

Web Based Course Platforms: Request for Information

1 Introduction

1.1 The Swiss Higher Education Landscape

Switzerland is a small country with a tradition of local decision making in education at all levels. The central government in Bern funds directly two Federal Institutes of Technology (FITs) in Lausanne and Zurich. Ten universities¹ depend on the cantons where they are located but need federal help to meet contemporary standards of research and teaching. This help comes in several forms: contributions to running expenses and constructions, support of research projects by a Swiss National Science Foundation and a number of incentive programs called *special measures* to nudge the universities towards new developments. The Federal Institutes of Technology and cantonal universities (indirectly) report to the Federal Department of Home Affairs.

In the past few years, a cluster of Engineering, Arts and Business Administration Schools have been organized in a network of Universities of Applied Sciences (UASs) which report to the Federal Department of Economic Affairs

By tradition, all the above institutions have developed their teaching and their research to a large degree independently of each other. Recently, growing requests for contributions from the Federal State have called for more coordination. All initiatives which promote such coordination are welcome.

1.2 The Swiss Virtual Campus Initiative

In 1998, a proposal for incentive measures from the Swiss central government to promote the development of internet-based courses in higher education was accepted by decision-makers and teachers alike. They worried about changes that global access to Internet resources will bring to education. They were aware that small experiments do not scale up easily. Many teachers would like to take advantage of the new information and communication technologies; they are using e-mail, newsgroups, web pages, and other popular software to modernize their communications with their students, but some were also interested in participating in larger schemes to produce material that would be competitive with what is bound to appear on the market: they are the ones who responded to the calls for participation of the program below.

1.2.1 The SVC Program

In its message to the Parliament concerning the funding of Higher Education for the period 2000-2003, the Swiss Government included a credit of SFr. 30 millions (€20 millions) for funding the “Swiss Virtual Campus”² (SVC) with the following objectives:

- to promote collaboration between institutions - *higher education networks*;
- to entice teachers to explore a new pedagogical dimension - *learner centric model*;

¹ Basel, Bern, Fribourg, Geneva, Lausanne, Luzern, Neuchâtel, Southern Switzerland, St. Gallen, Zurich.

² <http://www.virtualcampus.ch>

- to encourage the development centers to become producers of high quality learning material – *competitiveness of Swiss higher education*.

The projects that are jointly funded by the universities and by this program (FITs and UASs are invited to join with their own resources) have to abide by the principles of the “Swiss Virtual Campus” which are summarized in the five following criteria:

- foster cooperation between higher education institutions (cantonal Universities, Federal Institutes of Technology, and Universities of Applied Sciences);
- highlight a clear pedagogical objective;
- participate in the selection and use of common tools on stable platforms;
- present a realization plan with evaluation criteria;
- obtain from the start a contribution (matching funds) from the institutions participating in the project with the promise to integrate its use and maintenance into their normal planning once the development is finished.

A public call for participation produced 155 letters of intent by September 1999. An international group of experts selected 55 of them and asked for a detailed proposal: 27 were accepted and started in July 2000. A second series produced 58 proposals: 22 were accepted and started in July 2001. Every project involves at least three institutions of higher education (one leader and several partners) who pledged they will let their students take the courses for credit after an appropriate evaluation.

To help the project, mandates were given to cover technical, legal, pedagogical and organizational issues. Among those, the Edutech³ group maintains an evaluation of course platforms, runs seminars for project managers and provides consulting services on technical matters.

1.2.2 Future plans

A new proposal covering the period 2004-2007 is being prepared. It will have to be approved by Parliament and some changes may still occur. It asks for SFr. 50 millions over 4 years and intends to achieve the following goals:

- provide maintenance for successful projects from the current period and offer support to the users;
- set up a professional “e-learning production team” in each institution;
- fund new projects selected after another call for participation;
- provide for coordination, mandates and program management.

SWITCH⁴ and Edutech have been asked by the SVC steering committee to look for long term solutions to the platform maintenance problem.

2 Request for Information

In order to prepare recommendations for the Steering Committee of the SVC⁵, it would be desirable to know which software platforms could best cover the needs of the SVC and at what cost. The best solutions would be for the SVC to support as few platforms as possible without any loss of quality for the different projects. Conversion tools for any proposed solutions would be considered.

³ <http://www.edutech.ch>

⁴ SWITCH is a foundation established in 1987 by the Swiss Confederation to set up and run the network connecting Swiss institutions of higher education (see <http://www.switch.ch>).

⁵ <http://www.virtualcampus.ch/display.php?pid=43>

It is not possible at the present time to know exactly where the servers will be installed, how many students will be registered or how many simultaneous users will be connected to the SVC at any given time. Based on their experience, platform providers could help design optimal solutions⁶.

Although the program is not yet very large, it is a national scheme in which all the Swiss institutions of high learning participate. It is also characterized by a high degree of multilinguism involving Swiss national languages and English. As such, it is a pioneering experiment and some platform providers could be interested in entering a joint project to be defined precisely later.

It must be stated that this is a request for information. No financial liability can be derived from it either for the SVC projects or for the platform providers. If requested, the answers will be treated confidentially.

2.1 Platform use in SVC Projects

Currently, SVC projects have adopted one of the three following solutions to implement their courses⁷:

- a large number of projects use an existing platform: about 75%;
- some projects have implemented (in-house or through outsourcing) their own ad-hoc platform (in some cases, this development is based on an existing system, such as the Zope⁸ environment): 15%;
- finally, in some projects, courses do not use any platform and consist only of a structured collection of web pages (additional tools such as discussion forums may also be used): 10%.

2.2 Cost estimates for the following two scenarios

The costs for setting up and maintaining several course platforms locally at each institution is very high, especially for smaller institutions with limited financial resources and also for those providing only a limited number of online courses. Thus, it is planned that a single organization operates and administrates centralized servers for one or several course platforms that will be made available to all Swiss higher education institutions.

In the beginning, the servers' hard- and software should be designed with regard to primarily high availability, reliability and security and secondary for high performance

2.2.1 Scenario 1 - Realistic

1st year: 10 courses (2000 seats*)
2nd year: 40 courses (8000 seats)
3rd year: 80 courses (16000 seats)

2.2.2 Scenario 2 - Optimistic

1st year: 45 courses (9000 seats)
2nd year: 70 courses (14000 seats)
3rd year: 100 courses (20000 seats)

⁶ One could for instance imagine to have geographically distributed servers.

⁷ These numbers are based on the 30 projects for which this information is available.

⁸ <http://www.zope.org>

(*seats are calculated based on an average class size of 200 students)

For the above two scenarios:

1. What are the one-time and yearly licensing costs? What are the costs for updates?
2. Are other licensing models possible, e.g. based on registered students, simultaneous users, unlimited site license, etc.?
3. What hardware is required that would be sufficient for the first two years? (proposition of a systems concept addressing performance, security, availability and backup)
4. What manpower is required for system-administrative tasks: installation and maintenance of the servers (application, database, etc.), including availability and security management?

3 Requirements and Criteria for Course Platforms

3.1 General Requirements

- Efficient development and management of courses with a long-term perspective.
- Easiness of use for authors, tutors and students.
- Support for multiple languages (ideally, the user should have the possibility to change the interface language dynamically).
- Demonstrated use of the platform in higher education would be an asset.

3.1.1 Authors

Authors are experts of the course domain. They usually are experienced web users and highly motivated, but only have basic web authoring skills. The platform should on the one hand enable the authors to efficiently develop a course structure along with its content, and on the other hand support them in being compliant with technical, didactical and usability standards – in other words, it should prevent them from making severe errors.

3.1.2 e-learning production team

The SVC feels the need of having professional teams to help produce quality courses from the authors' design. Their role is to improve the interactivity but also to impose certain standards on the interfaces, metadata and student management. How will their work be helped by the proposed solution.

3.1.3 Tutors

Tutors are typically advanced students, teaching assistants or – more rarely – professors. They should have attended a 1-day introductory, didactically focused teletutoring course. They don't have much time to get used to a platform, but they still should be able to quickly handle its basic tutoring tools: communications, announcements, students subscriptions, group management, tracking data evaluation and quiz results evaluation.

3.1.4 Students

The target audience of the courses are higher education students, with a typical age of 20-30 years. They are usually experienced web users. They have a wide spectrum of good and modern equipment, and internet access with flat rate can be expected. The platform should support various pedagogical models for students, that are to a certain extent autonomously learning but also coached by tutors and professors.

3.2 Criteria

This section lists more precisely the requirements for an e-learning platform. A detailed list of criteria would cover dozens of pages, and its usefulness is questionable. We therefore try to be as precise as possible when describing our requirements with qualitative statements at large.

3.2.1 Course usage

Compliant with common Web technology: The platform is compatible with common browsers (Netscape, Explorer, Opera, Mozilla, ICab) on common hardware (PCs, Web tablets, set-top boxes, mobile devices etc.). Page URLs can be bookmarked, copied and pasted to email messages and used by fellow students. Other common browser functions are supported: print current page, save page on local disk, find word in current page.

Usability: The platform respects common web usability guidelines like scalable text size and frame-free content delivery⁹.

3.2.2 Tutoring and Didactics

Communications: The platform focuses on asynchronous communications, mainly threaded discussion forums. They can be dynamically created by tutors or students, they can be searched, efficiently browsed and archived. The system also features asynchronous teamworking tools with document exchange facilities. It furthermore allows the tutor to define in a flexible way collaborative working tasks and groups.

Students management: The platform allows complementary ways to enroll students: self enrollment, enrollment by tutor with web-interface, upload of student lists, synchronization with directories via LDAP. The same holds for the definition of working groups.

Activity tracking: The platform generates useful reports about the activity of students in the course, the quizzes and the communication tools. The purpose of the reports is to give the tutor a didactically relevant feeling of what happens in a course.

3.2.3 Course Development

Development framework: The platform supports the course authors with the development of widely usable content. The content should be accessible by a large public (including persons with disabilities) by a variety of browsers ran by any OS.

Simple for beginners - extensible for experts: The platform by default offers a generic course structure and a navigation scheme. It is therefore easy to develop content out-of-the-box in an efficient way. Experienced power-authors have the possibility to go beyond these default functionalities. They can program dynamic pages (using server-side scripting), attach them to databases and access to platform functions with a documented API.

Developers support: Availability of documentation. The platform producer runs a website that includes a “developers corner” with rich information (guides, tutorials, HowTos, references) and discussion forums. The producer answers promptly to support requests and bug reports.

⁹ If frames are used, the system should at least provide the possibility to bookmark any page.

Compatibility with standard web authoring tools: The platform is compatible with standard web authoring tools like GoLive and Dreamweaver. Content can be up-/downloaded via FTP or WebDAV for collaborative authoring or with similarly powerful methods.

Support for e-learning standards: Among the many upcoming standards for e-learning, it turns out, that the IMS standards suite is widely accepted in the domain of higher education. The most important parts are IMS-CP and IMS-QTI, where implementations should support import and export. Also important is IEEE-LOM or IMS-metadata support. The main purpose of using standards is reusability and interoperability.

XML support: The platform can handle XHTML and content of XML applications like for example LMML. The XML content is formatted with user defined XSL stylesheets. The platform contains an XSLT and an XSL-FO engine.

Adaptable look-and-feel: it should be possible to customize the general appearance of the course platform: a default layout would be provided, that could be adapted by each institution and/or each course, if desired.¹⁰

Migration of current WebCT courses: About 70% of the currently developed SVC courses are using the WebCT 3.x platform. A new WBC platform should allow to migrate the static content of a WebCT 3.x course, including course structure, course content, quizzes, syllabus, glossary. The migration of live course data like forum discussions, student records, tracking data, is *not* required. An estimation of migration costs should also be provided.

Multilinguality: One course can be offered in different translations. The navigation language can be changed by the authors and/or the students.

3.2.4 Large scale national platform

Performance: The platform is scalable, e.g. by supporting load-balancing techniques.

Configurable corporate identity for client institutions: The platform allows to serve multiple institutions with their own corporate identities. An institution can work in its “sandbox”, change designs, and customize or add functions without influencing the other institutions.

Flexible authentication scheme: The platform support a flexible authentication scheme in order to offer single-log-in accounts for students. It should also be interoperable with the Authentication and Authorization Infrastructure currently under development at SWITCH for Swiss higher education institutions¹¹.

Security: How secure is personal data? The passwords, as well as other sensitive data are encrypted when they are stored and transmitted.

What happens, if a security hole is detected? The platform supplier has an efficient procedure, does develop and distribute patches.

Availability: The platform supports methods like server mirroring, to make it highly available.

¹⁰ In the simplest case, this could be done with cascading stylesheets: a global default stylesheet can be partially overridden by an institutional stylesheet which can itself be partially overridden by a course-specific stylesheet.

¹¹ <http://www.switch.ch/aai>

Maintenance: The platform can be upgraded on a running system. The upgrade can be tested on an identical test server before it is installed on the production server.

3.3 Schedule

Decision: The final decision, which one (ore more) solutions are selected to build a centralized eLearning platform will be taken by the end of novembre 2002, by the Swiss Virtual Campus Steering Commitee.

Running production server: It is planned to make a running server available to the course developers around Easter 2003.

JM, RB (Edutech), Sep. 3rd 2002