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EDUM project

How to create and to manage eLearning activities

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3nd Report of the Educational Management in the Swiss Virtual Campus Mandate (EDUM)

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Introduction

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This document aims to assist higher-education teachers and researchers engaged in the development of an eLearning activity, by providing them with basic information on the main issues and choices needed to develop and implement these activities successfully. It draws on work done in the 'Educational Management in the Swiss Virtual Campus' mandate (EDUM; www.edum.ch) and on lessons learned from the experience of the Swiss Virtual Campus projects. Due account has also been taken of analogous cases abroad and of existing literature on the subject.
Since the possible applications (and contexts) of eLearning differ quite notably from case to case, ours is not a recipe for how best to build an eLearning application. Rather, we indicate the main issues to be considered, the possible choices and their implications. Let us give an example. In the technology chapter, we highlight the advantages and drawbacks of the choice of a commercial platform over a home-made solution (see Chapter 5). It is then left to the person in charge of the project to select the option which best meets his/her needs.
In this introduction, we define the scope of the applications considered and the target public. Further, we explain the structure of the document and the connections between the different chapters. Finally, we present four examples of eLearning activities, which we will use throughout the text to illustrate the different subjects.

The public and the application domain

At the outset, it is necessary to delimit the domain considered. We do this according to the following parameters: the definition of eLearning; the institutional context; the educational unit considered; the target public.

Definition of eLearning. As we will further discuss in Chapter 1, we favour a broad definition of eLearning, which includes every application of new multimedia technologies and of the Internet to improve the quality of educational activities. This includes complete on-line courses, hybrid courses (where part of the teaching is still in presence), and the use of multimedia and simulation to support learning activities.

Institutional context. We discuss applications of eLearning in higher-education institutions and, more particularly, in institutions delivering most of their educational activities through presence lectures to students on campus. This doesn't exclude the creation of fully on-line courses or delivery to external publics, or as cooperation with private bodies, but still in an institutional context centred on presence activities. This limitation is necessary since the business models of presence and distance education institutions are so different that it is hardly possible to treat them at one and the same time.

National context. Much of the content of this document is general, but in some cases we will make reference to the specific case of Switzerland. Also, our context is higher-education systems in continental Europe, where on the whole there is less competition and private activity in higher education than in Anglo-Saxon countries.

Educational unit. We focus on the level of a university course, defined as an educational unit that deals with a specific subject and which bears a credit value to be used to achieve a degree (B.A., B.Sc, or vocational diploma). In most cases, a course is under the responsibility of a single professor. This is also the level addressed by most Swiss Virtual Campus projects. Considering the course level means that a

number of external conditions are fixed or difficult to modify, like the organization of the whole curriculum, the number of hours devoted to the course, and the time schedule.

Target public. This is an introduction to eLearning for higher-education teachers and researchers, who do not have a large experience in eLearning and need a quick overview of the subject. It is not a manual for specialists seeking detailed advice and technical information.

Organisation of the text

The document is composed of ten chapters, plus the introduction, which are largely independent from each other, so that the reader may go through the text quickly and then focus on individual chapters of specific interest.
Each chapter is composed of the following elements:

- an introduction to the subject;
- a detailed analysis of specific issues;
- a series of examples to illustrate the analysis;
- an exercice where the reader is invited to apply the content to his/her needs;
- a selection of references for further reading.

Outline and themes

In our approach, the objective of an eLearning project is to deliver and maintain a course assisted by educational technologies. Thus, the production of tools and (online) contents and exercises is only one step along this road: it must be preceded by careful educational planning and followed by the delivery and maintenance of the course.
Accordingly, the content of the document is organised in four main parts:

- Definition of the objectives and of the educational needs. Firstly, we discuss the concept of eLearning, as well as the different options in the use of educational technologies (Chapter 1). Secondly, we present the stages of the development process, from the definition of needs to the delivery of the course, and the way they interconnect (Chapter 2). Finally, we consider the objectives one can achieve through eLearning and the possible publics (Chapter 3);
- these definitions serve as premises from which to plan or modify an educational activity. In Chapter 4 we present the construction of educational scenarios. Further, we concentrate on two critical issues, closely related to the chosen scenarios: the choices of technology tools (Chapter 5) and the costs and financing of eLearning (Chapter 6);
- the third part concentrates on management issues; it is divided into two chapters, one on the general management of a project (Chapter 7), the other on contractual and Intellectual Property Rights aspects (Chapter 8);
- finally, we move on to the phase of delivery of the course. Two sets of issues emerge: the first one concerns the integration of the course into the curricula and its maintenance (Chapter 9); the second is the evaluation of the quality of the curriculum and the impact of eLearning on the students (Chapter 10).

Four examples of eLearning

To illustrate the contents of the chapters, we will use throughout the document four examples of eLearning courses, as follows:

- a course of Statistics for economists;
- a course of Mediaeval philosophy;
- a course on Designing aircraft engines;
- a course in Agrarian sciences for prisoners.

While some of their features may reflect real aspects of existing courses, they are purely fictional examples invented to represent the different options available for eLearning courses (as shown in Figure 1). The general features of these 'cases' are presented below. Each time they are used in successive chapters, they are marked with a specific colour.

Parameter	*Statistics for economists*	*Medieval philosophy*	*Designing aircraft engines*	*Education for prisoners*
Public	Campus students	Campus students	Campus students	External students
Delivery	Hybrid course; asynchrounous	Hybrid course; synchronous	Fully distance, asynchronous	Fully distance, synchronous/ asynchronous
Tutoring	Intensive tutoring	Intensive Tutoring	Autonomous study	Intensive tutoring
Development costs	High costs	Low costs	High costs	High-costs
Technology	Home-made platform	Commercial platform	Home-made platform	Commercial platform

Figure 1. The examples and their parameters

a) Statistics for economists at the University of Tobat

Together with three other universities, the University of Tobat has established an eLearing course for Economics undergraduates. This was prompted mainly by the fact that statistics was missing from the 'bridging' (or levelling) curriculum for the Master in Economics programme. It was felt that applicants' preparation in this subject was insufficient. It was therefore decided to introduce an admission test to check their basic knowledge. Candidates found wanting must attend this course. An on-line course was seen as the most satisfactory answer to the problem. The advantage of this solution is that students are free to choose when to devote time to study for the remedial course.

Subsequently, it was felt that parts of this course might be usefully proposed to first-year students in the University's regular degree programme in Economics. The Statistics course was replaced, especially the exercise part. As a matter of fact, a good deal of this course rests on the setting of simulation tasks using different applets (case studies and data analyses). Students will therefore alternate between face-to-face theory lectures and applications on the internet, which will save them a fair percentage of time.

The team brings together four national universities, all of which have a degree curriculum in Economics. Each of these universities is responsible for the development of two modules, which contribute to producing the complete course. Since all of these universities offer a Master's programme in Economics, each of them uses this course for both end targets. The Statistics course for Master's students is entirely on-line, whereas for first-year undergraduates it takes place largely on campus, with theory lectures held in a classroom by the course teacher, and exercises on the web, by means of a tracking system for the students.

b) Mediaeval philosophy at the University of Palm Creek

A survey conducted on first-year students reading for a Philosophy degree at Palm Creek University showed that 70% of all registered students were women. Of these, 30% worked for a living while pursuing academic studies, and 40% were married women with at least one son of less than two years old.
The 'Introduction to Mediaeval philosophy' professor decided to make life easier for her female students, and replaced part of her course, till then entirely a presence course, with on-line course segments. In this way, female participants would be able to reconcile family life with study pursuits. This professor is also the Faculty Dean. Approximately two-thirds of all classes remain face-to-face; the other third has been put on the web.
The theory and fundamental principles are still taught in the classroom by the professor; while texts to be read and discussed by students within a peer-to-peer forum have been placed on the Internet, according to a well thought-out schedule.
The course was designed with the assistance of two other full professors of the Philosophy Faculty at Palm Creek and of their respective second-year students. The platform used is Webboard.

c) Design of aircraft engines at the Polytechnic of Tydney

Tydney Polytechnic resolved to introduce a totally new course into the aerospace engineering curriculum. It is a course on the design of engines for military aircraft and is intended for students of Tydney Polytechnic and of Zilano Polytechnic. It is compulsory for third-year students of the former institution but it is optional (an 'elective course') for Zilano students. Moreover, the two institutions signed an agreement with the airline company, NumbiosAir, to make the course available to their trainee maintenance mechanics. This is how Tydney Polytechnic was able to raise enough revenue to fund the development and maintenance of this course.
It is an entirely distance course, which entails dispatching by normal mail CD-Roms containing design simulations of excellent technical and graphic quality. The course is also expected to make use of the Speedfly platform, built by Zilano Polytechnic. As it shares forum, chat, and spaces, the platform will enable asynchronous communication between students and teachers of the two institutions.

d) Bachelor in Agrarian sciences for prisoners in Maziland

The Department of Justice of Maziland decided to launch a large-scale educational programme for prisoners serving long sentences. Each of them should have a chance to earn a university degree (bachelor level) by the end of their prison term. The motivation is that better education should improve their chances to find a job and diminish the risk to relapse into crime. To try out the idea, the Department mandated a consortium of five universities to plan a bachelor's degree in Agrarian sciences (food industry is a very important sector in Maziland).
The choice of a fully distance education curriculum was quite logical, seeing that students are dispersed in several prisons (males and females are always held in separate institutions) and are moved quite frequently from one to the other. Moreover, the universities involved are located in different cities. The course comprises weekly videoconference lectures given by university professors, and selected lectures and exercises on the web. Moreover, a communication platform and communication tools are due to be introduced whereby students could work together from a distance. The course, which took one year to develop, started in October 1999 with 100 students. The experiment is to be extended over the next few years into a 'full-blown' distance university for prisoners.

Educational Management in the Swiss Virtual Campus

Educational Management (EDUM) is a mandate of the Swiss Virtual Campus (SVC; www.virtualcampus.ch), the programme for the development of eLearning in Switzerland's higher-education institutions. EDUM was commissioned to explore the conditions for the successful adoption of eLearning activities in Swiss higher education, focusing in particular on courses supported by the Swiss Virtual Campus. The project is run by the Institute for Communication and Education (ICEF; http://www.com.unisi.ch/icef) at the Università della Svizzera italiana as part of the activities of the New Media in Education Laboratory (www.newmine.org) It is financed by the Swiss Virtual Campus programme and by the Università della Svizzera Italiana. EDUM is organised around two main activities:

- The analysis of SVC projects: during 2002 we interviewed 18 SVC projects to examine strategies for the use and maintenance of already designed courses, as well as for their integration into curricula and institutions.
- The analysis of university strategies for eLearning in Switzerland and in neighbouring regions through interviews with all Swiss universities and federal institutes of technology, as well as with 15 universities in neighbouring regions: Baden-Württenberg, Catalunya, Lombardy, and Rhône-Alpes. An extension of this work to the universities of applied sciences will be created in 2004.

Contributing authors

The following people have participated in EDUM and drafted parts of this document:

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- Isabella Rega, PhD student;
- Sibilla Rezzonico, PhD student;
- Chiara Succi, PhD student.

Outputs

EDUM results have been submitted in two reports to the Swiss Virtual Campus, as well as in scientific papers; all documents are available on the mandate's website (www.edum.ch).

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1 What is eLearning: definitions and parameters

Lorenzo Cantoni and Sibilla Rezzonico

1.1 Objectives

While there is widespread agreement on the fact that new (i.e., digital/electronic) information and communication technologies (ICT) can offer great opportunities for teaching and learning, the conditions under which they can be effectively and efficiently integrated into the learning/teaching experience remain debatable. Thus, to better understand the terms of the debate, and to avoid possible misunderstandings, this first chapter is devoted to a clarification of the term 'eLearning' itself.
First of all, we briefly outline and discuss the meanings of eLearning. After proposing and discussing two definitions, we focus on some parameters relevant to every definition of eLearning and illustrate them with some examples drawn from the SVC projects.

1.2 What is eLearning?

Many terms have been coined and used (and abandoned) to denote the application of new ICT to education and training. Among them let us quote – just as examples, and in alphabetical order – CAL: Computer-Assisted Learning, CBT: Computer-Based Training, CSCL: Computer-Supported Cooperative Learning, TBDL: Technology-Based Distributed Learning, TEL: Technology-Enhanced Learning, WBT: Web-Based Training, and so on. Indeed, every term is rooted in a given moment of technological development and is quite often indebted to specific theoretical, pedagogical, and even philosophical assumptions.
Widely used in different theoretical contexts and consecrated by the European Union documents, 'eLearning' seems to be the most neutral of these terms. EU documents define it as follows: 'the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration' (CEC 2001: 2). Depending on how that 'and the Internet' is interpreted, we may or may not include in the definition 'teaching/learning activities enriched by multimedia but done *in praesentia*'.
Tony Bates (2001) suggests classifying the different eLearning activities, as in Figure 2. If we imagine a *continuum* between *no online learning* and *fully on-line learning* we can create a simple taxonomy.

1. *Face-to-face classroom teaching:* 'traditional' activities involving teacher and students in the same place (syntopic) and at the same time (synchronous);
2. *Technology-enhanced face-to-face teaching*: like classroom lectures but supported by on-line materials or software simulations;
3. *Mixed mode (reduced face-to-face + on-line) teaching*: here some activities, for example questions or exercises, are completely delegated to the new technologies.
4. *Distance education:* courses or degree programmes developed completely as 'distance'; enrolment, fee payment, lessons, communications, and examinations are managed from a distance with new technologies.

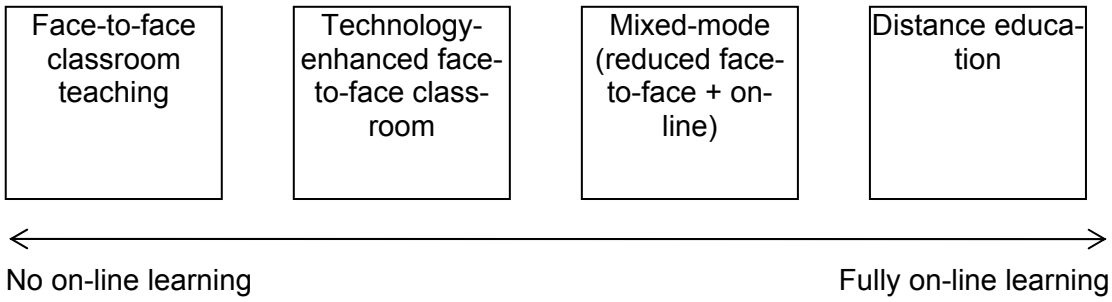

Figure 2. Models of eLearning (Bates 2001)

1.3 Relevant parameters

Many comparisons between eLearning and 'traditional' teaching activities do not account for the real complexity and richness of the learning experiences themselves; in fact, what is thought of as being 'traditional' in a given setting – in a specific here and now - might not be traditional at all in other settings. Consider for example: was outdoor training offered by Epicurus [341-270 BC] more traditional than classroom teaching? Or was it the other way round? Or what else? As we have seen, the very term 'eLearning', far from having one single meaning, needs specifying each time. To do so, we list and briefly analyse a set of five relevant parameters, which help us interpret - but also plan and evalutate - an eLearning activity/experience.

1.3.1 Space

eLearning can be used to enrich teaching/learning activities done in a classroom, in a face-to-face setting, or to assist distance learning. Distance learning settings may be, for their part, very different, ranging from individual learning to working in groups where the teacher is sometimes present and sometimes not.

1.3.2 Time

From this point of view, we can distinguish synchronous and asynchronous activities; all activities *in praesentia* are synchronous, while all other activities can be carried out either simultaneously (e.g., audio- and videoconferencing, chat) or asynchronously (e.g.: reading texts, discussing in an online forum, doing tests, and so on). Asynchronous eLearning activities may be distinguished on the basis of their independence from time constraints. At one (timeless) extreme we can see just-in-time learning, where learning objects can be accessed the exact moment one needs them. At the other extreme, we can see activities where some temporal milestones are set: for instance, a university course where activities are carried out in an asynchronous way, but which set out clearly what is to be done every week, when something starts, when it ends, and when examinations are to be taken.
Both temporal and spatial types of (relative) independence constitute the flexibility of eLearning. It is worth stressing that flexibility is not a value in itself, but should be available as long as it is useful to learners. In fact, flexibility suffers from a serious shortcoming: the learner needs to be strongly and deeply committed for flexibility not to become an alibi to postpone the learning experience endlessly. When offering the learning experience and agreeing on the teaching/learning contract this aspect should be made clear.

Distance	Chat, Videoconference	On-line content Forum, Mail Self-test
Presence	Lesson in class	
	Synchronous	**Asynchronous**

Figure 3. Presence/distance vs. synchronous/asynchronous

Example: presence-distance / synchronous-asynchronous
The 'prisoners' project comprises weekly videoconference lectures given by university professors, as well as selected lectures and exercises on the web. Moreover, a communication platform where students can work together from 'home' is due to be launched; and so are tools for tutor-students communication.
The course combines synchronous distance activities (videoconference; group work on the Internet) with asynchronous activities (reading of selected texts; tests; asynchronous communication by email and forums). Subsequently, it was decided to record lectures, too, since prisoners are often engaged for judicial reasons or for other social activities.

1.3.3 Integration/substitution

eLearning can be added to enhance existing learning experiences (reducing, for instance, the number of hours learners have to sit in a classroom, or broadening their experience through multimedia and/or simulations), or to completely substitute *in praesentia* activities. Many experiences have shown that a blend of different scenarios (not complete substitution) presents relevant advantages: *blended learning*.

Example: substitution
The Mediaeval philosophy course is an example of partial replacement, in which one-third of presence classes are substituted. Students can get hold of reading material to be used in the seminars directly from the website. The discussions raised and fuelled by these readings have also been put on line. Indeed, the course includes a peer-to-peer forum in which students confront each other, discuss the reading assignments and study the topics in depth. The introduction of the on-line part and the forum affords students a better chance to interact. It must be said that the sheer number of first-year Philosophy candidates allowed little room for interaction during classroom lectures. By creating an asynchronous forum the course has considerably improved this particular aspect, too.

1.3.4 Group and communication settings

New ICT allow for a number of communication scenarios, where individuals or groups of different organizations can interact, share knowledge and work together in many ways. By means of technologies, those who design the learning experience can define in detail who can do what, and how.

Example. Group: one–one / one–many; many–many; many–one.
The course in Design of aircraft engines has adopted an off-line support (CD ROM) to create simulations. This situation is defined by the following parameter one-one: man – machine. A student who practises simulations by using a multimedia support can in no way interact with other people. However, a PC is in any case capable of reacting intelligently to certain inputs; therefore this situation, too, is interactive. As far as 'one-many, many-many' parameters (the interactive part involving several users) are concerned, the same course has concentrated on the development of a home-made platform. In this part of the course, we have a tutor, a chat, and a forum.

1.3.5 Assistance

eLearning activities can be designed for, and accessed in, a distance-learning scenario, or they may rely on the assistance of dedicated persons: experts and/or tutors. While assistance *per se* is to be considered an added value, one must also stress that the more assistance one offers in an eLearning activity, the higher its costs.

Example: assistance
The Statistics foundation course, designed for first-year undergraduates, is organised to provide intensive supervision, above all for the exercise part, which is on-line. Right from the start, students are looked after, step by step, by two different tutors, available via chat at appointed times. One type of tutor, available solely in the early stages of the course, helps to overcome technical difficulties. The other type of tutor is there to guide students for the entire duration of the course: helping them with the exercises, setting brief tests, organising group drills, etc. Each tutor is entrusted with a maximum of 15 students. These tutoring tasks are assigned mostly to second-year students, who in return are rewarded by course credits.
On the other hand, the Statistics course as intended for students needing pre-Master remedial classes has less tutorial support built into it, because it merely runs parallel to the official core programme, to provide support to candidates with a poor background in Statistics. Although supervision has been included in the programme, it is not scheduled at set times; and students will contact appointed tutors, by e-mail, as and when they require.

1.4 Exercise

Consider your eLearning project, and check it against each single parameter. Have you made all the necessary decisions? Do any of these aspects deserve a closer look?
Cross your choice and try to describe your course!

Space	Presence		Distance	
Time	Synchronous		Asynchronous	
Formality	Integration		Substitution	
Group and communication scenarios	One-one	One-many	Many-many	Many-one
Assistance	Alone		Expert	

1.5 Further reading

Web sites

www.eLearningeuropa.info (portal of the eLearning initiative by the European Commission)
www.masie.com (run by Elliott Masie, one of the most influential eLearning consultants in the corporate field and probably the inventor of the term “eLearning”)
www.newmine.org (the website of the New Media in Education Lab of the University of Lugano)

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2 The development process and its phases

Benedetto Lepori and Sibilla Rezzonico

2.1 Objectives

In this chapter, we outline the different phases of the development of an eLearning activity, from the initial idea through to the delivery of the course and its maintenance over time. We begin with a reflection on the relationship between educational planning and implementation of an eLearning environment. Then, we examine the different phases of the development process; and. finally, we discuss possible models of this process over time (linear, recursive, fast prototyping).

2.2 eLearning environment and eLearning activity

It is important to distinguish between two elements of an eLearning project:

- the building of an *eLearning environment* containing resources to be used in education, like contents, exercises, tools for simulations, etc. The materials are produced and accessed through different programs and formats, like html pages, pdf files, applets, communication software, etc. (see Chapter 5). The environment will be accessed through Internet or other supports (like DVD). Alternatively, it could be installed on computer in informatics laboratories;
- the delivery of one *educational activity* (or more) using an eLearning environment, like a university course, a vocational training course, etc. Except for truly distance education, the course will integrate some presence activities, like classroom lectures or group work or discussions. *Educational planning* will be discussed in Chapter 4).

These two elements obey different logics: eLearning environments tend to have high development costs, and thus should be standardised and produced for large markets. Conversely, educational activities need to be subtly adjusted to the local situation (educational, institutional, and cultural). In classroom teaching, the problem has been solved by a separation of functions: publishers produce handbooks for different subjects, while teachers deliver customised courses, using existing handbooks for reference.

Most eLearning projects comprise both elements: developing an environment which is more or less complete and re-usable, while at the same time delivering a university course to specific students groups. The articulation between *product development* and *educational planning* is a key issue, which largely determines the economic success of the project (see Chapter 6).

Example: statistics for economists

The figure shows the content of the eLearning environment for the course on Statistics for economists and its use with first-year undergraduates. Some activities take place in the eLearning environment of the course (like studying course materials) while other activies take place in presence.

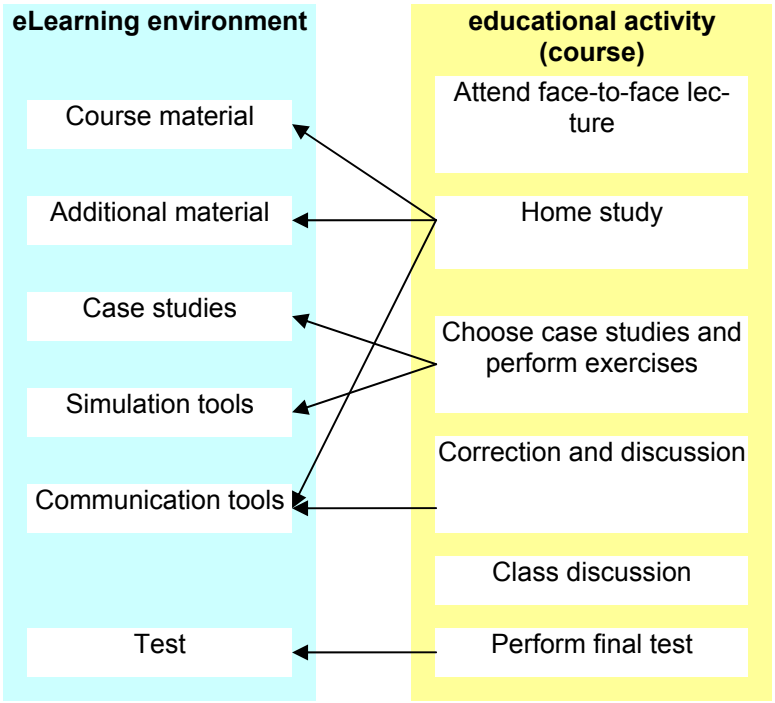

Figure 4. eLearning environment and educational activities

2.3 The project's life cycle

In a very general way, it is possible to divide the development of almost all projects into the following phases (see Figure 5):

- identification of objectives and needs;
- definition of the product's specifications;
- implementation phase;
- a test phase, where the product will be assessed against its original objectives;
- final delivery of the product.

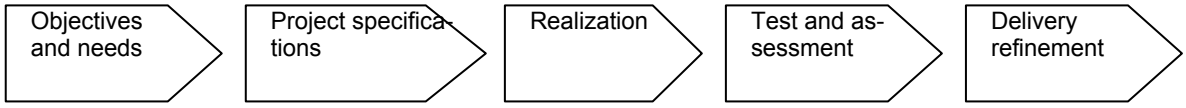

Figure 5. Phases of the project's development

2.3.1 Definition of objectives and needs

The starting point for an eLearning project (and of each educational activity) should be a clear definition of the objectives to be achieved, and of the characteristics and needs of the students involved. However, objectives and needs are often difficult to define accurately, since eLearning is still a rather experimental activity. (see Chapter 3).

It is nonetheless important in the early stages to declare the project's objectives clearly and confront them with the actors involved (students, university department, project partner). Having different objectives is the rule and thus one needs to make compromises. There are techniques that allow us to assess the needs of the students (through interviews and questionnaires), but one should be aware of their limitations. This step will be useful to evaluate the progress and attainment of the objectives and to revise them during the project.

Example: an incorrect definition of the needs

The introductory course on mediaeval philosophy was conceived for those female students who, in addition to attending university, have a job, and often are mothers, too, with children of less than two years old. The organization of an on-line course allowing studying working mothers to juggle with their commitments and time appeared to the Dean to be the winning formula. A study was carried out at the end of the first test cycle, whose results showed that the female students concerned proposed other alternatives instead: they would welcome the day-nursery formula at more attractive conditions. This is a case where there was obviously a failure in understanding the needs and questions of the students concerned. It would have been far more productive to ask for their opinion (for instance by means of a questionnaire), before the project took off.

2.3.2 Project's specifications

eLearning can be be represented as a "do-it-yourself" shop where you buy a set of tools to build different applications. There is no single recipe and, except for distance education, there are few existing models one can apply directly. In this phase, you define:

- one or more educational scenarios, i.e. a set of activities which should bring the students to achieve given learning targets (see Chapter 4);
- hence, the architecture of the eLearning environment, how it will be used and how it will be implemented (including the choice of technical tools; see Chapter 5).

The specifications should also consider the costs and resources available (see Chapter 6) the possible integration of the eLearning course into curricula (see Chapter 9) and, thirdly, a reasonable schedule for completion and delivery. The definition of the competences needed for developing the course should also take place in this phase.

2.3.3 Implementation

In this phase, you will assemble a project team charged with producing the necessary contents and software tools and integrating them into a complete eLearning environment. Important aspects will then be: a correct management of the project (see Chapter 7), settling contractual and Intellectual Property Rights aspects (see Chapter 8), and controlling the quality of the products.

2.3.4 Testing and assessment

In the test phase, the eLearning course is delivered (partially or totally) to a selected group of students. Other parts of the course have to be activated, like tutoring activities (in presence or through internet), presence lectures, classroom discussions, and on-line forums. The aim of this phase is to evaluate the functioning of the course (time organisation, facilities, usability and access to on-line resources) and the attainment of the learning targets. For educational activities, testing is very important since the outcome of an educational experience can hardly be predicted. Also, the interaction between human beings and computers may require modifications of the course:

- in most cases students print web pages to read them, in which case, all efforts to design an interactive hypertext become utterly pointless; if so, pdf files are a cheaper and better solution;
- some students do quizzes by trial and error, defying their function to check the knowledge acquired; fitting in some time between the test and the answer could be a solution.

Testing is normally accompanied by some form of assessment, through interviews with students, professors and teachers or through direct observation of the educational process and of the interaction between students and computers. The results of the assessment can then be used to modify and refine the course (see also Chapter 10).

2.3.5 Delivery and maintenance

This phase comprises three main activities:

- the 'normal' use of the course according to the educational targets and scenarios defined. Here, the main components are the infrastructures for the course delivery (technical tools, physical infrastructure), the management of students and examinations, as well as the recognition of the course by the departments; these issues are discussed further in Chapter 9;
- the exploitation of eLearning products for other uses, like commercialisation of electronic contents (for example on CD-ROM or DVD) or re-use of the eLearning environment for other courses. This marketing and diffusion effort is necessary to achieve viability given the costs of production and maintenance;
- the maintenance and further development of the eLearning environment to update contents and technology and to develop new features. In a market where electronic educational products are developing quite rapidly, without innovation your course will very soon be outdated. Obtaining the necessary resources for this activity is crucial.

2.4 Implementation as an interactive process

The process described follows a linear sequence, where the phases are separated and logically organised (first define objectives, needs, and specifications; then complete the project). However, in most cases this model is not well suited to eLearning since:

- objectives and needs are often unclear and difficult to define at the beginning;
- the context may change; for example, the curriculum's organisation may be modified during the project or the financial framework may become less favourable;
- the introduction of technology into a social system like education often causes unexpected effects, since users tend to adapt the technology to their habits;
- cultural change is also important. The introduction of eLearning is in most cases a process where the actors involved learn and change their ideas on the educational process itself;
- finally, since technology changes rapidly over time, your initial choices might be outdated or even no longer possible.

This means that specifications as a rule will need revising as the project progresses. There are some possible strategies to deal with this (see Figure 6):

- In a *recursive model,* objectives and specifications are revised as the project progresses; of course, the disadvantage is that some work has to be modified with consequent waste of time and resources;
- An alternative strategy, which derives from software development, is called *fast prototyping*. Rather than wasting time in preparing detailed specifications,

you quickly produce a prototype. The advantage is that in no time you can test the feasibility of your ideas and techniques and integrate user's feedback in the specifications. This strategy is very useful for innovative applications.

As a rule, at least 50% of your project time should be devoted to testing and modifying the eLearning course rather than to the development phase. It is advisable to organise partial tests as soon as some parts of the course are available. Good planning and project organisation are a prerequisite for these more complex strategies.

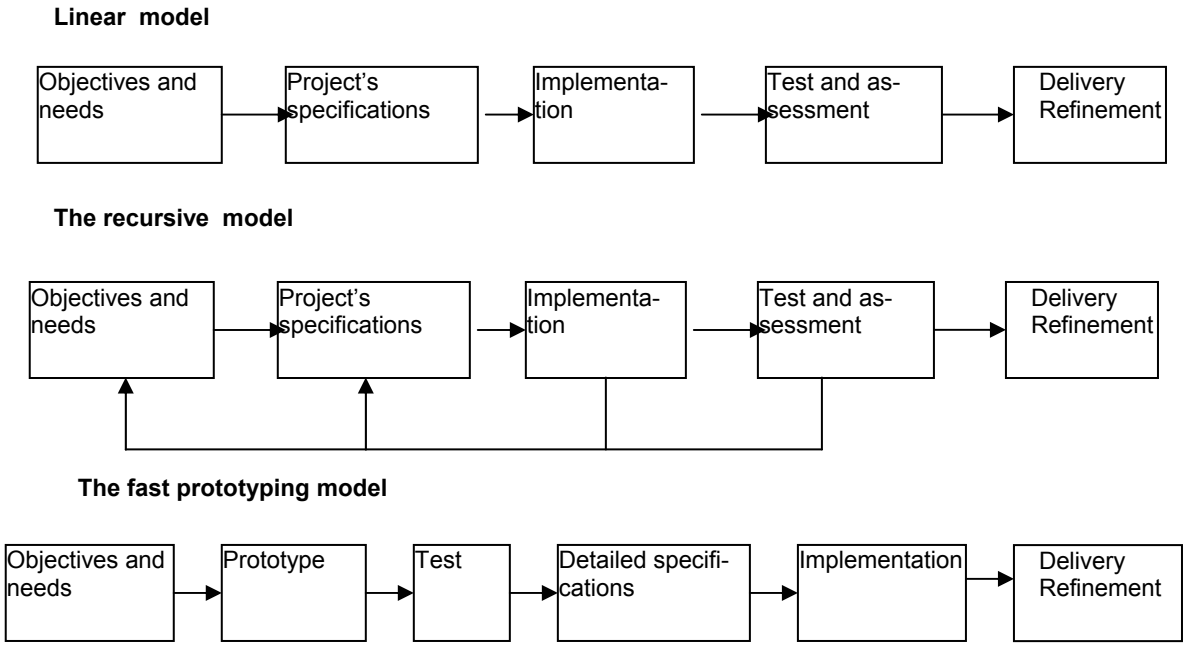

Figure 6. Project development models

Example: fast prototyping

During the first six months of the project for the 'Introduction to Mediaeval philosophy' course, the University of Palm Creek developed a module of thomistic philosophy. This module was then submitted to the partner institutions and classroom tested. The test highlighted a number of flaws. For example, the animations introduced to liven up the readings made the relative downloading too lengthy and cumbersome for the female students who were working at home. Not only, but the contents proved too tedious for self study. Some students volunteered to review some of the trickier points with their teachers and assistants. The procedure described proved very efficient for the University of Palm Creek: rather than spending much time working out a lay-out and a presentation methodology, the University chose to discuss the whole thing on the basis of a concrete example and the test results.

2.5 Specific features of eLearning

It is useful to examine the commonalities and the differences between the development of a 'traditional' (face-to-face) course and of an eLearning course. To begin with, there are many common features. In both cases:

- you identify target students (including, for example, the expected entry level);
- you define a set of pedagogical targets (what the students should know);
- you identify the specific topics of the course;
- you design an educational scenario.

However, eLearning carries differences, too. In many cases, in fact, as the course will rely less on oral communication, contents will have to be written down more pre-

cisely. You will also have recourse to technical infrastructure and software tools, which need to be prepared and tested carefully. Moreover, while 'traditional' teaching can rely on a set of well-known and 'road-tested' practices, eLearning is largely a new domain where you need to experiment and to advance by trial and error.
These features have important consequences on the development process:

- firstly, the preparation and development phase requires more time and resources than for presence courses. Thus,while for the latter preparation is included in the course activity and done in the periods between semesters, eLearning projects frequently require between one and two years of development and a separate budget;
- secondly, the objectives, the organisation of the activity, and the course contents need to be formalised more precisely, since there will be less flexibility in the lectures and each change entails high costs;
- thirdly, an eLearning activity cannot be developed by the professor alone, but needs the support of a team of competent people in different areas (content development and adaptation; pedagogy; technology). Good organization and management, therefore, deserve a good deal of attention.

An important consequence is that the economic management of eLearning courses differs quite radically from that of face-to-face courses.

2.6 Exercises

1) Read Chapter 4 and design some educational scenarios for your course; then design a suitable eLearning environment (see the example in this chapter) and describe the relationship between the two.

2) Identify which of the three project development models is most suited to your project or design the model which best fulfils your needs; explain why.

3) On the basis of this choice describe the different phases of your project by indicating:

- the tasks you need to fulfil;
- the resources needed for each phase;
- the timeframe.

2.7 Further reading

to be added

3 Objectives, publics and institutional context

Benedetto Lepori

3.1 Objectives

In this chapter we discuss three issues that are often overlooked in the development of an eLearning course: the objectives of an eLearning project, its target public, and the role of different actors and institutions participating in its development and delivery. These aspects are closely interconnected. For example, different actors generally have different objectives when they tackle eLearning; and the target public is in many cases defined at the institutional level, rather than at the level of a single course or project.

3.2 Why introduce eLearning?

The literature on eLearning lists a whole series of possible advantages, expressed largely in terms of the general objectives of an educational system. Some of the most cited are listed hereafter (Bates 1999; Bates 2001).

3.2.1 Improving quality

eLearning can improve the quality of education in different ways:

- multimedia material can enhance the learning experience, for example by overcoming the limitations of handbooks through hypertext and by integrating audiovisual material. So, for example, public institutions may be studied with the aid of original audiovisual material);
- simulations help to visualise phenomena otherwise difficult to see (like in chemistry) or to conduct otherwise costly or dangerous experiments;
- communication tools may be very helpful when classes are crowded and where direct contact with teachers is difficult; moreover, tools like BSCW or forums enable cooperative work and exchange of experiences.

eLearning focuses on learning practices that strengthen students' soft skills, like the ability to work autonomously, to work in groups, to learn by practising and experimenting.

Example: improving quality

The course within the curriculum in Aerospace engineering makes use of software to create simulations for experiments that would otherwise be very costly and very dangerous. The main purpose, therefore, is to improve the quality of training through practical exercises that are impossible to carry out in any other way. Additionally, the use of Internet and CD-ROM gives the Polytechnic of Tydney the opportunity to reach an interested and paying public outside: and this is how funds are raised to support the course.

3.2.2 Flexibility of curricula

eLearning courses can relax time and space constraints through (asynchronous) distance education. While saving travelling time might be important, the main advantage in most cases is temporal and spatial flexibility: students are (to some extent) no longer constrained by fixed lecture hours and places. Flexibility is helpful in coordinating family or working life with study. It is equally useful for campus students when, for example, they have to make up for some courses that are run in parallel to normal curricular courses, or if they wish to attend some courses in other universities at the same time. On the other hand eLearning demands more discipline of the students,

especially if classroom activities are replaced by autonomous study; tutoring and follow-up of students are then of the utmost importance.

Example: students with special needs

'Introduction to Mediaeval philosophy' addresses an on-campus body of students with particular problems. Most of the students enrolled on this course are in fact women, and 40% of these have children and a day-time occupation. The motivation behind this on-line course may therefore be qualified as 'social': its aim is to improve the quality of life of these students. It is intended to make it easier for these women in education, by ensuring greater flexibility during their studies.

3.2.3 Cost reduction

Initially, it was hoped that eLearning would bring cost reductions (per student) and thus help to accommodate growing numbers of students in the face of stagnating budgets. Now it seems that for traditional universities eLearning will not reduce overall costs; yet in some cases it will open new markets, which could boost the revenues of some educational programmes. eLearning could then improve the cost-benefit ratio of some courses, saving them from closure (see chapter 6).

3.2.4 Access to higher education

A major asset of eLearning is that it makes higher education possible for people who cannot attend university on a daily basis (e.g., workers, mothers, prisoners and handicapped people). In countries like the UK, Spain or Germany distance universities fulfil this function. eLearning can improve their educational curricula by adding some interactivity and can help presence universities to enter this market, re-using existing skills and educational material.

Example: widening access to higher education

The 'prisoners' project is a typical case where eLearning is used to meet specific educational needs, which are not satisfied by traditional university education. There is a strong political and social rationale for this course, which implies also the willingness to provide additional financing. Note that large benefits may be expected from a drop in crime rates and social problems. There are special features to this public, including restricted mobility and security issues; drug-related and psychological problems for many students; a social climate which is not very conducive to study; uncertainty about the future and distress.

3.2.5 Life-long learning

Life-long learning has become a central issue in the past few years, and this is related to rapid technological change and the obsolescence of any knowledge acquired. It is both a political and a social concern; but it is also a concern for companies, whose employees need to be re-trained. eLearning has some advantages, since temporal flexibility and reduction of classroom time imply direct economic advantages. Moreover, universities can re-use digital content produced for normal courses, adapting it for professional training.

3.3 Objectives, publics, and actors

Some crucial observations are in order at this point.

1) Firstly, different types of eLearning yield different advantages (as well as possible disadvantages). A fully on-line asynchronous course maximises flexibility, though at the expense of direct contact between teacher and student. Blended learning modes,

on the other hand, allow much less flexibility but keep some of the advantages of presence courses. Objectives and design choices are thus closely related.

2) Secondly, these advantages are closely dependent on the target public. Flexibility is relatively unimportant for campus students, and on-line communication can in the best of cases complement face-to-face communication. In general, the advantages of on-line courses are much more evident for non-campus students and especially for adult education. This means that a clear identification of the target public is essential.

3) Thirdly, the importance given to these advantages and to the related objectives varies from one country to another and also between the different institutions and actors in higher education. The degree of priority for different objectives is determined by who decides and who pays for the project.

4) Finally, it is not always true that institutions and individual actors act to achieve some goals: many universities approach eLearning simply because they feel the need to imitate other institutions and colleagues. Also, some goals have nothing to do with educational benefits: eLearning projects are in some cases launched to net in additional resources or in the hope of reducing teaching tasks and boosting research.

With these comments, we do not want to belittle the role of objectives for an eLearning course. Neither do we want to discourage you from seeking benefit-maximising solutions. We do nonetheless conclude that this process and the relation between objectives and execution are more complex than in educational planning.

3.4 Educational markets and target publics

In developing eLearning applications, it is useful to distinguish three main target publics.

1) Students registered for a full-time curriculum leading to a university degree and attending university lectures regularly (campus students). For these students, there is little point in providing distance education. However, a more flexible course organisation (through asynchronous learning) is useful for students who are also in employment and where students have to catch up with missed classes. In most cases, eLearning is used to improve learning quality: typical examples are improved support in courses with very large numbers of students or simulation tools (like in mathematics, architecture, or engineering).

2) Students wishing to undertake a university degree, but unable to attend university classes regularly. These include workers, mothers, prisoners, and to some extent also handicapped people. In this case, switching from a presence course to an at least partially distance courses can be extremely important. In most cases, the issue is not distance, but having enough flexibility to cope with other life constraints. In countries like UK, Spain or Germany, there are large ‘distance’ universities recruiting among thesecategories. There, the institutions are subsidised by the State, since the aim is to broaden access to higher education also to people who cannot (or couldn’t) go to university. Serving this public is then mostly a political decision.

3) Students needing some kind of retraining for professional activity. Vocational training is a large market, where private providers are very important and which is largely managed according to business rules (without state subsidies). This is also a market where training has a direct economic interest (for companies and workers) and that is a market ready to pay for training. Many universities have been active in this domain

through continuous education departments; here, eLearning offers certain evident advantages:

- giving more time and space flexibility to course participants;
- re-using materials produced for curricular courses;
- reaching a larger market both at the national and at the international level (for very special courses).

3.5 Actors and institutions of eLearning

Like all educational activities, the production and delivery of an eLearning course is a cooperation process involving different actors and institutions, like professors and tutors, students, higher education institutions, publishers, and funding bodies. Understanding and managing this network and promoting cooperative solutions is a key to successful eLearning (see also the management chapter 7).

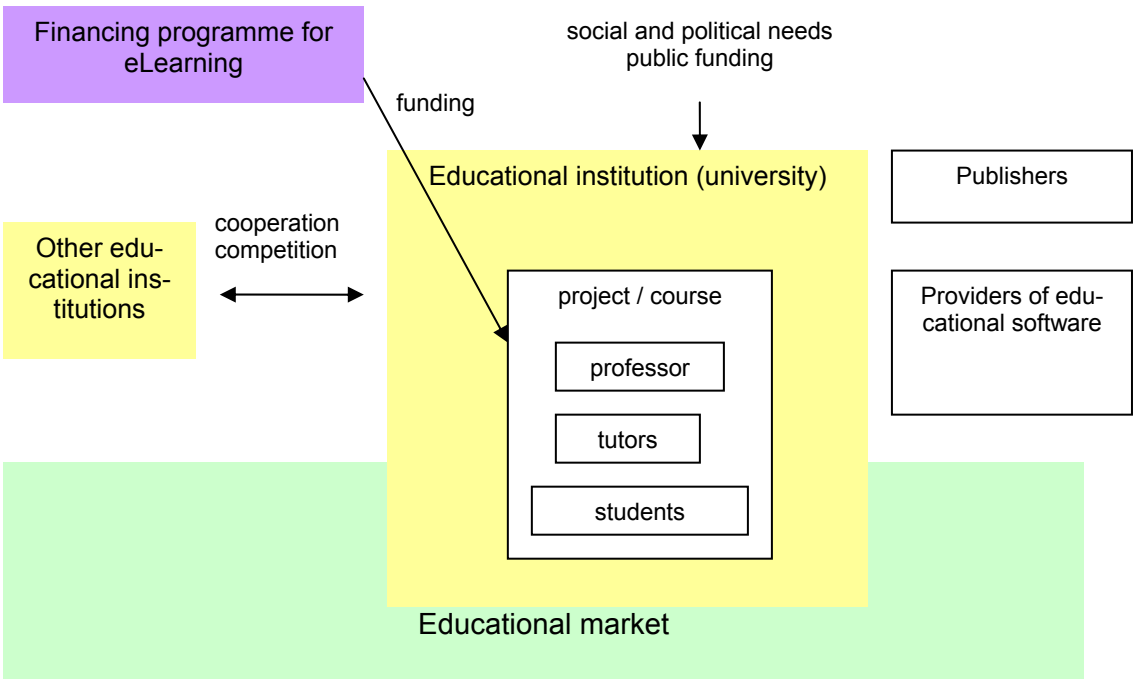

Figure 7. The actor space of an eLearning course

In a very simplified manner, we can represent the actor space as in Figure 7.

3.5.1 Individual course

This is the level considered in this document. Typically, here we find a professor responsible for the course subject, other people involved in the production and delivery of (technicians, contents producers, tutors, pedagogy consultant), as well as the students following the course.

3.5.2 Educational institution

Courses do not stand alone, but are offered by some kind of educational institution, like a university, a professional school or a private company. In most cases (at least in universities) courses are part of some curriculum leading to a degree or a certificate (bachelor's, master's, certificate of capacity, etc.).
The framework for individual courses is largely defined at the institutional level: this includes the definition of the target public, the format of the curriculum, the timing and content of individual courses, available resources and infrastructure. Moreover, educational institutions are to some extent competing with other institutions to attract

students or cooperating on joint degree programmes. The institutional integration of an eLearning course will be further discussed in Chapter 9.

3.5.3 Students and educational markets

As already explained, there are different markets for educational activities and eLearning which should be considered separately. Some markets are very competitive (like continuing education), while others are segmented according to location (as the university students markets in most European countries). Moreover, even in these segments, students are far to homogeneous: some attend university to pursue an academic career, others to get a well-paid job, others because their family pays them to attend university. These markets differ also markedly for their economic value and for the willingness of students to pay more if you improve the educational service.

3.5.4 The social and political context

Higher education is largely a public activity, serving to achieve social and political objectives (like economic development, social justice or regional development) and most universities (at least in Europe) are to a great extent financed by public authorities. This means that political and social objectives have a large influence on eLearning:

- define the overall goals of higher education;
- define some rules for of higher education, like access, delivery of diplomas and accreditation of institutions and courses;
- finance most university activities.

In many countries, public authorities promote also directly eLearning through of specialised institutions and through funding programs; these programs have normally their own goals and rules.

3.5.5 Providers of educational materials and tools

These organizations sell off-the self educational materials (for example full on-line courses) or tools, like learning management systems or software for communication, simulations or content editing. Most of these organizations are private companies, like publishers of software companies, but also universities enter in some cases in these activities. These companies could play different roles:

- providing off-the-shelf solutions, like educational materials or software; you will thus be confronted with the alternative between developing or buying;
- acting as project partners in the development or the delivery of the course; a publisher could sell an on-line course derived from your educational materials;
- acting as competitors on the same market, especially for continuing education.

3.6 Exercises

1) Describe the institutional context of your project and in particular the roles of:

- public authorities;
- eLearning funding programs (if available);
- your educational institution.

Identify possible goals conflicts between these actors and with your objectives.

2) Define the possible target public of your course, as well as possible future extensions.

3) Evaluate the importance for your course of the following possible advantages of eLearning.

Importance	Low	Medium	High
Improving quality			
Flexibility			
Cost reduction			
Access to higher education			
Life-long learning			

Repeat the same exercise for other actors involved in higher education:

- national political authorities;
- your university;
- your department;
- your students.

3.7 Further reading

References

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4 Objectives and educational scenarios

Jean-François Perret

4.1 Objectives

In this chapter we aim to present the learning and teaching paths along which a project may develop. We want to distinguish between two complementary stages. First, one makes the necessary choices regarding the project to be conducted. Secondly, one creates a framework in which teaching and learning activities are due to take place according to the set goals.

4.2 Fixing the primary goal

What educational needs and problems could be seen as urgent enough for us to go in search of innovative solutions? There are several concerns in higher education nowadays, and they vary from discipline and discipline, from faculty to faculty. These concerns fall mainly into three categories:

4.2.1 Developing skills, rather than knowledge alone

These days, several innovative ventures emphasise the importance of “learning by problem solving" or also of "project-based teaching". In either case, the point is to avoid ending up with students whose learning is totally passive. Through the use of ICT we can motivate students by setting them complex tasks suitable for individual research or for team research (for instance case studies, statistical analyses, simulations). In this way they are encouraged to engage and broaden whatever knowledge they have already acquired.

4.2.2 To encourage the ability to work alone and to search for information

Another goal is to promote self-sufficiency and the ability to find one’s way in an environment where documentary resources are complex and manifold. It is fast becoming increasingly important in various domains to be able to command data search techniques. One way of answering these new expectations is to equip students to access and make the most of available resources. That is where eLearning and technological tools come into their own and prove invaluable.

4.2.3 To appreciate co-operative learning

In the world of work, more and more emphasis is placed on the group or team as a vital support in professional activities; and each of us seems to be expected to acquire social skills, too. The practice of co-operation, therefore, needs to be encouraged as a matter of urgency. Group activities, on the other hand, are not invented overnight; to exist they require the support of a relational and organisational framework. Here is where communication through electronic media can bring a new input for collective learning and work.

Experience teaches us that effective and successful eLearning projects are those that have focused on a clearly defined learning objective, shared by all parties involved. Any time one creates a teaching programme, in fact, one needs first of all to sort the problems requiring a solution according to clear priorities. At times, the choices (priorities) are collective, for example within a university or a faculty, where a new curriculum is to be created. Frequently, however, it boils down to a teacher’s personal choices, which s/he defines on the basis of his/her subject, teaching objectives, previous teaching experience, as well as of the tutoring resources available.

4.3 Thinking up a teaching scenario

Inevitably, e-Learning upsets the progress of a course and study routines. A basic component of a teaching scenario lies in the chronological set-up of teaching activities and studying activities inscribed in a new agenda. This arrangement must be made absolutely clear so as to dispel any doubts as to what is expected of whom, and when.
In teaching scenarios where presence and distance combine (*blended learning*), a number of different activities have to be planned with great care. In particular, one has to co-ordinate:

- Teaching schedules
- Personal study
- Exercises or workshops
- One-to-one supervision (tutoring)
- Group work
- Knowledge assessment

The use of ICT for teaching purposes at university level prompts us to review three kinds of approaches.

4.3.1 Class hours / study activities

The most typical approach consists in providing students with the necessary resources to review, practise, or investigate further any of the concepts or theories taught during the course.
It is also possible and interesting to take another path, which would mean asking students to work on a chapter of the course *before* it is tackled in class. In the latter case, the re-structuring alters the function of the lecture, which thus turns into a time for asking questions, for clarifying, cross-referencing, illustrating, or also for a more thorough investigation of a topic, depending on the students' questions and reactions.
While the role of teaching hours is reviewed, their frequency is also reviewed. Depending on how much work students are able to do on their own, class hours may be reduced to that extent. The maintained lecture hours will for example be devoted to introducing a new chapter; after an interval of two to three weeks of self study, these lecture hours will be set aside for a discussion of specific points with the students. Another method consists in setting up a more regular sequence of personal work and maintained classes on a fortnightly basis.
In any case, a reconstitution such as this one – of personal-work time and lecture time – must be introduced with some care to the students. In fact, this manner of operating entails a very radical change of the teaching contracts and of the working methods which the students used to be familiar with.

Example: alternation
"Mediaeval philosophy" alternates between lectures (largely maintained) and self-study based on complementary reading. Mostly, the reading of texts is intended to achieve a more thorough study of topics presented in class. With some selected reading assignments, the students are required to prepare some texts ahead of the class, so that the professor may devote more time to a group discussion of the chapter already prepared by the students. These processes and expectations are explained in class by the professor; and also they are clearly signalled on the platform's electronic calendar.

4.3.2 Direct communication / Media communication

For a scenario aimed at combining presence and distance, it is essential that the contributions and the limitations of each communication medium is taken into account.

Electronic media communication allows teachers to extend and complete what they have conveyed by words of mouth. As to students, this is a mode of communication through which they can ask questions, receive replies, comments, revisions, and access or pursue a dialogue with other students.
Media communication, however, experiences severe limitations, too. So long as the media-enabled dialogue addresses very precise questions, the outcome is satisfactory. When, however, the questions raised are complex and require discussion, or again when there are decisions to be taken, face-to-face communication is to be preferred, as it is effective and of better quality. This aspect should be borne in mind when dealing with a teaching scenario that combines different modes of communication. In-presence dialogue periods must be secured in order to cover the shortcomings of media communication. Conversely, in presence dialogue moments, often few and far between, will gain by being carried out at a distance whenever the subject matter is appropriate.
It is above all important in this sense to separate questions asked during a forum, liable to be discussed among students; comprehension questions, which don't lose anything by being put off until the next class, to be dealt with *viva voce* by the professor; or again questions connected with the solution of an exercise or of an activity, which expect a quick answer, electronically, so that the student may not be delayed in his work. To claim that every question must receive an immediate answer does not seem to us a desirable teaching practice. It may indeed be productive to be faced with a hard question for a while rather than fire off a request for help in a hurry.

Example: using communication by means of electronic media
In the framework of "Agrarian sciences", because of the difficulties involved in meeting up as a group, electronic media communication is bound to play a crucial role for the success of the enterprise. Consequently, one should read the messages very accurately, to get a clear grasp of the questions asked by students and the requests for help that they send through.

4.3.3 Electronic support / printed material

The third approach we want to examine concerns access to documentary resources. Here, we want to define in what way the printed document stands vis-à-vis electronic aids. To smooth the path to knowledge, one often opts for course material that is available entirely on line. Yet we know, too, that reading - but above all studying - texts on screen is anything but easy for students. As a result, the latter systematically resort to printing out these texts, so as to alternate between times spent working on screen and study on the printed text.
The point here is not whether electronic media will or will not replace printed matter, but to examine how they can complement each other. There are indeed tasks – such as research, reference, tracking down, observation, or also simulation – that inevitably require the use of a computer and of the Internet. Other tasks, however, are more easily performed on a paper support, especially in cases where studying a long text means annotating it, summing it up, or learning it by heart.
The purpose of teaching scenario is not only to anticipate which activities are best performed on one type of support rather than the other, but also to help students by pointing to reasons why they might swap one support for another.

Example: on-line material and paper version
Statistics for economists is available entirely on line. However, students also receive a paper version of a memorandum listing the fundamentals of the course. This document is a useful reference to be looked up at need, while doing exercises. In addition, students can hold on to it and come back to it, anywhere and any time they wish to do a revision exercise on what they have learnt.

4.4 Exercices

To show you what decisions need to be taken in developing a scenario, we invite you to consider the following set of questions:

1) What are your priorities?
Looking at your teaching context, how do you rank the following teaching aims: low / medium / high?

- To develop skills rather than merely to acquire knowledge
- To encourage the ability to work autonomously
- to stimulate learning by cooperation
- Other aims

2) *A scenario: over how long a period?*

- What is the expected duration of the scenario? Will it cover the whole academic year, one semester, or will it merely cover the length of one part of the course (one chapter, one module)? Is it perhaps intended as a block course (intensive course)?
- Can it be launched straight from the beginning of the course? Or is it preferable to introduce it later, a few weeks into the course, when students have already become familiar with the subject taught and the way it should be studied?
- If the scenario covers a short time span (e.g., an introductory course, two weeks of self study, followed by a concluding course), is it likely to be resumed, in the same form for each module, or does it need adjusting to the course contents, and each time to new targets?

3) How many class hours would you maintain?
In order of importance these hours will aim to achieve:

- A general introduction to the specific teaching field
- A complementary theoretical contribution
- Connections with other chapters or other disciplines
- A different method of presenting the subject
- A presentation of examples, of illustrations
- Some case studies
- A discussion of difficult points
- A discussion of students' homework assignments?
- ...

4) *What sort of independent study would you expect of students?*

- Answer straightforward comprehension questions (QCM)?
- Summarise the main notions acquired
- Look up and read complementary documents
- Do exercises
- Carry out observations
- Analyse data
- Solve problems
- Take on case studies
- ....

Of all these activities, which is the most suitable for group activities?

5) What sort of supervision?
What sort of support can students obtain?

- On-line support (round the clock, at given moments in the week?)
- In-presence assistance (set office hours?)

- a key-solution to problems (collective or personalised)
- Assistance assured by whom? (Tutors, assistants, professors?)
- Which documentary resources?
- Course material entirely on line?
- Multimedia material liable to be used in the classroom?
- Mixed electronic material (web + CD-ROM)?
- Other reference books or articles (proposed, recommended, obligatory?)

4.5 Further reading

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5 Choice and management of technology

Lorenzo Cantoni and Sibilla Rezzonico

5.1 Objectives

The goal of this chapter is to give an overview of the main technological tools for eLearning and of their possible uses. The choice of technology has to be closely connected to the chosen educational scenario, and should also take into account the resources available and the technical competences of the institution. First, we outline the educational processes supported by technology; then we discuss the choice between a commercial learning management system and a home-made platform; finally, we examine briefly the issues of maintenance and standardisation.

5.2 Processes supported by technological tools

Digital technologies assist, and interact with, the educational experience along these four lines: 1) content (production and delivery), 2) management of the learning environment, 3) communication, and 4) assessment.
Except for courses that are completely on-line, some of these four areas/functions require no technological support. For example, assessment can often be carried out as a presence examination: and discussions can take place in the classroom in a blended learning experience. The following picture shows some areas/activities where a technological support is or may be used. Notice that the above distinction into four areas is made for taxonomy purposes: in fact, all of them cross and overlap.

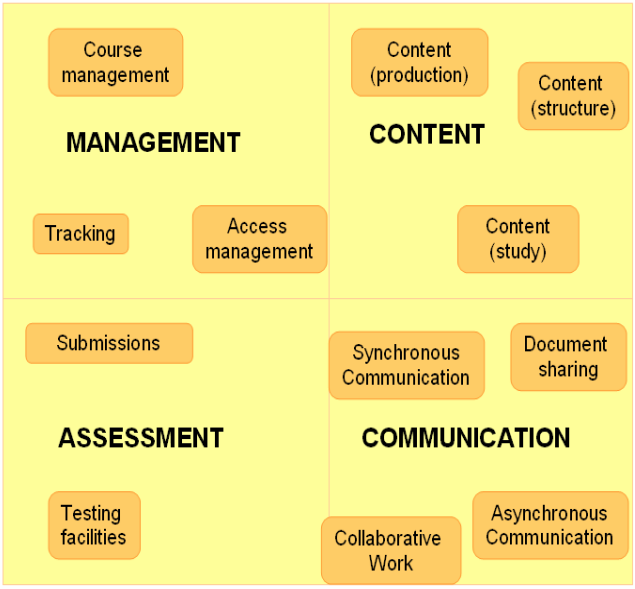

Figure 8. Processes supported by technological tools

5.2.1 Content

Course content can be offered in a digitized format in different ways, both from a semiotic point of view (text, still images, audio, video, etc.) and from the point of view of language and coding standard(s): html, ppt, doc, pdf, java, other programming languages, mpeg, ram, avi, and so on.
Every format has its own strengths and weaknesses. In general, that format is to be preferred which better represents the chosen semiotic code and is the most economical, used by the student community involved, and easy to transfer over the net and to access from different hardware and software platforms. The use of unusual or bandwidth consuming format can lead to difficulties. For information items that are conceived also to be printed, and/or are available only in paper form and have then to be digitized, the pdf format has become a *de facto* standard.
Information can be made available as single items, or connected in a hypertextual form (as in a simple website), or stored in a content management system (database driven). The latter solution, although requiring more complex software and sometimes more advanced technical expertise, enables the addition of new items, which can then be managed and interconnected in a rich variety of ways. Usually, learning management systems (LMS) integrate a content management tool.

5.2.2 Communication

A rich and lively virtual learning environment requires a variety of communication tools, which allow students to communicate with peers, tutors, experts, professors, technical support staff, and so on. Both synchronous and asynchronous tools are to be considered (see Chapter 1).
Collaborative learning experiences are supported by groupware functions, which create a “shared workspace”, supporting document sharing, versioning, event notification, group management, one-to-one as well as one-to-many and many-to-many communication exchanges. In particular, forums and chat rooms are usually integrated in an LMS.

5.2.3 Management

An eLearning course can be managed also by using technological tools.
The easiest way is to use a platform. In fact an LMS is designed in order to build, organise and manage an integrated learning environment. An LMS offers the possibility of tracking and delivering the course; for example one can monitor students’ access to the different course items, enrol students, split a class into different groups, give different access rights to different kinds of users (learners, professors, tutors, evaluators, administrators, and so on).
Statistical information is usually provided, which can be useful to better monitor how the course is going. We must not forget, on the other hand, that statistical data are just numbers and they need to be placed in context.

5.2.4 Assessment

Technological tools – integrated into an LMS – can support different testing activities. In particular, all the so-called “objective tests” are suitable to be offered and rated by means of a computerized instrument. When it comes to subjective tests, an LMS can help in distributing assignments and collecting them; but human intervention is required. Security issues of test results (against hackers) also need to be considered if the tests are used to rate students.

5.3 Learning Management Systems

As mentioned above, the manager of an eLearning course can choose either to adopt an LMS, integrating the main tools needed for the course and its management, or to develop an *ad hoc* solution: a dedicated website, a mix of different tools, etc.
WebCT – www.webct.com- and BlackBoard – www.blackboard.com -are two of the most used LMSs in the higher-education sector, but many other products/solutions are available on the market. There is not just one *best* product, but all of them offer many similar services and some specific ones. Moreover, they may widely differ in their licensing and user-support policies. Open-source products are a possible alternative, where some cost advantages are counterbalanced by the disadvantage of not being backed by a company supporting their development and maintenance.
The second choice is to create your own eLearning environment. Technologists have a wide range of possible constructions; the result is a cobbling together of different choices (platform, programming, communication tools and sometimes content management systems like Zope – www.zope.org). The project team must have high technological competences and plenty of time to spend on realisation and maintenance.
The table compares advantages and disadvantages of the two solutions. We stress that the choice depends on different factors, like: what functions are required, what are the existing competences, what is the budget available.

	Advantages	**Disadvantages**
Learning Management System	• Easy to use, no technical competence needed; • Reliable enough, functionality and cross platform compatibility almost guaranteed; • Bug fixing, developing and updating: a commercial LMS is usually better equipped for all these activities;	• May be expensive, open source products are free but they do not come with a support. • Limits to the course presentation. Less flexibility for the structure. • Durability is a risk. Nobody knows the future of the company.
Home-made system	• High flexibility in the design • Independent of an external provider • No need to buy something	• Needs technological competences • Needs programmer. Can be very expensive • The user needs time to learn how to use the system. • Stability can be a problem because of the *bricolage* (cobbling together) • Maintenance costs; • Sustainability is a problem, especially if the programmer leaves.

Figure 9 Learning management systems and home-made systems

Example: using a commercial LMS

For the course of Mediaeval Philosophy, the commercial platform, Webboard, was preferred because it is simple to use. Indeed, the philosophy students who contributed to setting up the course were anything but technically highly skilled, while the Philosophy Department was not rich enough to hire outside technical assistance. The course requires no advanced technical solutions, since the aim is merely to go online with one-third of all face-to-face classes and to encourage course participants to communicate with each other within a discussion forum. Hence the decision to adopt a commercial platform appeared as the most sensible solution.

Example: new development

The course in *Design of Aircraft Engines* calls for a re-enactment of simulations that can be realized only in a virtual medium. This project proved technically very demanding: therefore it was entrusted to computer experts hired specifically for this task. An off-line multi-media support was devised especially to conduct simulations, so that network hitches may be avoided.
A new platform was created to deal with the communication and the on-line parts of the course. This removed the need to use outside firms, and it was thus possible to guarantee all the functions needed according to plan.

5.4 Maintenance

First of all, a clear distinction is to be made between the educational process (content delivery and update, assessment, interaction, etc.) and the technical maintenance of the LMS. While the first area is covered in chapter 9, here we briefly address the second one. In particular, the following aspects are to be considered:

- Bug fixing: there is no perfect piece of software!
- Platform updating for compatibility: given the rapid obsolescence of technology (affecting operating systems as well as browsers), the software has to be continuously upgraded in order to remain usable in a new technological context.
- Content re-codification: every single piece of content, stored in a given format (e.g.: mp3, avi, etc.) has to be transferred to the new available formats.
- Platform improvement: according to user needs and usage experience, it may be wise to add services or features to the platform (e.g.: to add voice to a textual forum, or versioning features to a piece of content, etc.).
- Service maintenance: if the service is an on-line one, its 24/7/365 availability is to be ensured.
- Backup.

Maintenance activities are very relevant and expensive, in terms of expertise, time, and money. The use of a commercial LMS, or of a platform supplied by an application service provider (ASP) basis could help reduce these costs while ensuring the stability of the system/service, its updating, and the possibility for educational institutions to focus on their core business: teaching. However, if the institution does not have in place the necessary expertise to develop *ad hoc* software, we recommended not to waste any time on that.

Example: the risk of innovative solutions

To meet its very specific needs, the prisoners' project decided to adopt the Zumpa platform produced by EduGenius. This company was created three years ago by a group of students of the Polytechnic of Maziland, and promised a very innovative approach to eLearning, centred on students' needs and educational activities, rather than on technology. While the company was really brilliant and innovative, its management was inadequate, and it went bankrupt nine months after the project started. The project team resorted to an off-the-shelf platform supplied by a large company. So, the course was ready to be launched one year later than planned, and costs shot up by about 30%.

5.5 Standardisation

In the eLearning field many standardisation attempts have been made, regarding:

- finding a course (hence a standardised course description is needed);
- implementing and delivering a given course (or part of it) in different LMSs;

- re-using a learning module(or object) in a different context, which could mean adapting, customizing, and localising it. The cost of producing new eLearning materials encourages a wise recycling of what is already available (ranging from a complete course, to a single module, or a piece of software such as java applet).

These attempts have not yet ended in a single standard, but in quite a few specification and guidelines proposals: IMS, LOM, QTI, SCORM.
When buying (or developing) an LMS, it is important to verify its compliance with the most used standards, those most relevant to your organisation and for the organisations you are likely to work with.

5.6 Exercises

1) Take the educational processes presented in Figure 8 and decide, according to your educational scenario, which process should be supported by technological tools and which can be realized in presence or through print media.
Prepare a list of all the features that require the support of your eLearning environment.

2) Based on the preceding exercise, evaluate advantages and disadvantages of a commercial platform in your case; if necessary, contact the support centre of your university or Edutech to know which platforms are available and what their functions are.

5.7 Further reading

Links
http://www.edutech.ch/ (Higher Education and New Technologies - Switzerland)
http://www.masie.com (The MASIE Center. An international e-lab and ThinkTank located in Saratoga Springs, NY)
http://www.masie.com/masie/default.cfm?page=standards (About standardisation)
www.webopedia.com (On-line dictionary and search engine you need for computer and Internet technology)
www.nctp.com (National Center for technology planning)
www.educause.edu (Advance higher education by promoting the intelligent use of information technology)

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6 Costs and financing

Benedetto Lepori and Sibilla Rezzonico

6.1 Objectives

The issue of eLearning costs has been widely debated. On the one hand, government expectations are that eLearning could reduce costs per student and help to accommodate increasing numbers of students in higher education, when budgets stagnate. On the other hand, universities have expressed concern that eLearning could result in swelling budgets, especially because of higher tutoring costs. The subject is quite complicated and few projections may be relied on, especially for blended learning. The message of this chapter is that one must be careful in evaluating economic costs and benefits of eLearning because a project's viability might depend on them.

6.2 Some definitions

eLearning courses differ from face-to-face courses not only in terms of cost levels, but also in terms of costing structure. To understand the whole picture, we need to distinguish different accounting categories:

1) *Fixed and variable costs*. Fixed costs don't change with the level of production, for example with the number of times a course is delivered or with the number of students it is delivered to. Variable costs increase with the production level. In education, for example, development of course materials are fixed costs, while their reproduction is a variable cost; teachers' and tutors' costs are also variable costs. The general argument for on-line courses is that their fixed costs are higher than for presence courses, on account of the development of on-line materials and CD-ROMs. On the other hand, their variable costs are lower since the number of students can increase without requiring more teachers and classroom space (see Figure 10). If distance tutoring is provided, variable costs are higher but still lower than for presence course (this is not consistently true). The consequence is that, above a certain number of students, distance education may be expected to prove cheaper than presence education.

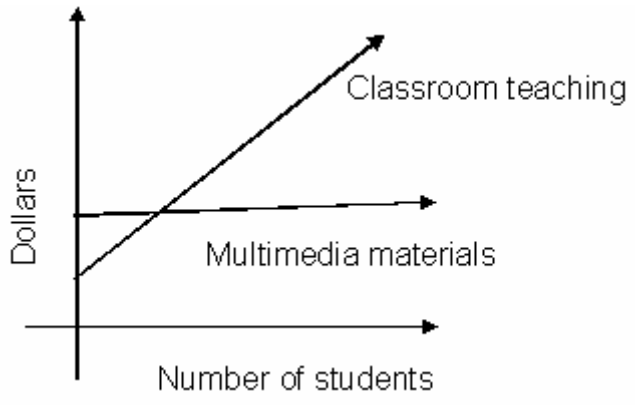

Figure 10. Costs of Classroom Teaching v Multimedia materials

Source: Bates 1999

2) *Direct and indirect costs*. Direct costs are directly related and debited to the project or the course, while indirect costs are borne by other actors. An example of indirect costs is the university's general costs (central administration, buildings, infrastructure), which in most cases are not charged to each course (except in institutions with

a fully commercial accounting system). Another example is costs supported by students, to pay for their personal computer or access to Internet. In some cases eLearning may result in transfer of costs: distance-learning universities replacing printed materials with materials on the web transfer the cost of printing documents to the students (normally at a higher cost). The economic balance of eLearning will then depend on the level considered (a single course, the university, the educational system, the student, society).

3) *Development and recurrent costs*. Development costs are incurred when one devises a course, while recurrent costs are repeated each time the course is delivered. For eLearning, development costs include production of course materials, design, infrastructure and implementation. Recurrent costs are costs of maintenance (both technical and content), tutoring, etc. Development costs for eLearning courses are higher than for presence courses, especially for fully on-line courses; this means that in most cases an eLearning course requires an initial investment, which is recovered only after some years.

4) *Average and marginal costs*. Average costs are the total production costs divided by the number of students. Marginal costs are the costs of adding a single student to a class. For example, in a presence course marginal costs per student are almost nil provided there are vacant seats in the auditorium. Once this limit is reached, you have to split the course and thus the marginal cost will be very high, since total costs will almost double. Many decisions on eLearning are based on marginal costs rather than on average costs. For instance, if an increase in Chemistry students requires the building of a new laboratory, reducing laboratory time through simulation can be economical. Another example: if the university has appointed a professor in Archaeology with too few students, an economical solution might be to extend his course by adding distance classes.

6.3 Cost categories

The following table shows some cost categories for eLearning courses, divided into initial and recurrent costs and between the actors bearing them. The relative importance of these costs, as well as the division by institution, course, and student depend heavily on the chosen eLearning mode and on the accounting system.

	Development costs	**Recurrent costs**
Institution	• upgrade of informatics infrastructure (classrooms, network connection, server); • seed money for projects.	• informatics support (helpdesk); • technical maintenance and upgrade; • license costs; • network connection costs; • administration of students; • training for teachers and tutors.
Course	• content development; • layout and design; • software development; • implementation of the course; • training of teachers and tutors.	• maintenance of contents • tutoring and students assistance • marketing • Intellectual Property Rights
Student	• personal computer (upgrade); • software licences; • network connection.	• access to network; • printing costs.

Figure 11. Cost categories for eLearning

Example: a low cost solution

The Mediaeval philosophy course is an example of a low-cost course, where the structure and technology of the on-line part is very straightforward. Indeed, this course revolves mainly around reading exercises, which means that there is hardly any need for graphic or navigation skills. The course was elaborated by second-year students, who were duly awarded credit points for their time and commitment; a half-time assistant was taken on to assure maintenance and tutoring.

6.4 Some empirical results

There are a few empirical findings concerning costs of eLearning, in most cases for fully on-line courses. Let us mention the the most interesting ones:

- in traditional universities eLearning is not a cheap alternative to presence education; however, it is possible to produce on-line courses at a cost comparable to presence courses; the minimum number of students is between 20 and 30;
- development costs depend heavily on the management model; well-organized projects using off-the-shelf technology can cut costs dramatically as opposed to more experimental projects; costs also decrease quite noticeably after the first experiences;
- in the case of adult students, on-line courses can bring economic benefits by reducing loss of work time and travel costs; this is much less clear for full-time students;
- the accounting system of most universities does not allow for an accurate calculation of indirect costs, and thus it is difficult to evaluate the economic effects of eLearning;
- distance universities can produce on-line courses at half the cost per student recorded for traditional universities; however, their business model is different and they are normally not engaged in research in all domains like traditional universities.

For blended learning, the situation is less clear and depends critically on how the change process is managed; if eLearning is simply added to the existing structures it will most probably entail an increase in costs (possibly with an improvement in quality). You should also bear in mind that in many cases presence teaching is very cost-effective: gathering a large number of students in a room for a lecture and leaving them to study with very little support is very convenient, since the economic value of students' time is much lower than that of professors and tutors.

Example: a high-end solution

The course in Design of Aircraft Engines is of top importance for Tydney Polytechnic. Moreover, the laboratory which the University of Tydney used to conduct simulations had become obsolete and its maintenance costs soared, Consequently, the most efficient solution turned out to be an on-line course on simulations. The costs of setting up the course are high since besides developing the on-line technology (home-made platform), the project is also debited with the costs of the back-up multimedia material.

Most of the funding and management of the project have been met through an agreement with the airline company, NumbiosAir, which bought the course. The balance has been covered by the University of Tydney, who owns its copyright. The Polytechnic of Zilano contributed the Speedfly platform, and has in return obtained the course licence for ten years as well as the appointment of a teacher on the project.

6.4.1 An example of cost/benefit calculation

Figure 12 shows the calculation of costs and benefits for an on-line master in Educational studies at the University of British Columbia (UBC). The situation is typical for postgraduate education, where general costs are charged to each course through overheads to be paid to the department or faculty. Development costs are very high, so that the first year closes at a loss; in subsequent years fixed costs drop and the course makes a net profit; willingness to invest is thus necessary for eLearning. However, the result depends strongly on the number of students, as shown in the comparison between 1999 (60 students) and 2000 (32 students).
Finally, the overall balance after four years is positive only because the course was adopted at the Monterrey Institute of Technology in Mexico (ITESM) and licensing fees were payed to UBC. In other words, exploiting external markets is very important if eLearning is to enjoy economic success.

Cost	**1997**	**1998**	**1999**	**2000**
Subject experts	12000	4000	4000	4000
Internet specialist and design	3300	1800	1500	1500
New procedures	6000	0	0	0
Marketing	3000	3000	3000	3000
Server and library	1300	0	0	0
Overhead	6150	2200	2125	2125
Copyright	700	700	700	700
International tutors	3000	3000	3000	3000
Total fixed costs	**35450**	**14700**	**14325**	**14325**
Tutoring	8800	13200	13200	7040
Delivery	3021	4822	4822	2572
Overhead 5%	2014	2247	2247	1320
Total variable costs	**13835**	**20269**	**20269**	**10932**
Total costs	**49285**	**34969**	**34594**	**25257**
Revenues from students	25270	38940	38940	20400
Rights from ITESM	15000	6000	6000	6000
Total revenue	**40270**	**44940**	**44940**	**26400**
Profit	**-9015**	**9971**	**10346**	**1143**

Figure 12. Costs and benefits of eLearning

Source: Bartolic-Zlomsic and Bates 1999.

6.5 Benefits and financing strategies

At least in public education, eLearning is not developed to reduce costs, but to accrue benefits to the students (more flexibility; better education), to the educational institution (reaching new markets; improving reputation) or to society (access to higher education; improvement of educational levels). Some benefits are directly monetary (the continuing-education market can bring additional revenues to a university), but in many cases their economic value is indirect. In fact, a better qualification can bring graduates higher revenues in their professional career, therefore not present or instant earnings but a future opportunity.
Thus, the relevant question is not whether an eLearning course costs more or less than a presence course, but whether anyone is willing to pay for it; and this depends also on expectations, strategies, representations, and values of people and institutions. For example, in many countries widening the access to higher education is a

political objective, and the state is ready to subsidise distance universities to achieve it. This depends also on effective communication and marketing, not to mention power: some people might be able to obtain funds for eLearning courses, while others might not.
From the course's perspective, there are some possible sources of revenue:

- Students' fees. In curricular education, these are normally based on political criteria, but in continuing education this is not the case. For example, companies could be ready to pay more if thanks to eLearning workers were less absent from the workplace
- Seed money for development from national or university programmes. However, seed money does not cover the delivery and maintenance of the course;
- Redistribution of existing resources. If eLearning is considered to be an opportunity for the university and brings benefits (for example a better reputation), funds might be redistributed to eLearning courses;
- Recovery of resources saved, like teachers' classroom time, reduced occupation of rooms and laboratories. This is almost indispensable for blended learning in universities.
- Access to external markets as a complement to existing courses. Re-use of eLearning materials (for example through agreements with other universities or publishers) can help to cover development costs of course materials.

The central message is that one needs to define an economic strategy for one's project (see under Exercises) and this strategy will be different when conditions change. If you are developing an on-line course in marketing together with a large company willing to pay a lot for its employees to achieve an MBA degree, you can afford high-end solutions with nice web materials and exercises. If, on the contrary, you develop some support materials for an overcrowded university course, financial means will be limited: here, a simple environment with an eLearning platform, pdf of the course materials (or printed materials), and some communication tools might well do the job.

Example: political support
The Department of Justice financed the prisoners' project with a large sum, because it saw a clear social motivation behind the project. The project was also one of the main electoral arguments of Maziland's Justice Minister. As a consequence, the project design was costly and involved a large number of hired tutors; for the universities involved this provided a good opportunity to employ supplementary staff. However, in spring 2000, a political change took place: the new Minister of Justice endorsed a more restrictive policy and cut the project's budget by 50%. As a result, the original concept had to be reviewed and, especially, teaching staff considerably downsized.

6.6 Exercises

1) With reference to the eLearning environment and the technological choices you made in the previous exercises, try to calculate the costs of your eLearning course by comparison with the presence course. Distinguish:

- direct costs of the course;
- costs incurred by the students;
- the institution's general costs.

2) On the basis of the previous calculations develop a financing strategy by distinguishing between the development phase and the delivery phase.

3) Check whether your eLearning scenario and technological choices are compatible with the economic framework and, if not, revise them.

6.7 Further reading

Links

http://bates.cstudies.ubc.ca/ (University of British Columbia, *Cost-benefits of eLearning*)

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7 Management of an eLearning project

Benedetto Lepori

7.1 Objectives

Project management (PM, also for project manager) is a key issue for eLearning projects. Good PM helps to develop courses by keeping schedule and costs under control. In this chapter, we present some principles, focusing on the management of social and institutional relationships inside the project and with its environment.

7.2 Project Management

Project management may be defined as the use of knowledge, skills and techniques combined to ensure that a project attains its objectives. These objectives include, for example, scheduling project activities over time, appointing people with the right competences for a given project, or solving conflicts and crises. Thus PM has little or nothing to do with content, but rather with the project's effectiveness (the ratio between objectives and results) and efficiency (the ratio between costs and results).
PM is a well developed discipline and is based on a large body of knowledge and techniques that can be applied to projects in different areas, like engineering, public administration, software development, etc. Sometimes these techniques are quite formal, using tight and systematic scheduling, reporting, meetings etc. Of course, if you are in charge of the realization of a virtual curriculum with dozens of people involved, you will need some formal management tools to handle the project. However, many eLearning projects are relatively small and embedded in an academic culture that is remote from formal management. In this context, you should allow people more freedom; you should concentrate on motivating them and promoting communication and collaboration, rather than troubling them with meetings and schedules. In fact, some of the worst failures in projects are due to a project coordinator's working style that is incompatible with the habits of the people involved.
So, our advice to you is to *choose carefully the management style* which best suits the project's objectives, your skills, as well as the culture of the different members of the project team.

7.3 Dimensions of Project Management

Project management is usually divided into a series of processes run in parallel:

- *Integration management* means ensuring that the project activities are properly coordinated; it also means trading off and prioritising activities. The project plan (a chart showing sequences and dependencies between activities) is the main formal instrument used for this task. However, integration must be achieved first of all at the cognitive level (developing joint representations and values for the project), at the social level (integrating people from different cultures, like software engineers and pedagogues), and at the communicative level (fostering exchange between activities and people).
- *Scope management* means ensuring that the project includes all the work that needs doing, and only this work. This means stopping people from getting sidetracked by irrelevant activities or even from pursuing their own goals, but also checking that all activities are completed according to plan. In academia, where normally you don't have much control over people, this calls for the ability to motivate them to do what the project needs.

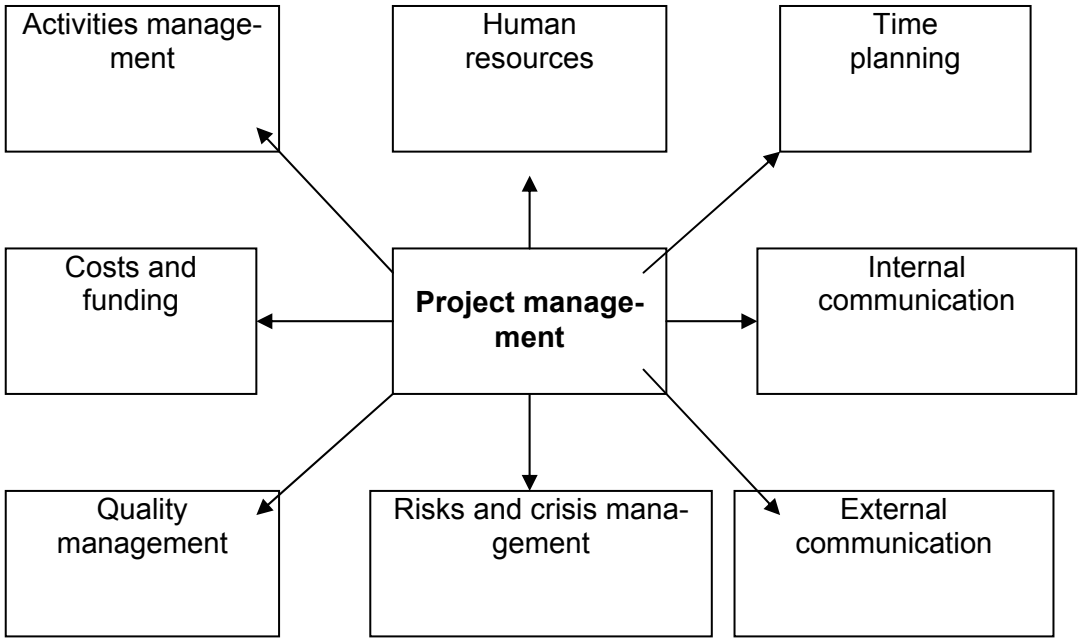

Figure 13. Dimensions of project management

- *Time management* means planning project activities so that these take place in the right order throughout and are finished on time to meet the final deadline. Your planning must be flexible, since production of educational contents is a complex task, and quality is more important than schedule; this means also that you should build in a sufficient time reserve to conclude the project.
- *Cost management* includes all processes to secure financial resources, to ensure that these are used efficiently, and to avoid overspending. This is complicated, since in eLearning projects the host institution tends to provide some resources in kind; and so you will need to negotiate with the relevant administrative officer. Cost and budget management includes administrative paperwork for reporting, where you are likely to need the help of specialist people. Cost effectiveness is a key problem for eLearning (see chapter 6).
- *Quality management* includes all processes to ensure that products meet the needs of their users. Quality is very important for eLearning projects, since their main goal is that students learn as much as, or better than, with existing courses.
- *Human resources management* includes recruiting the necessary staff for the project and ensuring that they do their best for the project. This includes tasks like directing people, assigning and checking jobs, delegating and motivating, promoting team work and dealing with conflicts. A good team of motivated people working together is the key to success (see section 4). Many different professional figures are required for eLearning development and use, like instruction designers, media specialists, education technologists, evaluation technicians, graphic designers and distance tutors. You will need to encourage these competences and prompt cultures to cooperate if you want to achieve a good product.
- *Communications management* includes all the work required to disseminate information on the project to your stakeholders (e.g., the university's management; the funding programme) or to other potentially interested institutions or people. Creating a positive image of your project, attracting interest, showing useful results: all of this will facilitate relations with your stakeholders and

a give you a better chance to raise funds for follow-up projects or for maintenance.

- *Risk management* includes all the measures needed to cope with uncertainty and changes in the project development. Of course, some events are totally unpredictable, but some might be anticipated; the trick is to be ready with *alternatives* and to design *robust* projects allowing you to stand up against some of the most predictable changes.

7.4 No project is an island: your project and its context

As a project manager, you might be tempted to concentrate on the internal functioning of the project. However, your success will depend largely on the ability to achieve support and to integrate the project into its institutional context. Even a team of good and enthusiastic people might run into trouble if their work is not supported and recognized by their parent institutions.
This is important for eLearning projects, since they produce courses to be integrated into a university curriculum and this is usually decided by academic departments. Moreover, in many cases funds are available only to realise the course, while to use and maintain it, money has to be sought from the university.
Institutional integration has more subtle aspects, too: every institution over time tends to develop (mostly unwritten) rules, practices and procedures that broadly determine people's behaviour. This is the case with universities, too: for example, the behaviour of scientists is largely driven by a need for academic recognition, especially through scientific publications. Also typically, university governance structures have a flat hierarchy where professors are granted a good deal of autonomy; and decision-making processes are based on consensus building. However, European universities are different from American ones, and natural sciences are different from the humanities. To avoid conflicts, you should be aware of these norms and decision-making procedures.
In large projects, you will also have to deal with inter-institutional relations: cooperation yields clear benefits in terms of available skills and publicising of project's results. Nonetheless, managing projects effectively when several institutions are involved is difficult, because objectives and cultures are different. Not least, the general (academic and political) relations between these institutions might well interfere with the project.

Example: organization and communication

The prisoners' project had a clear organization. The Justice Department defined the project's specifications and financial framework. The University of Bugano coordinated the realization and functioning of the course, while work was clearly divided among the other partners according to their competences in specific fields of agrarian science. However, many communication problems emerged: faculty members found it hard to grasp the situation of prisoners, and thus prepared lectures that were poorly suited to their needs. The political agenda of the Ministry of Justice, which wanted the project to be a showcase, was not always compatible with the ideas of those who designed the teaching curriculum. In addition, some of the partners tended to use project money to finance research activities, which were seen as more interesting.

Example: institutional support

Partly on the strength of her knowledge and partly thanks to her position, the Faculty chairman of Palm Creek was able to convince her teaching staff of the usefulness of the new course, Introduction to Mediaeval Philosophy. This way the Faculty Council approved its integration into the degree curriculum. It was also agreed that she could hire a new half-time assistant, responsible for course maintenance and tutoring, whose salary would be paid entirely by the Faculty.

7.5 Project management as a social task

As a project manager, you might think that your main task was to take decisions and to tell people what to do. Obviously, the definition of the roles and activities of the project staff members is a major task of every PM.
However, projects in universities do not resemble military or corporate projects, where there is a hierarchical structure and roles are divided between decision-making and implementation. In educational activities, as well as in research, people's initiative and innovation abilities are extremely important. Team members who only execute your orders are of limited value. It is therefore essential that you motivate them, that they feel appreciated, and that their ideas are given due regard. Developing good social relations in the project as well as a shared culture is very important, too.
Moreover, power dynamics are in many cases complex, since the project structure might be different from the institutional structure; for example, the project leader might come from a small university and thus have limited influence over the colleagues from larger institutions. Also, the coordinator, or project manager, tends to be placed in a weak position vis-à-vis university professors. At this point, a key challenge for a project manager seems to be whether he is able to manage power and decision-making processes, in order to build a consensus and to reach shared decisions which can be implemented easily.
We think that a good PM has to be above all a manager of people and social relations rather than of contents (even if technical competence is mandatory if he is to make good decisions and be legitimated). This also means that quite often he will have to step back from his own ideas in order to adopt or adjust to another's suggestions.

Example: promoting your project

NumbiosAir, Tydney Polytechnic, and the Polytechnic of Zilano held a press conference to present the course. There, they highlighted the advantages of simulation software and the benefits to be drawn by aerospace engineering students and NumbiosAir mechanics alike.
The press conference has had an extremely positive impact in terms of image for both Polytechnics as well as for the airline company (NumbiosAir), whose participation in a new kind of training was thus fully acknowledged. The event buoyed up the enthusiasm of NumbiosAir managers: after their initial scepticism, they have become increasingly confident in the new teaching method, and they are now committed to providing financial backing to the course.

7.6 Conclusion

Reading this chapter, one might end up feeling that PM requires one to be extremely competent on all project subjects, to be a sensible politician and people's manager, to communicate perfectly, and to work hard. Of course, depending on your background, you will be better at some PM tasks than at others. Also, your time will often be limited: this means that you have to set *your* priorities and to identify which tasks are more important for the project's success. Finally, the project's success will depend only partially on your ability as a PM, and much more on external factors beyond your control. This means that you have to be aware of your limits; in case of major failures or problems, you should also seek assistance from more experienced people.

7.7 Exercises

eLearning projects are very diverse, depending on the product to be developed, the people and the institutions involved, available funding, etc. So we propose that you

try to characterize your project, to identify strengths and potential shortcomings or trouble.
This exercise is important right at the outset, since normally the project proposal is not accurate enough to manage the project. However, it is advisable to repeat it after some time in order to adapt the project's organisation to its development.

1) For the actors involved in the project (institutions and people) identify:
- The reasons why they are taking part in the project (for real interest in the subject, for political reasons, to get recognition…).
- Their objectives: developing competences; raising money; acquiring reputation; getting more power….
- Their competences and abilities (knowledge of contents; technology; social capabilities; communicative abilities).
- Their possible role and function in the project, as well as potential causes of conflicts and problems.

2) For each PM dimension listed above, prepare a short implementation plan where you set the objectives, the actions to be taken, as well as the drawbacks and the potential sources of difficulties. Review this plan with all project participants.

7.8 Further reading

PMI Standard Committee, *A Guide to the Project Management Body of Knowledge*, Project Management Institute. On-line at www.pmi.org).

8 Intellectual Property Rights

Sibilla Rezzonico and Benedetto Lepori

8.1 Objectives

Intellectual Property Rights (IPR) and especially copyright laws are an important issue for eLearning. In fact, producing an eLearning activity is exactly the same as producing a paper-based or printed handbook, and thus one needs to acquire all the necessary rights for existing material, but also for material produced by people working on the project. In this chapter, we introduce the basic definitions and regulations of IPR and we examine their relevance for eLearning courses.

8.2 Definitions and basic issues

Intellectual property protects intellectual creations that are *immaterial* and are not covered by ordinary property rights:

- The protection of *industrial property*, including new technologies, production processes or products; this covers the fields of patent law, the protection of the topographies of semiconductor products, design protection, trademark law, geographical indications of origin as well as protection against unfair competition.
- The protection of literary and artistic is guaranteed by *copyright laws*.

8.2.1 Copyright

Copyright protects works of literature and art which are the product of the intellectual talent and endeavour of one or more persons, and which have individual character. This includes: literature, musical compositions, fine arts, audio-visual recordings, choreography, pantomime, scientific work etc. Computer software (both source code and machine code) is also protected by copyright. Copyright protection doesn't concern only whole works but also drafts, titles and parts of works on condition that they are creations of the mind and individual in nature. Also protected are the works of performing artists (musicians and actors), audio and audio-visual recordings, and radio and television broadcasting. These rights are referred to as "neighbouring rights".
A copyright comes into being when the work is created. Protection is not subject to any formal requirements such as registration or fixation of the work. In Switzerland protection expires 70 years after the death of the author (50 years in the case of computer programs). Only the individual who has created the work is considered to be the author and therefore the first owner or holder of the copyright. Authors hold the exclusive right to use or authorize others to use their work.
Copyright legislation varies from country to country. However, international agreements guarantee mutual protection between different countries (the Berne Convention). So you must presume that works produced abroad are protected by copyright even when used in Switzerland. In Switzerland, the matter is regulated by the Federal Law on Copyright and Neighbouring Rights (Federal Copyright Law).

8.2.2 Copyright entitlements

Copyright comprises a whole set of different legal rights, divided into two categories:

- The *rights of exploitation*: in particular, the rights of reproduction, public reproduction (for example broadcasting), and distribution;
- The *rights of authorship*: the right to be mentioned as the first author of a work or to publish it for the first time; further, the right to modify and adapt the work.

These rights may be transferred and licensed separately.

8.2.3 Limitations of copyright

In Switzerland protected work can be used without formal permission in three cases:

- Quotations. Published works may be quoted if the quotation serves as an explanation or a caption for an illustration. The quotation must be properly indicated and ascribed - the name of the author and the source must be duly identified - and its length appropriate.
- Private purpose. Published works may be used for private purposes; this includes the use by a teacher in class. However, this doesn't apply to the integration of works in an eLearning course, since in this case you are producing a new educational work.
- Works located in a public space (for example sculptures) can be freely represented or photographed; this includes only the external part of buildings (paintings hanging inside a building are excluded).

8.2.4 Copyright and the Internet

Copyright applies to works published on the Internet exactly as much as to works on other supports. You cannot download texts or images from a web site and modify them or integrate into your eLearning course without formal permission. However, you are allowed to download a document for your private use. When a document is published on a web site, you can link up to it; however, you should verify that the document was lawfully published (linking to web sites publishing forbidden materials is illegal). The link must be clearly recognizable and indicate the reference, so that the user is aware that he/she is navigating in an external web site; inserting foreign web pages into frames is not allowed without authorisation (keeping the URL and the layout of your site).

Example: linking to web sites
The Mediaeval Philosophy course included links to Prof. Devil's web site, where most of the classical readings in medieval philosophy were available on-line. Three years later, the University was served a summons by the publisher, Elsage, who owned the rights on the critical edition of the works of Thomas Aquinas. Elsage argued that the web site of Prof. Devil infringed copyright laws; while this was tolerated for personal use, it could not be for a large-scale educational use. Luckily, the University of Palm Creek owned a licence on these works for its students, it still had to pay a fee to extend it to external students; and so tuition fees for external students increased by 15%, even if the number of available reading texts was considerably reduced.

8.3 Copyright issues for eLearning activities

When you produce an eLearning course, you are developing a new educational instrument, which will be delivered and used like a course handbook published by an editor; thus, you need the agreement to use and/or modify all copyright-protected works. Figure 14 shows the whole chain of agreements needed:

- End users acquire a licence for the course; for university students, this will be subsumed under their registration, while external students might pay additional fees;
- The course deliverer(s) acquire from the producer a licence to offer the course to a target public; this might include the right to customize it (an Italian university might buy a licence to translate from an English-language original course and to deliver it only to students in Italy);
- The course producer will have to acquire the necessary rights to develop the course (for example to adapt original materials or software pieces), to use it and to grant licences to deliverers. The extent of the rights which the producer has to acquire depends on the expected use of the course; ideally, the rights should be

as extensive as possible, but cost considerations might suggest different strategies.

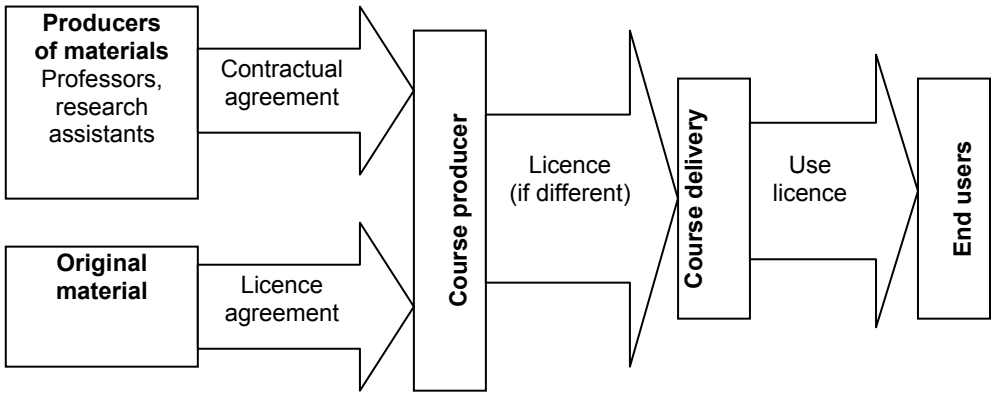

Figure 14. Licence and agreements for eLearning activities

There are two main types of works protected by copyright used in an eLearning course:

- Materials produced in the development of the course. You have to acquire rights on these materials from people working in the project.
- Original materials: pre-existing documents or images which are integrated and adapted for the course (for example translated or converted to a digital format). You will normally have to obtain the necessary rights.

Software tools, too, require a licence; costs depend on the number of users and are usually lower for educational purposes; breaching these licences can have serious consequences. Freeware software is normally granted under some licensing conditions, even if there is no price to pay (for example for non-commercial use only; www.opensource.org).

8.4 Contracts with the course producers

According to Swiss legislation, when a professor or a researcher writes a text or produces other material, they also own the copyright, even if they are in employ and on the payroll of, say, a university. The main exception to this rule is software code, which is owned by the employer if it is written in direct connection with the work contract. The work contracts of some universities provide for transfer of copyright rights to the employer; however, these rules are not always clear and, without an explicit reference in the work contract, their legal value might be contested. This means that it is important, right at the beginning of the project, to sign contractual agreements with the people working on it; most universities have a standard model contract.

Normally, you should acquire all the rights on produced materials; this will be easier with research assistants or research fellows, but could be more difficult with professors; here some issues:

- *Collective works*. eLearning courses are normally produced by different peoples (research assistants, professors, designers). For collective works, any decisions on the exploitation require the unanimous consent of all the authors and thus, if you don't acquire the rights, the situation can be very complicated.
- *Right of modification*. It is very important to acquire these rights, because normally you will want to revise the course after some time. Otherwise, you will have to replace the whole text. You should however consult your author first, as he ought to be the one to modify the original in the first instance.
- *Commercial use*. In the case of commercial exploitation, authors should be credited a fair share of the revenues; most universities have their own rules on this.

- *Partial use*. You might want to leave the authors to decide whether they want to use their contributions outside the eLearning course.
- *Getting back the rights*. Normally, when not exercised, the rights will go back to the project collaborators.
- *External collaborations*. When other people outside the university participate in the project (for example software companies or designers), it is important that contracts provide for the transfer of all the needed rights. If you don't own the rights on the logo of your course, you will have to get back to the designer for each modification, probably paying a lot of money. Working with external software companies also requires a lot of care in defining the licenses.

Example: IPR on software

A central feature of the course on military planes engines was the realization of a software environment, which allowed simulations of the engine's behaviour. According to IPR laws, the software code is owned by the Polytechnic of Tydney. However, knowing that the code is easy to imitate, the Polytechnic followed a two-fold protection strategy. Firstly, the simulator was patented as an industrial product, to cover its specific features. Secondly, all users had to sign a non-disclosure agreement whereby they undertook not to publish the software code or not to use it to realize other programs. The reason for this protection was that the simulator had a large market among aerospace companies and airlines, being the sole product of this kind in the world. The Polytechnic of Tydney and NumbiosAir saw the possibility of recovering the development costs through licensing.

8.4.1 Defining the rules in your consortium

Often many universities get together in a consortium to cooperate on the production of a course. This means that each university will own the rights to the elements developed and that ownership of the whole (as a collective work) will be managed collectively. You should define some basic rules:

- Each university should guarantee an unlimited-use licence to its partners.
- Partners should identify the person or persons responsible for modifying or editing the course; this role could be centralised or divided among the partners.
- Partners should identify the person or persons responsible for managing the rights and granting licences. If the consortium is small, this can be decided together; if it is large one partner should be selected to negotiate and manage the common rights.
- For commercial use, rules on the sharing of revenues are necessary; of course, it is easier to define them before the situation becomes complicated.

The instrument used to settle all these issues is called *consortium agreement (CA*). It is a contract that is signed by legal representatives of each institution and lays down some principles for the collaboration on the project. To illustrate the point, imagine the case of one partner who does not work properly or wishes to leave the consortium. The legal office of your university will probably help you to draft a contract which suits your needs.

8.4.2 Acquiring external copyright

Copyright can be transferred from the author to other people or legal entities through a contract. Rights can be ceded to a third party, who then becomes their owner with the same rights as the author. For example, the authors of scientific handbooks normally transfer their copyrights to the Publisher. This means that the first step toward acquiring copyright is to identify who its legal owner is (for books this is mentioned in the imprint. Copyright societies will help you in more complex cases.

However, in most cases you will acquire a *licence*, which grants some rights or permission, for example only for limited uses of a work and in a limited geographical

area. The different rights are also normally negotiated separately. So, if in the Philosophy course you need to provide your students with passages or excerpts from Thomas Aquinas' *Summa Theologica*, you acquire the right to publish them in the course; however, if you want to adapt the lecture of your colleague, you need the right to modify the work. It is thus important to determine precisely the scope of the rights you need for your course.
Collecting societies are private institutions established by authors with the objective of protecting collectively (within Switzerland) their rights, in areas of use where individual collection is not possible (for example use of musical works for radio broadcasts):

- SUISA (Suisse Auteurs – www.suisa.ch) for musical works except theatrical plays;
- ProLitteris (www.prolitteris.ch) for literature, artistic works, and photography;
- SUISSIMAGE (www.suissimage.ch) for visual and audiovisual works;
- SSA (Société Suisse des Auteurs www.ssa.ch) for theatrical, music-dramatic and audio-visual works;
- SUISSPERFORM (www.swissperform.ch) for neighbouring rights.

To simplify the procedure for multimedia products, four copyright societies have founded a common office called SMCC (Swiss Multimedia Copyright Clearance Centre – www.smcc.ch) which clears the necessary rights for multimedia. The tariffs adopted by copyright societies are subject to approval by an independent commission.

Example: licensing for a specific use
The prisoners' project was based on existing materials, like a handbook in agrarian science and course materials already used in universities; videos and photographs were taken from the archive of the Chamber of Commerce for Agriculture of Mazi-land. The University of Bugano negotiated with all the rights-holders a licence agreement for use only by prisoners; given the special target, most of the owners granted a licence for free. Access to the course is checked through personal accounts, supplemented (to avoid fraud) by a check of IP computer numbers (only numbers belonging to the Department of Justice are allowed).

8.4.3 Scientific publications

Scientific publications and educational texts (for example course minutes) are all subject to copyright. Rights on scientific papers are normally owned by publishers. Working papers, unpublished documents and minutes are owned by their creators.
Even if these documents are circulated freely within the scientific community, things change when you integrate them into an educational product. For example, free archives of scientific papers (like www.jstor.org) normally grant a licence for single copies and for personal use. Your colleague will be happy if you read his paper, but less happy if you lift from it large parts to insert in your on-line course. The rule is thus that you require permission for the use of any pre-existing material; if it is not for commercial purposes, in many cases the owner will be satisfied with the additional publicity he gets (however, you probably will have to pay to use parts of educational handbooks).

8.5 Conclusion

You might believe that these are issues for large companies and for commercial activities only. *From a legal point of view* this is untrue, since the same rules apply also to educational activities, irrespective of the number of people and the amount of money involved. However, there are some cases where you must be more careful and respect legal rules; namely when you exploit your eLearning activity commer-

cially, i.e. to earn money; when the activity is on a very large scale and, finally, when you use materials which are commercially produced and exploited. In other cases (for example, university courses with a small number of students) there might be some more tolerance; moreover, in many cases it might be preferable first to develop the course, and then to acquire the rights on the materials that are necessary, rather than trying to regulate everything from the beginning. Finally, you have to remember that laws define only the framework and a basic protection against judiciary rulings. In fact, the *content of the agreements* ultimately depends on good and friendly relations with people: and so you should take care of them.

8.6 Exercices

1. Identify all the pre-existing materials (text, pictures, music, photographs) you are using:

- Which rights do you need?
- For which use?
- Can you easily identify the owner of the rights?
- Should you contact the SMCC for help?

2. Clarify IPR rules in your institution:

- Identify the university service that can help you (normally the legal service or the technology transfer service), and get in touch with it to examine all the legal implications of your eLearning activity.
- Clarify rules on copyright and define suitable agreements with people working on the project.

8.7 Further reading

Link

www.ige.ch (Swiss Federal Institute of Intellectual Property)
www.wipo.int (World Intellectual Property Organisation)
www.ipr-helpdesk.org (European Community – IPR Helpdesk)

References

Bär & Karrer, *Swiss Virtual Campus: Guidelines zum Urheberrecht*, Bern.

9 Delivery and update

Lorenzo Cantoni and Isabella Rega

9.1 Goal of the chapter

The chapter aims to highlight some crucial factors to be taken into account in the delivery and maintenance phases of an on-line course. Processes in designing, delivering, and maintaining an on-line learning experience are reviewed and explained, and examples of realistic situations provided.

9.2 Delivery

Activities involved in the delivery process vary according to the learning scenarios planned:

- In **self-learning courses,** the most critical factor is to provide **clear explanations of the use** of the material. Written guidelines are provided on how to be a good eLearner;
- All **other scenarios include** assistance activities; hence **the learning experience** needs to be **carefully designed**. In the following paragraph we will discuss the main factors to be taken into account in the planning phase.

9.2.1 Designing the learning experience

In planning the learning experience it is essential to pay attention to the regular organisation of activities along the course's life cycle. A precise schedule (for synchronous and asynchronous situations, see Chapter 1) is crucial, so that course students may have a sense of its pace, organise their time accordingly, and fully appreciate the experience. Each activity, and type of activity, has to be carefully thought out, in terms of tasks and timing, before the course is delivered; it has to be balanced so as not to overload, or even under-load, eLearners.
Instructors have to select activities they want to run; to explain the purpose and the timing of each of them and to clarify implications for the costs of the course. Learning activities may be characterised as follows:

- **Study** activities. These include reading, thinking, and writing assignments. In this regard it is necessary to properly balance the amount of material available to participants. Publishing additional material on the web tends to be a strong temptation for instructors, who sometimes forget that, if sharing material may be a fast process, absorbing them may not be as fast (and this is bound to be a cause of frustration for eLearners);
- **Assessment** activities. These may have two different functions: a formative one, allowing participants to become aware of the level of knowledge and competences acquired, and an evaluative one, giving the instructor a chance to evaluate knowledge and competences acquired by learners. Usually during the course period a number of on-line intermediate tests are planned, to help students to keep up to date; these kinds of tests count for a percentage of the final mark. They are typically made of closed-automated questions such as multiple choices, fill in the blank and matching. On the contrary, final examinations have never been run on-line yet. Identity-certification issues, in fact, do not allow institutions to give students recognised certificates without an on-site examination;
- **Communication and collaboration** activities; both between participants and teachers, and between different participants.

Example: Helping students to keep pace with the course
Consider the peculiarities of Philosophy undergraduates at the University of Palm Creek: most of these students are mothers with a busy life. In cases like this one, where participants are not full-time students and have many activities besides their learning interests, it is essential to help them keep up with the pace of the course. A useful strategy is to make available and unavailable contents and materials each time, week by week; by doing so we guarantee students the necessary regular support during the entire period of the course.

9.2.2 Integration into the curriculum

If an on-line course is seen as part of a wider study path run on site, the issue of integration into the curriculum has to be considered. In fact, competences acquired in a given on-line course have to be the same as those assimilated by students choosing the on-site modality (another good reason for maintaining final examination on site).
Moreover, in introducing on-line and blended courses into a curriculum, instructors and designers have to consider the implications affecting the study path as a whole, and have to adjust the curriculum to make the new "piece" fit in properly. Time spent on re-planning the curriculum must not be underestimated.
So far, we have considered aspects of testing knowledge and competences acquired by attending a given course. It is nonetheless worth spending a few words on the importance of setting criteria for accessing the course. In fact, unless the course is part of a structured curriculum, where students can be assumed to have the same entry level, some provisos become extremely important if we want to avoid unmanageable heterogeneous environments.

Example: adapting the course to different entry levels
All the students attending the Master's degree programme in Economics at the University of Tobat have to pass an aptitude test in statistics, to verify if they reach the minimum level requested for that curriculum. Based on the test results, a personalised study plan is prepared using the material available in the on-line course (self-study mode). If the entry level in statistics is too low, students are required to attend the first-year course in blended learning mode, where they receive more support from tutors.

9.2.3 Loneliness

A carefully designed plan for using on-line courses helps students to overcome the feeling of isolation, often associated with distance education. Isolation is one of the main causes of high drop-out rates affecting on-line courses.
Two kinds of *isolation* may be found:

- *isolation* connected with **the mental and physical conditions** of the learner;
- *isolation* connected with **the class situation**.

Let us start by describing factors affecting the mental and physical situation of participants. The context in which a person attends an on-line course is quite variable; and teachers, even though they cannot predict every single environment, have to take into account possible scenarios diverging from an 'ideal' use set-up.
It is quite unrealistic to think of an eLearner placed in a quiet room, with plenty of time and will to study, with a fast connection, well rested and completely absorbed in the course. More probably, this student will attend the course at the end of a tiring day's work, carving out spare moments in the midst all different activities filling her evenings, with a kid knocking on the door or sitting on her knees... Context is an important element, not to be overlooked when designing the course activities.
The second kind of isolation faced by the learner derives from being unable to have an intuitive feeling of the overall trend of the class, to know how much progress one's

classmates have made, and to check the learning process of the group. To overcome this second type of loneliness, it is extremely important to provide feedback, helping students to *contextualise* their position according to that of colleagues. Feedback falls within the category of tutoring.

9.2.4 Tutoring

Tutoring is the main tool for instructors to have a flavour of the class's progress and to build group awareness. Tutoring may be connected to three main areas:

- **Technology** (how to use technical tools);
- **Content** (concept clarification, discussion, …);
- **Learning experience** (how to develop adequate learning strategies).

Technical tutoring is crucial to avoid any hitches likely to compromise the proper functioning of the learning experience. Strategies have to be planned to solve as fast as possible all kinds of technical problems arising when dealing with technologies. Technical tutoring has to follow the entire course cycle, from the start, typically the introductory lesson, where requirements and the necessary computer skills have to be specified.

Example: technical tutoring
Let us imagine students enrolled for the medieval philosophy course at the University of Palm Creek. This kind of student is typically not very familiar with technology. Therefore, to dispel any fears they may have of ICTs, it is necessary to listen to even their most banal questions, enabling them to overcome possible constraints created by the medium, and allowing them to focus on content instead.

Furthermore, tutoring should focus on the specific subjects and themes explained in the course, providing continuous assistance to clarify doubts and concerns; and preventing any sense of isolation as mentioned above. No need to remind instructors that tutoring strategies have to be planned carefully and explained clearly to participants, in order to avoid overwhelming streams of communication, or unfulfilled expectations.
The third type of tutoring aims to help students to develop adequate learning strategies in relation to use of material, collaboration with other participants, and use of time.

Example: supporting the learning experience
Tutoring aiming to support the learning experience is particularly relevant in the case of prisoners registered for a B.A. degree in Agrarian sciences with the University of Maziland. Participants are not used to collaborative strategies; therefore, giving them support in creating and in understanding the importance of a cooperative environment is essential to fulfil the pedagogical aims of the course.

9.2.5 Managing students

Managing students is an essential component in the overall management of on-line courses. The enrolment process is highly time-consuming, a factor to be considered in the time-budget. Using a Learning Management System allows to enter student's information once and then assign users to courses. For large numbers of students, integration with administrative student management tools is mandatory to avoid duplication of data (access data; examination results).

9.3 Maintenance

Delivering the first issue of a course does not mean having concluded the design process. Maintenance implies different actions to be carried out by the managers of an on-line course.

9.3.1 Time-dependent contents

Currency is most important. Whereas to understand the current relevance of a book one simply refers to its date of publication, the same is not true of on-line material. Therefore, accuracy in keeping on-line material up to date is necessary, since one commonly assumes that if a piece of information can be retrieved on the web it is automatically valid and up-to-date.

9.3.2 Pedagogical tuning and refinement

The most accurate pedagogical planning cannot claim to consider all factors happening in the running of a course. Therefore it is important that all people involved in designing it meet up at the end of each edition to discuss and refine:

- **The product**: all kinds of materials provided;
- **The process**: the organisation and timing of learning activities.

It is worth adding that the cost of fine-tuning and refining a teaching product and process very much depends on the technical and organisational characteristics of the course itself (see Chapter 5).
Moreover, never forget issues related to intellectual property, which are explained in detail in Chapter 8.
The refinement of material has to be taken into consideration also when the course is exported to other contexts. In this case, localisation plays a major role.

9.3.3 Localisation

Changing environment implies the re-definition of all context-dependent elements, which have to be adapted to the culture and the social world of the new target-learners. Relevant factors are the following:

- Language
- Measurement units
- Currencies and values
- Laws
- Cultural background
- Pictures, faces, furniture, etc.

This is particularly important since re-use of course materials and licensing to other universities or countries are an important means to recover development costs (see Chapter 6),

Example: customisation for a different country
The prison of Tamboo in India decides to offer its prisoners the possibility of attending the B.A. in Agrarian sciences programme developed by the Department of Justice in Maziland. Before delivering the course in Tamboo, designers have to localise the curriculum in the new context, changing, for example, the crops to be considered, explaining differences in laws and regulations, and the 'local' currency.

9.3.4 Technical maintenance

A key issue in the maintenance phase is coping with potential technical problems, which can occur to both teacher and learners.
The most useful suggestion on the teacher's side is always to keep a backup copy of the course, in order to avoid, in the event of a system breakdown, the loss of the entire work done, including material developed, discussions arisen and technical statistics on students' access behaviour.

9.4 Exercises

Given the pedagogical scenario set up in Chapter 4, define

1. a proper learning experience setting: plan study, assessment and communication activities; plan technical, content and learning experience tutoring; consider issues related to the integration in the curriculum
2. a maintenance plan.

9.5 Further reading

to be added

10 Quality and Evaluation

10.1 Goal of this chapter

How to test, assess and grade learners, teaching/learning activities and educational institutions are fundamental questions in both the practice and the theory of education and training. Clearly – as they largely depend on the operational contexts involved and on the points of view adopted – there are no single answers to questions like: why, for whom, how, when the assessment/evaluation activity is supposed to take place, what it is designed to test, and who should run these activities.
This chapter deals with two quite distinct, though deep-down connected, processes: testing and evaluating what eLearners have learnt, and, secondly, evaluating and assessing eLearning activities.

10.2 Quality and eLearning

Initially, the debate on new technologies in education focused on their effectiveness and on how they compared with the traditional sort of education (Phipps & Merisotis 1999). Now, however, we have gone past that phase where each university wondered whether it was worth "developing or not developing" training activities by means of new technologies. The emphasis is rather on how to implement them and – above all – how to ensure they are of good quality.
One of the main risks is the following: one tends to measure the quality of eLearning education merely on the basis of the technologies used, very much as if innovative tools and software were *per se* an value added for education.

Example: Different educational needs
And yet, with every new case one has to evaluate the application context of a course in order to understand whether the most innovative solution does indeed contribute value added; or, on the contrary, whether what is already in place might be the most effective anyhow.
Take the example of Statistics for Master's students: this has been conceived as wholly on line, whereas for first-year undergraduates it was decided to hold it largely as classroom lectures. Newly-registered (first-year) university students have totally different needs from their Master's colleagues. The latter, in fact, may be in a paid job; they may have worked out a study method that suits them, and they are unlikely to want to socialise on campus.

This is why each institution needs to define its own plan for quality in eLearning, which should include identifying some criteria for evaluating both the learning and the relative teaching processes. In the following sections, we describe both levels of assessment, and highlight their main implications.

10.3 Testing and evaluation

Testing may be defined as the operation by which we measure the level of knowledge or skills. If then we call 'yield' any increase in knowledge (know-how or aptitude) which can somehow be ascribed to an educational experience, we can conclude that 'evaluation' is our assessment of that 'testing' and that 'yield'.
The arguments used in the test are generally divided into *objective* and *subjective*. 'Objective' evidence is that where each answer to the test receives an *a priori* score; all other evidence is subjective (here the term 'subjective' is not to be interpreted as 'arbitrary' but purely as non-objective).
Objective tests have an edge over the others because they can easily be compared and they can be processed by computer. Yet they do not encompass everything that

one might want to check and assess; in many cases, therefore, we resort to subjective tests, for instance a written essay or an interview (Cantoni & Di Blas 2002).

In Chapter 5 on technology, we referred to the functions enabled by an Learning Management System, one of which is evaluation. An LMS enables the design of "objective" tests, and can support any other kind of testing activity.
A) *As far as objective evidence is concerned*, professors and tutors ought to be suitably informed and trained on the objective tests available to them. In fact, designing a good questionnaire requires specific skills (e.g., to be able to build distractors, to formulate questions, and to calculate difficulty and discriminative indices).
B) *As far as subjective evidence is concerned*, where for example the candidate is invited to draft a brief essay, the tutor/assessor must be able to provide adequate feedback especially if they are preparatory tests (i.e., if they are meant to help the student practise in view of the final examination).

In learning contexts, too, it is essential to clarify from the beginning the parameters with which learners are to be tested/evaluated. Suppose, for example, that you want to evaluate the participation in a discussion forum. In this case, you have to spell out the parameters on which your evaluation will be based: number of messages? Their depth? Number of messages receiving a reply? Duration of connection to LMS? Frequency of log-ins? And so on.
There are, in addition, issues relating to organisational and legal aspects of the test that lecturers and course tutors must be duly informed about. These are, for instance, students' identification, certification of the environment in which the test takes place (access to on-line resources, to communication tools with people who may help the candidate, and so on).

Example. Defining one's criteria for assessment
We have seen in the case of "Mediaeval philosophy" that the theory and main concepts are taught by the course professor in the classroom, whereas the Internet is used to make available to students reading material to be later commented on in a peer-to-peer forum, according to a clear schedule.
In this project, now well under way, the criteria used to mark the students' responses will have to be set in advance; also to be decided in advance is the question whether these responses (comments) are taken into account for the final grading. A further task is to estimate the number of tutors needed to conduct this activity, what expertise is demanded, and whether *ad hoc* training should be provided.

10.4 Evaluation and assessment

Universities are increasingly urged to set up partnerships with other universities and with companies. Hence, universities are more and more under pressure to assess their own activities, and to identity quality assessment parameters in common with these institutions.

Example. Accreditation and cooperation between universities
Tydney Polytechnic and the *Politecnico di Zilano* have decided to launch a brand new course with the aerospace engineering curriculum. The two institutions have different nationalities and have grown out of very different academic traditions. To plan this joint course, they will need to negotiate some of its features; weighing them up against two different sets of standards: in the manner they design their courses and in the way they fit them into the respective degree programmes.

There are various ways of rating quality in eLearning activities, but all of them make use of comparison, either by being set up against an ideal theoretical model or by

juxtaposition with some *best practices* to be found in real life. Several quality parameters have been put forward that can illustrate the characteristics required of an optimal activity in eLearning. Two of them in particular deserve attention: a proposal by ASTD Certification Institute and one by of the Institute for Higher Education Policy.
The first of these documents, "E-Learning Courseware Certification (ECC) Standards (1.5)" (ASTD, 2003) presents a methodology to assess the quality of the technological object from the points of view of usability and of instructional design. ASTD proposes 18 Standards divided into 4 Clusters:

Cluster One – Interface Standards These standards address the relationship between the learner and the courseware itself.	Standard 1. Orientation Standard 2. Tracking Features Standard 3. Required Navigational Functions Standard 4. Optional Navigational Devices Standard 5. Operational Support
Cluster Two – Compatibility Standards These standards address the relationship between the courseware, the operating system, and related applications.	Standard 6. Installation and Initial Launching Standard 7. Set Up Standard 8. Subsequent Launching Standard 9. Uninstalling
Cluster Three – Production Quality Standards These standards examine the quality of the courseware's text, graphics, grammar, and visual presentation.	Standard 10. Legibility of Text and Graphics Standard 11. Formatting and Internal Consistency
Cluster Four – Instructional Design Standards These standards examine the relationship between the course purpose, objectives, instructional content, instructional methods, and the learner.	Standard 12. Expression of Course Purpose Standard 13. Presence of Instructional Objectives Standard 14. Consistency of Objectives With Course Content Standard 15. Presentation, Demonstration, Facilitation of Learning Standard 16. Practice with Feedback Standard 17. Engagement Techniques Standard 18. Assessment of Learning

The proposal made by IHEP "Quality on the Line" (Phipps & Merisotis 2000) addresses instead the process of delivery and use of eLearning activities within the institution as a whole, identifying 24 benchmarks classified into 7 fields:

I. Institutional Support	**1**. A documented technology plan that includes electronic security measures (i.e., password protection, encryption, back-up systems) is in place and operational to ensure both quality standards and the integrity and validity of information. **2.** The reliability of the technology delivery system is as failsafe as possible. **3.** A centralized system provides support for building and maintaining the distance education infrastructure.
II. Course Development	**4.** Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes—not the availability of existing technology—determine the technology being used to deliver course content. **5.** Instructional materials are reviewed periodically to ensure they meet program standards. **6.** Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.
III. Teaching/ Learning	**7.** Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or e-mail. **8.** Feedback to student assignments and questions is constructive and provided in a timely manner. **9.** Students are instructed in the proper methods of effective research, including assessment of the validity of resources.
IV. Course Structure	**10.** Before starting an online program, students are advised about the program to determine (1) if they possess the self-motivation and commitment to learn at a distance and (2) if they have access to the minimal technology required by the course design. **11.** Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement. **12.** Students have access to sufficient library resources that may include a "virtual library" accessible through the World Wide Web. **13.** Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.
V. Student Support	**14.** Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services. **15.** Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, news services, and other sources. **17.** Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints. **16.** Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.
VI. Faculty Support	**18.** Technical assistance in course development is available to faculty, who are encouraged to use it. **19.** Faculty members are assisted in the transition from classroom teaching to online instruction and are assessed during the process. **20.** Instructor training and assistance, including peer mentoring, continues through the progression of the online course. **21.** Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.
VII. Evaluation and Assessment	**23.** Data on enrolment, costs, and successful/ innovative uses of technology are used to evaluate program effectiveness. **24.** Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.

An issue directly connected with quality assessment is accreditation, which means sanctioning (generally by a State) that a given curriculum or institution fulfils the minimum standards for the recognition of the degrees or diplomas they award. Ac-

creditation is especially important with regard to distance courses supplied to students from overseas, so as to guarantee the validity of the degree or diploma obtained. In Switzerland, it is the Conference of Swiss Universities that grants accreditation, whereas the Commission for accreditation and quality control in Swiss universities is responsible for the definition of the prerequisites and for the assessment.

10.5 Exercices

1) Ask yourself whether your university has a quality plan; and compare it with the benchmarks proposed by (Phipps & Merisotis, 2000).

2) Examine an on-line course and assess it on the basis of the 18 standards put forward by ASTD.

3) Try to sketch a quality test for your eLearning course:

- indicate if you want to apply objective or subjective tests;
- indicate the number and nature of the evidence;
- name the persons (officials) who will be responsible for processing the tests;
- specify the criteria to be used in marking / processing.

10.6 References

Link

www.oaq.ch (Center of Accreditation and Quality Assurance of the Swiss Universities)
www.ihep.com (the Institute for Higher Education Policy)

Further reading

ASTD (2003), *E-Learning Courseware Certification (ECC) Standards*, on-line http://www.astd.org/ASTD/Marketplace/ecc/standards.htm
Cantoni L. & Di Blas N., (2002) *Teoria e pratiche della comunicazione*, Apogeo, Milano
Perellon J.-F. (2003), *La qualité dans l'enseignement supérieur*, Lausanne: Le Savoir Suisse.
Phipps R. and Merisotis J., (1999) *What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education*, prepared by The Institute For Higher Education Policy (available online on the IHEP website).
Phipps R. & Merisotis J., (2000) *Quality On The Line. Benchmarks For Success In Internet-Based Distance Education*, prepared by The Institute For Higher Education Policy (available online on the IHEP website).

11 To go ahead

- use links and references provided in each chapter to deepen selected argument;
- contact the EDUM team for more information
- contact the support team of your university for advice and direct support in the development of an eLearning activity.

11.1 EDUM contact

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11.2 Links and contacts

National links	**WWW**
Swiss Virtual Campus	www.virtualcampus.ch
Edutech /technical support)	www.edutech.ch
Educational Management (EDUM)	www.edum.ch
Swiss Centre for Innovation in Learning (SCIL)	www.scil.ch
University Support Centres	
EPFL Lausanne, CRAFT	http://craft.epfl.ch/
ETHZ Zürich, Network for Educational Technology (NET)	http://www.net.ethz.ch/
Universität Basel, LearnTechNet	http://ltn.unibas.ch
Universität Bern, Virtual Campus Bern	http://www.virtualcampus.unibe.ch
Université de Fribourg , Centre NTE	http://nte.unifr.ch
Université de Genève, Centre for eLearning (CeL)	http://cel.unige.ch
Université de Lausanne, CENTEF	http://www.centef.ch/
Universität Luzern, Intitut für Kommunikation und Kultur	http://www.unikk.ch/
Universität S. Gallen, Institut für Wirtschaftpädagogik	http://www.iwp.unisg.ch
Università della Svizzera Italiana, eLab	http://www.newmine.org
Universität Zürich, ICT Fachstelle	http://www.ict.unizh.ch/