of education and to facilitate mobility in education. Numerous developments are currently being realized, which will have a decisive influence on the Swiss education system in the coming years, particularly with regard to cooperation and harmonization.

The main thrust of educational reform in Switzerland currently concerns the question of harmonisation. Differences in education systems from one canton to another can be a considerable barrier to mobility within the country. One approach to the issue is to improve the coordination between the many actors involved in the education system. In May 2006, the Swiss population voted massively in favour of modifying the Constitution so as to oblige the Confederation and the cantons to coordinate their actions and collaborate more closely in the field of education from primary school to university. One key aspect was the will to fix the duration of each level of education and the specific objectives to be attained by pupils at the end of each level. The latter is the subject of the HarmoS project led by the Swiss Conference of Cantonal Directors of Education (CDIP).

Currently, HarmoS is being ratified by the cantons. It is the cantons (cantonal parliaments, with a possible, facultative referendum) who decide about whether to join the new agreement. If the agreement is accepted, the cantons initiate steps in order to harmonise their cantonal structures and objectives concerning compulsory education. The HarmoS agreement came into effect on 1st August 2009 when 10 (out of 26) cantons had joined it. The agreement will only apply to those cantons that ratify it. These cantons will then be granted a transition period of six years in order to transpose whatever adaptations are necessary according to the HarmoS framework.

To date (September 2011) a total of 16 cantons (representing 76% of the country's populations) have joined the agreement. 7 cantons (14%) have declined joining the agreement, 4 (10%) are still pending.

1.2 KEY CHALLENGES /PRIORITIES FOR EDUCATION

Overall Federal policy on research and development is fixed in a framework document entitled "The Message of the Federal Council on Education, Research and Innovation" The most recent version is to cover the period 2008-2011 (to be extended to 2012). A total budget of about 20 billion Swiss francs (12 billion Euros) is to be voted for the four-year period. Two underlying principles govern this policy framework:

- Ensuring the sustainability and the quality of education;
- Stimulating competitiveness and growth via research and innovation.

Within this framework, the federal contribution towards the Swiss Educational Server (as well as the participation in PISA and the monitoring of the education system) is to be funded via the Federal Office for Professional Education and Technology (OPET).

The State Secretariat for Education and Research supports the international activities of the Swiss Centre for Educational Technologies in Teaching (CTIE) in the area of ICT and education. These activities aim at:

- ensuring that Switzerland is represented in the European Schoolnet and assuring the exchange of information between Switzerland and other European countries on ICT and education issues;
- coordinating the possible participation of Swiss Educational System institutions (co-coordinating institution, departments, schools, classes) in international projects in the fields of ICT and education and ICT;
- allowing Swiss Education System institutions, especially schools, to benefit from the country's participation in international projects, particularly such concerning electronic resources for teaching and learning.

"Almost all workers are educated at least to the upper secondary level and vocational education contributes to one of the most successful transition performances of youth to employment in the OECD. Higher education enjoys an excellent reputation, as reflected in one of

the highest scientific publication rates relative to population in the OECD and high placements of Swiss universities in international rankings. Participation in continuous education is among the largest in the OECD. Results for children with low socio-economic background or immigration background do not fully measure up to the high standards of the education system. Improving early childhood education and availability of childcare facilities for very young children would raise subsequent educational attainment, especially for these groups of children. Accountability of schools for their education outcomes should be raised. In tertiary education, attainment rates among the young are modest for a high-income OECD country, reflecting the importance of the upper secondary vocational system. A larger supply of tertiary graduates could have benefits for productivity performance especially in the context of demographic ageing. Public spending per pupil on pre-primary education is low in international comparison whereas spending on tertiary academic education per graduate is among the highest in the OECD." (Fuentes, OECD 2011)

The recent foundation of Teacher Training Universities has led to a general rise in the quantity and comprehensiveness of Swiss research on education. But until now only a few projects were focused on the use of ICT in K-12 teaching and learning. Only one Teacher Training University has set up a dedicated research institute on this topic: the Institute for Media and School Education (IMS) at the Teacher Training University of Central Switzerland (PHZ). For distinct projects of the latter see below: The school projects at Goldau.

To encourage the development of research in vocational training, six networks of competence (or leading houses) have recently been created by the Federal Office for Professional Education and Technology (OPET). One of these, called DUAL-T, is dedicated to new technologies and brings together CRAFT (EPFL), Futura (University of Fribourg) and TECFA (University of Geneva). The process of creation of these leading houses was particularly praised in the recent OECD national review of educational R&D in Switzerland as one of the potential solutions to shortcomings in applied research.

Sources

Promotion of Education, Research and Innovation for 2008 – 2011 (English/German/French/Italian) http://www.sbf.admin.ch/bfi2008/index_en.html

Fuentes, A. (2011), "Raising Education Outcomes in Switzerland", *OECD Economics Department Working Papers*, No. 838. 10.1787/5kgj3l0wr4q6-en

OECD National Review of Educational R&D Switzerland, OECD (2007) (in English) http://www.oecd.org/dataoecd/11/2/38011677.pdf

Educational R&D in Switzerland, Country Background Report, CORECHED (2006) (in English) http://www.oecd.org/dataoecd/11/24/38011656.pdf

Leading House: technologies for vocational training (in English): http://dualt.epfl.ch/

2. ICT POLICY

2.1. RESPONSABILITIES

Pre-school and compulsory education

According to the Federal Constitution, the cantons are responsible for school education. The cantons and their municipalities bear all responsibility for regulation and implementation in the field of compulsory education and pre-school. The municipalities assume various capacities. In general, the municipalities are responsible for the schools (in some cantons, for schools at the lower secondary level, the canton can also be responsible).

Upper secondary level

On the upper secondary level, the cantons and the Confederation each bear responsibility for parts of the public education system.

Vocational education and training as a whole (basic vocational education and training, higher vocational education and training, and vocationally oriented continuing education) is regulated by federal law and is within the capacity of the Confederation. The Confederation, cantons and professional organizations work together as partners. The cantons are responsible for the implementation of basic vocational education and training, and are responsible for the establishment and maintenance of educational institutions. The profes-

sional organizations perform important tasks in the field of basic vocational education and training. The cantons and the Confederation jointly regulate the recognition of matura certificates. The cantons establish and maintain the matura schools. Inter-cantonal regulations apply to the recognition of specialized middle schools and their certificates. The cantons establish and maintain the specialized middle schools.

Coordination and cooperation among the cantons at the national level have been established over a long period of time. They are based both on « hard law », which is binding for those which abide by it as well as « soft law » which functions as mere recommendation for the cantons to abide by. In the realm of « soft law » the EDK/CDIP has issued several recommendations concerning ICT, the the most recent concerning the overall strategy of the EDK/CDIP with regard to ICT dating from March 1, 2007.

ICT is one of those realms which have profited from long established cooperation between the national and cantonal levels, involving both the *Bundesamt für Berufsbildung und Technologie und Staatssekretariat für Bildung und Forschung* at national level and the EDK/CDIP at cantonal level as well as several other players. It is the Swiss Conference for the Coordination of ICT (SKIB)'s responsibility to coordinate the activities of the various bodies involved.

Sources

ICT und Bildung in der Schweiz 2007
http://www.educa.coop/dyn/78755.asp (German)
http://www.educa.coop/dyn/78786.asp (French)

Strategie der EDK im Bereich Informations- und Kommunikationstechnologien (ICT) und Medien vom 1. März 2007 http://edudoc.ch/record/30020

Stratégie de la CDIP en matière de technologies de l'information et de la communication (TIC) et des médias 2007 http://edudoc.ch/record/30021

Swiss Conference for the Coordination of ICT (SKIB)

http://www.educa.coop/dyn/80287.htm
http://edudoc.ch/record/30036/files/Statut_SKIB_d.pdf
(Statut)

2.2.   ICT POLICIES FOR SCHOOLS

Until recently there was no overall strategy for the integration of ICT in schools, although there was a more general Information Society Strategy, which was updated in 2006. It is noteworthy that the Federal Council very recently decided to set up their delegation to handle the Swiss Information Society strategy placing it at the highest possible governmental level.

The strategy fixes two main objectives:

• Integrating ICT in teaching at all levels both as a tool but also as a resource for all subjects, as well as a set of related competences to be taught in the framework of general media education.
• Ensuring digital literacy to enable all pupils to acquire the necessary competences but also promoting equal opportunities with respect to ICT and media.

It goes on to fix six "areas of coordination", that is to say, topics to be dealt with by cantons within the framework of the CDIP. These topics aim at:

• Ensuring that ICT as tools, resources and also as a set of competences are fully integrated into curricula.
• Guaranteeing the availability of suitable digital content by creating the appropriate context, for example by encouraging networking between content makers or developing policies to ensure standards of quality.
• Improving teacher competences for the use of ICT in education by completing existing actions such as implementing recommendations regarding ICT in teacher training.
• Providing suitable information about the education system as a platform for exchange and collaboration via the Swiss Educational Server.
• Ensuring the sustainability of the development and maintenance of infrastructure via framework agreements with private actors and through public–private partnerships.
• Strengthening Swiss and international collaboration thanks to expert networks, the gathering and sharing of information and improved dissemination of international projects on ICT use in education in Switzerland.

Sources

Information and Communication Technologies (EDK/CDIP) http://www.edk.ch/dyn/12277.php (German)

Information and Communication Technologies (EDK/CDIP) http://www.edk.ch/dyn/11744.php (French)

Strategie für eine Informationsgesellschaft in der Schweiz, 2006 http://www.bakom.admin.ch/themen/infosociety/00695/index.html?lang=en (in English, French, German)
Strategie der EDK im Bereich Informations- und Kommunikationstechnologien (ICT) und Medien vom 1. März 2007 http://edudoc.ch/record/30020

Stratégie de la CDIP en matière de technologies de l'information et de la communication (TIC) et des médias 2007 http://edudoc.ch/record/30021

Integration der ICT und Medien in der Bildung. Zusammenstellung der unterstützenden Massnahmen und Aktivitäten der Kantone zur Integration der ICT in den Unterricht. Schweizerische Fachstelle für Informationstechnologien im Bildungswesen SFIB 2009 (available online in German and French only) http://www.educa.coop/dyn/bin/81831-83894-1-sfib_integration.pdf

The Project School at Goldau

The Project School Goldau (PSG) is part of the state primary school at Goldau, a small commune in central Switzerland. The Project School is to serve as a model for a future school. The teachers aim to create a modern education while at the same time consolidating their endeavours with a theoretical foundation and justification.

The Project School Goldau works closely with the Institute for Media and School Education (IMS) at the Teacher Training University of Central Switzerland (PHZ) in order to conceive and implement innovative school projects.

Findings from research find their way into practical new teaching methods and vice versa problems recognized in teaching practice are brought to the imme-diate attention of the researchers. The Project School will also be a place where student-teachers can familiarize themselves with specific and practical issues related to research and development in education.
Work in the Project School is monitored by professional project management. The project management is advised by the Director of the Institute for Media and School Education (IMS).

By experimenting with various teaching arrangements valuable conclusions can be drawn for the training of future teachers as well as for the continuous in-service-training of active teachers. It is the express purpose of the Project School to improve the overall quality of teaching in primary schools.

The Project School's activities nevertheless have to be in accordance with cantonal school curricula, though. So all work done in the Project School is consistently based on the official curriculum and a regulatory framework ensures the transition of pupils from and to the Project School. Achievement of learning objectives is granted the highest priority at the Project School.
The cooperation between the Project School at Goldau and the Institute for Media and School Education (IMS) at the Teacher Training University of Central Switzerland (PHZ) is a successful implementation of the necessary dialogue between theory and practice in teacher training. This mutually beneficial cooperation has produced a number of projects, two of which have won awards for successful implementation of ICT in teching practice: These are lerntagebuch.ch and schweizer.ch - suissr.ch - svizzr.ch.

The iPhone Project

A current long term project at the Project School involves the use of smartphones. For the duration of a two-year pilot project starting in 2009 all 12-year old pupils of a fifth class of the Project School at Goldau have been given a personal Apple iPhone 3G to be used by them individually and without any constraints both in their spare time and at school.
The pupils are thus enabled to read, write, calculate, draw, take pictures, record sounds, listen to music, make calls, communicate and surf the internet whenever they want and whereever they are. The children are actively encouraged to use the device inside and outside school as a core part of their personal learning and working environment. They should thus be enabled to emancipate themselves from constraints put on

them by both their parents and their teachers, or by the entertainment industry and be put in a position where they can deal critically and in an informed way with a flood of information and communication technology which will increasingly become available both for learning and for entertainment puposes.

The pilot project was planned by the Institute for Media and School (IMS) of the Teacher Education Institute of central Switzerland at Schwyz (PHZ) and is now also run and scientifically monitored by that institution. The project is supported by Swisscom, the biggest telecom company in Switzerland, to the extent that no additional costs whatsoever arise either for the school, the parents or the pupils themselves.

Sources (all available in German only)

i-Phone Projekt der Projektschule Goldau
http://www.projektschule-goldau.ch/das-iphone-projekt

Projekt Lerntagebuch www.lerntagebuch.ch

Projekt schweizr – suissr – svizzr
http://www.schweizr.ch

2.3.   ICT FOR INCLUSION

There is a working group dedicated to issues of ICT for inclusion, particularly in the field of special needs education, which consists of members of all Swiss institutions offering courses in special needs education. In 2009 the working group has published a report on the role of ICT in the training of special needs education teachers.

Source

 "ICT in der Sonderpädagogik. Zur Bedeutung der Informations- und Kommunikationstechnologien in der Ausbildung der Lehrpersonen", Schweizerische Fachstelle für Informationstechnologien im Bildungswesen (SFIB) 2009.

SUMMARY of: ICT in Special Needs Education

Expert's declaration on the relevance of including ICT in special needs education teacher training

The growing impact of Information and Information and Communication Technologies (ICT) on everyday life, on training and schooling and in professional activities is becoming more and more evident, both on an individual as well as on a social level. Basic skills traditionally span numeracy, reading and writing. Skills in ICT should be added to these in the cycle of basic and lifelong learning.

As it is people with special needs are confronted with difficulties in everyday life, they should not be further burdened with difficulties in accessing, handling and using ICT. All the more considering that ICT offers genuine advantages to people with special needs.

In view of this basic and extended technical as well as methodical expertise in ICT for teachers in general as well as for special education teachers is a prerequisite. Need for action lies as well on a political as on a institutional level e.g. special needs education training centers.

A task group of representatives of all German speaking Swiss special needs education training centers, chaired by the Swiss Agency for ICT in Education discussed matters and put down the results of their mutual reflection.

These reflections and recommendations aim to raise the threshold of awareness to the significance of ICT in special needs education and encourage experts involved in special needs education training to expand and intensify steps towards the integration of ICT in special needs education training.

http://sonderpaedagogik.educa.ch/sites/default/files/20101022/saict_publikation_.pdf

2.4.   ICT PRIORITIES

Area	High	Middle	Low
Initial ICT related Teacher Training		X	
In service teacher training	X		
Curriculum development	X		
ICT based assessment			X
Infrastructure and maintenance		X	
Digital learning resources	X		
School-home connections		X	
ICT for learners with disabilities / special needs			X
ICT related research		X	
esafety		X	

		X	
Reducing the Digital Divide		X	
Interactive Whiteboards			X
Netbook/notebooks		X	
Developing key competences	X		
Developing 21st century skills (critical thinking, problem solving, communication, collaboration, and creativity and innovation)	X		

2.5. NATIONAL CHARACTERISTICS (OPTIONAL)

The education system reflects the way Switzerland is organised politically. In accordance with Switzerland's federal structure, the tasks of the education system are shared between three political levels, i.e. the national (the Swiss confederation), the cantonal (26 sovereign cantons) and the communal (communes and municipalities), which work together in their respective areas of responsibility to ensure the high quality of the education system.

Characteristics of the Swiss education system

As a rule the higher political level (e.g. the confederation) only passes laws and regulations or undertakes tasks if the lower (cantonal) level is not in a position to do so. Moreover, the confederation passes laws only in (the few) cases where the Federal Constitution gives the confederation legislative authority in educational matters. But even in these cases the implementation of the federal law lies with the cantons, which as a rule take the main responsibility for education. There is thus no central ministry of education at national level in Switzerland. Each canton has its own legal regulations for education. Moreover, the whole of the education system is characterized by a high degree of local anchoring in the four culturally diverse language regions (German, French, Italian, Romansh) of the country. The only exception to this rule is vocational education which is centrally governed at federal (i.e. national) level by the Federal Office for Professional Education and Technology (OPET, http://www.bbt.admin.ch/themen/berufsbildung/index.html?lang=en).

The responsibility for legal implementation, execution, supervision and financing varies depending on the type of educational level and the respective educational institution.

On the whole the responsibility for legal implementation, execution, supervision and financing thus varies greatly within the country depending on the canton, the linguistic region, and the educational level and type of educational institution. Nevertheless coordination and cooperation among the cantons have been established over a long period of time. ICT in particular is one of those realms which have profited from the established cooperation between the federal and cantonal levels.

Some few parameters in education are regulated on an "inter-cantonal" (not to be confused with federal) basis. These are based both on « hard law », which is binding for those which abide by it as well as « soft law » which functions as mere recommendation for the cantons to abide by. In the realm of « soft law » the Swiss Conference of Cantonal Directors of Education (EDK/CDIP) has issued several recommendations concerning ICT, the most recent concerning the overall strategy of the EDK/CDIP with regard to ICT dating from March 1, 2007 (cf. below under 3.2.)

The cantons share responsibility for the oversight of compulsory education with the communes: cantons can transfer various powers to the communes and municipalities. In particular, the latter assume various capacities on the pre-school, primary and lower secondary levels. Supervision and funding of compulsory education schools, in particular primary schools, lies generally with the communes.

However, the cantons are alone responsible for the supervision and funding of general education at upper secondary level.

There are 10 cantonal universities and 13 teacher training universities that are under the legislative responsibility of the cantons but receive additional funding from the confederation and from those cantons which do not have their own university.

Apart from vocational education, which as a whole sector is centrally governed – there are only 2 institutions that are under direct and exclusive rule (both legally and financially) of the confederation (i.e. the central government), which are the two Swiss Federal Institutes of Technology at Zürich and Lausanne.

3. THE CURRICULUM AND ICT

3.1. THE CURRICULUM FRAMEWORK

There is no national curriculum in Switzerland, as devising the curriculum is the legal responsibility of the cantons. However, work is currently going on at both federal and regional level to harmonise the curriculum and other aspects of schooling during the years of compulsory schooling. The national HarmoS project, developed by the Swiss Conference of Cantonal Directors of Education (CDIP) amongst other things aims to guarantee the quality of education by fixing standards to be attained by pupils in languages, mathematics and science at the end of the 4th, 8th and 11th year of their studies (including two years of kindergarten (ages 4 to 7, depending on the canton). These standards can either be defined in terms of the content to be studied or the competences to be acquired. Experts are currently working on the definition of these standards and their propositions are to be ratified by the cantons via the CDIP.

Regional educational organisations, such as the CIIP, which brings together the French-speaking cantons, are working on regional curricula (PER). The proposed curriculum for the French-speaking cantons structures the curriculum in terms of:

- General education, structured around three axes: the relationship to oneself, the relationship to others, relationships with the world;
- Subject content, organised into five areas: arts, body and movement, languages, mathematics and natural sciences, human and social sciences;
- Transversal competences: collaboration, communication, reflection, critical approaches, and creative thinking.

The curriculum is divided into three cycles, each with an indication of the study time to be spent on the five areas that are to be covered. Fifteen percent of the time allotted can be given over to activities not in the curriculum. It should be noted that ICT is included in the languages subject content group and is present in both general education and transversal competences.

The PER (regional curricula) is currently the subject of consultations in the French-speaking cantons. The CIIP's objective is for this regulation to come into effect by start of the school year 2010/2011. A similar programme is being put in place in German-speaking Switzerland. Consultation is taking place in German-speaking cantons on the *Lehrplan* (Learning Plan). Its

implementation in schools is scheduled for the school year 2011/2012.

Sources

HarmoS – Harmonisation de la scolarité obligatoire en Suisse (In German, French, Italian)
http://www.cdip.ch/dyn/11737.php

Plan d'études romand. (In French)
http://www.consultation-per.ch/

Projekt Deutschweizer Lehrplan (In German)
http://www.lehrplan.ch/

3.2. ICT IN THE CURRICULUM

The 2007 strategy of the cantons with respect to ICT in education fixes the achievement of digital literacy as one of its two general aims. Three objectives are indicated:

- to allow all pupils who attend compulsory education to acquire basic competences in ICT use;
- to promote equal opportunities with respect to ICT and media;
- to ensure that upper secondary school students are conversant with basic technical notions in the field of ICT.

Amongst the proposed actions aimed at achieving these goals, the ICT strategy mentions the possibility of fixing pedagogical objectives for ICT competences as constraints for cantonal curricula within the forthcoming HarmoS educational harmonisation programme. To ensure the necessary technical competences in upper secondary school, computer science has just been reintroduced as a subject in the Federal matriculation exams (which determine access to higher education). Inclusion is optional for the coming academic year. In 2008 it will be obligatory.

According to the PPP study, there are considerable differences between the linguistic regions when it comes to the development and implementation of a rational for the integration of ICT in schools. In the German-speaking part of Switzerland, 33.4% of schools have such a concept whereas only 5.8% of French-speaking schools have an ICT rationale.

A survey carried out by the CTIE in 2008 provides an overview of the political and educational measures

addressing the integration of ICT in the Swiss Educational System. The survey is based on a questionnaire addressed to those responsible for such matters in the cantons and asked for them to report on existing measures.

Results from the cantons show that 22 out of 26 specify concepts including components to further the integration of ICT during the years of compulsory schooling. From a more didactic point of view, 24 out of 26 cantons have adopted a curriculum which integrates ITC. The 2 cantons without such a curriculum mention that they are waiting for the forthcoming French-speaking curriculum (PER), which will provide a curricular programme integrating ITC.

As for the non-compulsary level of upper secondary schooling (ages 16-19, but excluding vocational schools) results from the cantons show that 10 out of 26 specify concepts including components to further the integration of ICT during the years of compulsory schooling. From a more didactic point of view, 11 out of 26 cantons have adopted a curriculum which integrates ITC.

Sources

Strategie der EDK im Bereich Informations- und Kommunikationstechnologien (ICT) und Medien vom 1. März 2007
http://edudoc.ch/record/30020/files/4_8_ICT_d.pdf
(German)

Stratégie de la CDIP du 1er mars 2007 en matière de technologies de l'information et de la communication (TIC) et de médias
http://edudoc.ch/record/30021/files/4_8_ICT_f.pdf
(French)

Integration der ICT und Medien in der Bildung. Zusammenstellung der unterstützenden Massnahmen und Aktivitäten der Kantone zur Integration der ICT in den Unterricht. Bestandsaufnahme Oktober 2008. SFIB, Bern 2009 (in German and French)

http://www.educa.coop/dyn/bin/81831-83894-1-sfib_integration.pdf (German)

http://www.educa.coop/dyn/bin/81890-83896-1-ctie_integration.pdf (French)

EDK Umfrage bei den Kantonen 2008/2009 : ICT im Unterricht : Projekte (in German and French)
http://www.cdip.ch/dyn/18009.php?filter=b3

3.3. STUDENTS' ICT COMPETENCE

The HarmoS programme being currently ratified provides a general framework for the specific competences to be achieved by students. Presently there is no national curriculum in Switzerland, and as a result, cantons still use rather varied curricula.

This situation is currently changing as the cantons (grouped by linguistic region) are working together on common curricula, such as the French-speaking areas' PER (*Plan d'étude romand*) and the German cantons' *Lehrplan* (Learning Plan).

As regards ICT the PER, currently in the process of consultation, suggests to integrate ICT within the field of media education, this subject itself being a part of general education. General educational objectives are organised primarily according to the level of education. In particular, the intention as regards the specific competences to be achieved by students is:

• to foster a selective and critical approach to media at key stage 1 (kindergarten and the first and second years of compulsory schooling);
• to decode the presentation of various types of message at key stage 2 (the third and fourth years of school) ;
• to foster multiple approaches to the consumption and production of media and information (the fifth and sixth years of school).

Each of the general objectives is broken down into specific objectives which can be consulted online on the PER site. Information on the contents of the *Lehrplan* (the curriculum for German-speaking areas of Switzerland) will become available as from October 2009.

Sources

Plan d'études romand (in French)
http://www.consultation-per.ch/

Lehrplan 21 (in German) http://www.lehrplan.ch

3.4.   ASSESSMENT SCHEME

Currently there is no national testing of pupils' ICT competences.

However, within the HarmoS framework, the CDIP has called upon a group of experts in order to draw up training standards to apply to all pupils and to be monitored by the CDIP. For the moment ICT is not a part of these performance standards, these will for the time being apply to mother tongue language skills, modern foreign languages, mathematics and natural sciences. Nonetheless it is possible that as part of a second phase of this project content standards will be defined and thus provide a possible framework for ICT competences, which might then be tested nationally.

EDK/CDIP Report on education standards (work in progress) (German / French)

http://www.edk.ch/dyn/12930.php

http://www.edudoc.ch/static/web/arbeiten/harmos/bildungsstandards_faktenblatt_d.pdf (German)

http://www.edudoc.ch/static/web/arbeiten/harmos/bildungsstandards_faktenblatt_f.pdf (French)

3.5.   ICT BASED ASSESSMENT

There are no ICT based assessment schemes at national level. Some very few such assessment schemes exist at cantonal level, though, the most important of which is called „Stellwerk", which is a web-based and curriculum-linked assessment tool for gauging and comparing – according to pre-defined standards - the performance in German and mathematics of pupils from different classes and schools at the end of form 8 and 9 (age groups 15-16).

At present the „Stellwerk" tool is officially used by the cantons of St.Gallen and Berne.

Computer based ICT-assessment

In the context of the PPP School on the Net project a system of competence evaluation on computer skills has been developed. It is called "Test your ICT competences" and is available on **educanet²**, at present in German only.

ECDL is available on the same platform, payable according to the status of the schools using it.

Sources:

Institut für Bildungsevaluation, Universität Zürich: Projekt "Stellwerk" (in German)
http://www.ibe.uzh.ch/entwicklung/stellwerk.html

Institut für Bildungsevaluation, Universität Zürich: Projekt "Test your ICT Knowledge" (in German)
http://www.ibe.uzh.ch/entwicklung/entwicklungalt/ict.html

3.6.   QUALITY ASSURANCE OF THE USE OF ICT IN SCHOOLS

In most cantons the evaluation of the teaching body from pre-school (kindergarten) to upper secondary stages is in the hands of the school management, often in partnership with the according teaching monitoring authority (school board, school inspectorate, etc.).

The monitoring authorities take part more often at lower levels, from kindergarten to lower secondary (Secondary I), than in upper secondary in the assessment of teaching staff. According to regulations in the cantons, colleagues and pupils are rarely involved in this evaluation, and when, then only at the upper secondary level (although all may participate at all stages in internal quality processes).

Presently the Institute for Media and Education (IMS) is carrying out a survey on the educational platform educanet². Financed by the Swiss National Fund, research began in 2007 and was completed in Spring 2009. The purpose of the study was to give a detailed and scientifically sound overview on the use of educanet² by schools. It will shed more light on the link between use of the platform and the following factors:

* technical facilities in schools;
* schools' organizational framework;
* support structures;
* teachers' knowledge of ICT;
* use of the platform's functions in combination with learning objectives.

The study further intends to identify the different variables facilitating a successful use of the platform by schools. Also any differences in uses at the primary,

lower secondary and upper secondary levels shall be taken into account. Analysis of the results will deliver a basis for reflections on the possible emergence of a new educational culture and it's relation to the the use of **educanet²**.

Sources

E-Learning und Blended Learning in Schule und Berufsbildung: Die Nutzung der virtuellen Lernplattform educanet2 in der Schweiz (in German)

http://www.schwyz.phz.ch/seiten/dokumente/abstract_educanet2pdf

EDK/CDIP survey 2008: Beurteilung von Lehrpersonen (German) http://www.cdip.ch/dyn/15891.php

EDK/CDIP survey 2008: Evaluation du corps enseignant (French) http://www.cdip.ch/dyn/15948.php

4. DIGITAL LEARNING RESOURCES AND SERVICE

4.1. CONTENT DEVELOPMENT STRATEGIES

There are no content development strategies involving publishers or open source initiatives at national level.

4.2. E-CONTENT DEVELOPMENT

By its second framework, the CDIP's strategy aims at promoting production of digitalised pedagogical content, ensuring their quality with reference to cantonal and regional curricula and enabling access via the Swiss Educational Server. To wit:

- encourage networking and collaboration by producers (production);
- give access to existing content via a benchmarking, description and evaluation system (access);
- compiling and formalising pedagogical and didactic experience in each discipline, as well as examples of good practice;
- training teachers and lecturers;
- devising a policy for the production and quality assurance for digitized learning content, while clarifying the distribution of roles between the actors concerned.

Math 7/8/9 is a major project of the francophone cantons, bringing together all available teaching resources for the official mathematics curriculum at the 7th, 8th and 9th grade of schooling. These resources are available to teachers on **educanet²**.

Stratégie de la CDIP en matière de technologies de l'information et de la communication (TIC) et des médias 2007 http://edudoc.ch/record/30021

Strategie der EDK im Bereich Informations- und Kommunikationstechnologien (ICT) und Medien vom 1. März 2007 http://edudoc.ch/record/30020

4.3. USER - GENERATED CONTENT

The **Swiss Education Server** offers a **database of worksheets** which have been for the most part created by teachers for teachers. The database is searchable both by a catalogue or a search engine.

http://unterricht.educa.ch/de/worksheet

4.4. WEB 2.0

Personal Smartphones in Primary Education (see above under 2.2.2)

All pupils of a fifth form (age group 11-12 year olds) at Projektschule Goldau are given an Apple iPhone 3G for them to use in and out of school as a part of their personal learnig environment between August 2009 and July 2011. The project is being supervised and evaluated by the Institut für Medien und Schule (IMS) of the Pädagogische Hochschule Zentralschweiz – Schwyz (PHZ Schwyz). It is being sponsored by Swisscom. It does not entail any extra costs for school, pupils or parents.

Personal Smartphones in Primary Education http://www.projektschule-goldau.ch/das-iphone-projekt

4.5. CONTENT SHARING

The SWITCHcollection - National Learning Object Repository (LOR) is a national library of reusable learning objects like courses, modules, images, video clips and text documents contributed by Swiss universities. Using SWITCHcollection, lecturers can make sure that their investments pay off. Produced learning materials are archived on a permanent basis, added

to, and made available for others to use (http://switch.ch/collection/index.html).

The Digital School Library Project (Bibliothèque scolaire numérique), launched in 2006 by the Swiss Institute for Educational and Cultural Media (educa.ch) and mandated by the Swiss Conference of Cantonal Ministers of Education (EDK), is aimed at creating an interactive database bringing together educational resources in an interdisciplinary manner. The project is part of the area of "electronic resources for teaching and learning" and has three themes:

- The dissemination and exchange of information
- Developing a framework for implementing electronic resources in teaching and learning
- Establishing partnerships with content providers.

The opening of the Digital School Library is expected in 2011 (http://biblio.educa.ch).

4.6.   LEARNING PLATFORMS

The Swiss Educational Sever provides a vast amount of information about education in Switzerland, as well as an e-learning platform called **educanet²** (www.educanet2.ch).

According to the PPP study on the integration of ICT in schools (2007), 48% of schools use an online platform. The most widely used platform is **educanet²** (91.7%). Other platforms include Moodle (4.8%), BSCW (3.2%), Ilias 1.6%. The study also shows that the most widely used functions are: online calendar (28.5%), wiki (28.5%), online publishing (26.1%) and forums (25.5%). It is noteworthy that more French-speaking schools tend to use these platforms than German-speaking schools.

Launched in 2004 (as a follow up to the former educanet site), the collaborative platform **educanet²** is organised around the concept of a virtual school with four distinct, but interrelated areas: a private space including a document store, an agenda, a personal web site and short messaging facilities; an institutional space where teachers can create online classrooms, fix tasks for their pupils, provide material and use a number of interactive tools with their students such as notice boards, a shared calendar and online forums; a community space for collaborative working; a space for

on-line courses with a site generator; an online course-authoring tool and the management of online courses. New features include an in-built Wiki, an alert system and on-line surveys.

As of April 2011, 3,504 Swiss schools subscribed to **educanet²**, with more than 129,000 teachers and 402,000 pupils in more than 32,000 classes (updated statistics can be consulted on the **educanet²** website).

This platform is used by more than 3,300 schools and offers four distinct areas of activities: a "private" space for each user, an "institutional" space for schools, a "community" space where groups can work together, and a space for online learning. Tools include an address book, task manager, electronic messaging, instant messaging system, workbook, web site generator, wiki, blog, authorware, etc.

The *lessonplan tool*, available on **educanet²** offers the possibility to teachers to create a work and learning plan for their pupils and classes, structuring and timing collective and individual activities. The lesson plan tool gives orientation to pupils and teachers alike with monitoring and assisting learning progresses.

eduhub is a platform for new learning technologies at Swiss universities. Its aim is to implement sustainable IT-based methods in academic teaching, to exchange experiences and to promote collaboration (www.eduhub.ch).

Educanet² Statistics:
https://www.educanet2.ch/ww3ee/5111556.php

Stratégie de la CDIP en matière de technologies de l'information et de la communication (TIC) et des médias 2007: http://edudoc.ch/record/30021

5. TEACHER EDUCATION FOR ICT

Development of teachers' competence in ICT use is mainly organised in optional, in-service training courses although some courses have been made compulsory. Demand for courses was at the beginning (i.e. in the years 2000-2004) mainly centred on technical competences. However, training is increasingly shifting towards methodological and didactical skills and the practical integration of ICT in teaching and learning. In addition, efforts are currently being made

to include pedagogical use of ICT in initial teacher training.

In the PPP study on ICT integration in education over 70% of those responsible for ICT in schools pointed to the lack of knowledge and know-how on the part of teachers as being a barrier to objectives set for ICT use. As for the teachers, over half (57.1%) assessed their ICT competencies to be above average although women generally judged their competencies to be on average half a point less than men (on a scale from 1 to 5).

The 2006 report of the CTIE on teachers' professional development in ICT use stresses that considerable progress has been made since the last report was published in 2001. Teacher development in ICT use is now organised in optional, in-service training courses although some courses have been made compulsory. Demand for courses from 2000 to 2004 was mainly centred on technical competences. However, the content of training is increasingly shifting towards methodological and didactical considerations and the practical integration of ICT in teaching and learning. In addition, efforts are currently being made to include pedagogical use of ICT in initial teacher training.

When asked to identify future challenges the Cantonal representatives in the PPP School on the Net pointed amongst other factors the need to achieve better integration of ICT use in teaching. Concern was also expressed about the sustainability of ICT training when federal funding stops with the end of the PPP (in 2007).

Sources

Lehrberuf - Analyse der Veränderungen und Folgerungen für die Zukunft, EDK 2008 http://edudoc.ch/record/27311 (German)

Profession enseignante : analyse des changements et conclusions pour l'avenir, CDIP, 2008 http://edudoc.ch/record/27310 (French)

EDK/CDIP, Profil für die Zusatzausbildungen für Ausbildende im Bereich Medienpädagogik/ICT, 2004 http://edudoc.ch/record/2031

EDK/CDIP, Recommandations relatives à la formation initiale et continue des enseignantes et enseignants de la scolarité obligatoire et du degré secondaire II dans

le domaine des technologies de l'information et de la communication (ICT) du 25 mars 2004 (in French and German)

http://edudoc.ch/record/24706 (French)

http://edudoc.ch/record/24707 (German)

Barras J-L, Petko D, School and Internet in Switzerland. Overview and Developments between 2001 and 2007. (In French and German) http://www.educa.ch/dyn/171225.asp

Androwski, C., Dallera C., and Delacretaz, C., Enquête: TIC et médias dans la formation du corps enseignant (in French and German) http://www.enquete-ict.educa.ch

5.1.   ICT IN INITIAL TEACHER EDUCATION

Teacher Training curricula for primary and secondary school teaching are not uniformly defined at national level, but rather at the local level by the university or teacher training institution itself. There are separate curricula for primary and secondary education. The individual teacher training institutions are likewise responsible for the assessment of their students. Digital skills are considered to be a key competence for initial teacher education. Knowledge about ICT and skills in using digital technology are integrated into the curriculum. The target set for knowledge and skills is competent use of media and ICT in the classroom. As it is part and parcel of the general curricula ICT related training is compulsory.

The 2010 Study on the role of ICT in Teacher Training in Switzerland by the Hasler Foundation

In the year 2009 the Hasler Foundation comissioned a study on **the role of ICT in Teacher Training in Switzerland.** The foundation is committed primarily to promoting research and training in the field of telecommunications, distributed information systems and related topics. Through its work, the Hasler Foundation actively helps to ensure that Switzerland continues to enjoy high-level know-how in this fundamental area of infrastructure. The Foundation's existing endowments derive from the former Hasler AG (1852-1986), a pioneer in the Swiss telecommunications industry. The Foundation is a non-profit institution which uses the net income from its assets to serve the progress of tele-

communications and the future of Switzerland. The purpose of the foundation is to finance or co-finance carefully selected education and research projects in the area of information and communications technology, and by so doing to contribute positively to the development of Switzerland as an intellectual and economic area.

Motivation for the study

The study was undertaken as a sequel to a previous empirical survey, which was also commissioned by the Hasler Foundation in 2008 to gauge the reputation of informatics as a topic with the population at large and the relative importance of ICT and informatics as subjects in schools at secondary II level. As a result of that inquiry it was found that most teachers confounded ICT and informatics, moreover that ICT skills were not well understood in their various functions (e.g. as a competence in their own right, as a means or tool for teaching, and as a prerequisite for the study of informatics as a scholarly subject). It was also found that the average teacher's ICT skills were not really up to the mark. This was found to be the result of a vicious circle: young teachers' lack of a sound knowledge in ICT related content is seen a consequence of the poor education and training, which they experienced as pupils and students in ICT related fields, which in turn lead to them becoming poor teachers of ICT themselves. It was concluded that only by laying a sound and solid basis of ICT related knowledge at primary and secondary levels can this vicious circle be interrupted. And a prerequisite for that aim are, of course, teachers who are highly competent in ICT.

It was therefore the declared aim of the **present study on the role of ICT in Teacher Training in Switzerland** to find out how future teachers for primary and secondary level I schools are being prepared for the task of teaching and/or integrating ICT in their later professional career as teachers.

More particularly the study was to provide answers to the following questions:

- What kind of ICT knowledge is regarded as a prerequisite upon entering a teacher training institution?
- Is there an entry examination to test this required ICT knowledge?

- What aspects of ICT are being taught to future teachers: ICT user skills or / and pedagogic / didactic knowledge?
- Are ICT knowledge and/or skills taught as a separate subject or as part and parcel of other subjects?
- What is the overall proportion (in terms of hours or ECTS points) of ICT tuition as against the total of hours of the entire teacher training curriculum?

In order to find answers to these questions the study used three different methods:

1. A pre-study in the form of a desk research of the laws and regulations governing the role and function of ICT in teacher training;

Part 1 of the study looks at the official laws and regulations governing ICT in teacher training and discusses the conceptual framework and terminology which can be derived from official documents.

The result of that discussion together with the analysis of the content of the study plans of teacher training institutions leads to a taxonomy which will be applied in the case studies of part

2. A pre-study in the form of a desk research of the role and relevance of ICT in the framework of the curricula of teacher training institutions;

Part 2 of the study inventorizes the study plans of all 13 teacher training institutions in Switzerland with a particular view to:

- Stated objectives in the field of ICT and media education
- Official curricula (comprising both compulsory and optional courses) in the field of ICT and media education

3. The main study is made up by individual case studies of four teacher training colleges.

Part 3 of the study provides in-depth case studies of the four (out of 13) most important teacher training institutions involving in-depth document analysis and interviews with decision makers and teaching staff on the role and relevance of ICT in the training practice for future teachers up to secondary I level.

Sources:

The 2010 Hasler study is available in German only: „ICT und Medienbildung in der Lehrpersonenausbildung in der Schweiz. Fallstudie über das Studienangebot an den Pädagogischen Hochschulen. 27.5.2010.“

It is the aim of the present study to map learning targets and content in the field of ICT as they appear in the curricula of the Swiss Universities of Teacher Education (Pädagogische Hochschulen).

In the context of this study ICT is considered as part and parcel of media education, which is itself being subdivided into the five disciplinary strands of 1) application skills; 2) computer studies (informatics) as a scholarly (and school-) subject in its own right; 3) general didactics of ICT; 4) (school-) subject specific didactics of ICT; and 5) pedagogy of media studies.

The study uses three different research methods: 1) desk research into ICT policies at both national and inter-cantonal levels; 2) desk research into ICT content as it appears in the curricula of the Swiss Universities of Teacher Education and Centres for Media Education; 3) exemplary case studies of the teaching practice at the four most important Universities of Teacher Education (which comprise 64% of the total student population) involving analyses of study plans and supplementary interviews with teaching staff and administrators.

For learning targets national and inter-cantonal policies were consulted: the most important document is the Strategy for ICT in Education of the cantonal ministries of education dating from 2007. In the field of teacher training in particular that strategy advocates the "use ICT to learn" approach over and above the traditional "learn to use ICT". It is expected that more guidance for teacher training in the field of ICT will be derived from the future national curriculum for compulsory schools ("Lernplan 21"), which is still in the works. For the time being "Lernplan 21" envisages "Media and ICT" not as a subject in its own right but rather as an inter- or transdisciplinary topic.

There are 13 Universities of Teacher Education in Switzerland, most of of which have their own Centre for Media Education affiliated to them, which offers its services to the school as a whole. Depending on the individual university the centre may be a mere library

for media, a consulting agency for the field of media education, or an independant department for research in the field.

http://www.haslerstiftung.ch/pdf/studie-ict-und-medienbildung.pdf

The enquiry dating from 2008: „Das Image der Informatik in der Schweiz. Ergebnisse der repräsentativen Befragungen von Schüler/innen, Lehrpersonen und Bevölkerung". Erstellt im Auftrag des Förderprogramms FIT in IT der Hasler Stiftung von Rütter + Partner, April 2008. http://www.haslerstiftung.ch/pdf/imagestudie_2008.pdf

5.2. EFFECTIVE TRAINING MODELS FOR INITIAL TEACHER EDUCATION

ICT in initial teacher training is in the responsibility of individual Teacher Training Institutions and is fully integrated into the curriculum. There are the most diverse models of integration of ICT into the basic curriculum. Details are available from the 2010 study of the Hasler Foundation (cf. 5.1.)

5.3. ICT IN IN-SERVICE TEACHER EDUCATION

Compulsory in-service teacher training has been the standard provision for all kinds of knowledge and skills related to the use of ICT in the classroom for many years. In service teacher training in ICT is the responsibility of the cantons and is offered by cantonal expert agencies for ICT. These are usually affiliated to the cantonal Teacher Training Institutions and are staffed by both experienced in-service-teachers and experts in the fields of pedagogy and ICT.

Source: http://unterricht.educa.ch/de/kantonale-ict-fachstellen

5.4. EFFECTIVE TRAINING MODELS FOR IN SERVICE TEACHER EDUCATION

In-service teacher training (see 5.3.) is considered a highly efficient and successful model by all parties involved.

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5.5. NEW INITIATIVES

The MINT learning center at the Swiss Institute of Technology in Zürich (ETH) is to develop teaching methods, learning objects, programs and curricula for the teaching of Physics, Chemistry and Technology in schools at upper secondary level in order to improve on students applied knowledge of these subjects. Primary target groups: Science teachers from all levels of school (from elementary to upper secondary) and vocational training institutions. At the MINT center in-service-teachers develop new teaching materials while testing them in their schools. Feedback from the teaching at the schools flows back to the learning center's development teams.

Source

MINT Learning Center at the Swiss Federal Institute of Technology http://www.educ.ethz.ch/mint/index_EN

5.6. ASSESSMENT SCHEMES

No nationwide assessment schemes exist for for teachers using ICT in teaching. The EDK/CDIP has regulated the recognition of diplomas awarded for the successful completion of in-service ICT training courses for teachers.

Durch die EDK anerkannte Zusatzausbildungen in ICT (in German / French) http://www.cdip.ch/dyn/13840.php

Lehrberuf - Analyse der Veränderungen und Folgerungen für die Zukunft, EDK 2008 http://edudoc.ch/record/27311 (German)

Profession enseignante : analyse des changements et conclusions pour l'avenir, CDIP, 2008 http://edudoc.ch/record/27310 (French)

5.7. TRAINING THE TEACHER TRAINERS

The issue is not addressed at national level. There are two inter-cantonal initiatives in the field. The teachers association MITIC in the French speaking part of Switzerland offers ICT-courses for in-service teacher trainers as well as general help and guidance in the field.

« PICTS - Pädagogischer ICT-Support » is the corresponding body in German speaking Switzerland. It offers a course on the theme of pedagogic ICT support, which caters for those in-service-teachers who are in charge of ICT issues, irrespective of subject or school type or level.

Barras J-L, Petko D, School and Internet in Switzerland. Overview and Developments between 2001 and 2007. (In French and German) http://www.educa.ch/dyn/171225.asp

Association EDUMITIC (for French speaking Switzerland) http://www.edumitic.ch/spip/

PICTS - Pädagogischer ICT-Support (for German speaking Switzerland) http://picts.educanet2.ch/info/.ws_gen/

5.8. INCENTIVES

As mentioned above, most training of teachers in ICT use takes place in in-service training courses, a few of which may be obligatory.

In the framework of the PPP initiative between years 2001-2006 several cantonal and inter-cantonal projects had been initiated with a view to training teacher trainers in ICT. In the course of these projects a number of pedagogical scenarios for the use of ICT in the classroom have been realized by participants. These scenarios are publicly available for all teachers on the Swiss education server.

Sources

Pedagogical scenarios for using ICT in teaching http://ppp-sin.ch/dyn/58565.asp (French) http://ppp-sin.ch/dyn/57497.asp (German)

EDK/CDIP, Recommandations relatives à la formation initiale et continue des enseignantes et enseignants de la scolarité obligatoire et du degré secondaire II dans le domaine des technologies de l'information et de la communication (ICT) du 25 mars 2004 (in French and German) http://edudoc.ch/record/24706

Barras J-L, Petko D, School and Internet in Switzerland. Overview and Developments between 2001 and 2007. (In French and German) http://www.educa.ch/dyn/171225.asp