QUIS - Quality, Interoperability and Standards in e-learning

2004-3538/001-001 ELE - ELEB14

QUIS new models for cost effectiveness and cost efficiency in e-learning

- in the perspective of the user, the provider and the society

Authored by the QUIS team.
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eLearning
Designing Tomorrow's Education

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Summary

Many institutions and e-learning networks have experienced how difficult it can be to control the cost of developing, offering and running e-learning. Through our work with WP (Work Package) 7 and WP 8 we have produced guidelines for cost effective implementation and operation of e-learning, in the perspective of the user (customer), the provider and the society. The report discusses economic factors related to the planning, development, teaching and offering, educational platform, student activities, examination, evaluation and administration of e-learning. We have also discussed the importance of market orientation, cooperation, competition, financing and different payment models if we want to offer cost effective e-learning. The report also includes some working models concerning resource allocation and collaboration.

Before an education provider (EP) can start the development of an e-learning course they have to do some upfront planning activities. It is important to find out who is ordering, paying, developing and delivering the e-learning courses. The EP must also map the upcoming use of resources and possibilities for marketing. A key factor is customer satisfaction (customer value); regardless of whom the customer is; a student following a course, a company ordering a course or the society (government). It can be a good investment to allocate extra resources in the planning and developing activities in e-learning since this most likely will lead to increased customer value and increased effectiveness and efficiency. One way to make the entire development process cheaper is to cooperate and collaborate with other education providers.

In the process of offering and running an e-learning course there are a lot of economic factors that the EP must be aware of to be able to be cost effective. The learning delivery methods, the choice of pedagogy and LMS, the different student activities and the way the EP offer examination. Another key activity to become cost effective is the evaluation of all the e-learning activities. The biggest cost in e-learning is often related to the number of teacher working hours spent in the development, offering and teaching of each e-learning course. This fact make it extra important to balance this cost against the customer perceived value (CPV), since the quality of the course from the students' point-of-view often is linked to the amount of student - teacher time. Using suitable technology and tools in the LMS can save teacher time without decreasing the quality and the value of the course, in the eyes of the students. Another solution to reduce the teacher costs is to use cheaper student instructors for some of the tasks involved in the e-learning offering to the student. In general we can say that it is important to be aware of all these factors before the EP starts to allocate resources to a course.

It is possible to save money if the EP co-operate with other education providers in development, marketing, support, administration and offering of e-learning courses. To make cooperation possible there must be some kind of common model for quality assurance and e-learning standards.

The report strongly promotes a greater awareness of all of the economic factors involved. It also shows that cooperation can be a possible way to increase quality and customer value and at the same time save money. Furthermore the report emphasizes the need for more market orientation among the education providers.

Content

Figures:

Abbreviations

Throughout the report we are using a lot of abbreviations, they are explained when they are used in the report for the first time.

CBL	**C**omputer **B**ased **L**earning	The use of computers as a learning tool
CPV	**C**ostumer **P**erceived **V**alue	Perceived value = TCV- TCC (total value – total cost for the student)
EP	**E**ducation **P**rovider	Any part offering and/or creating education
JSP	**J**oint **S**tudy **P**rogramme	A programme split between two or more EPs
LMS	**L**earning **M**anagement **S**ystem	The system managing distribution of material and students activities
LO	**L**earning **O**bject	small chunks of learning material that have been digitalized
MIUN/ITM	Mid Sweden University/dept. of Information Technology and Media	
OH	Overhead costs	Costs indirectly linked to the education of students
p.s.	per student	
QaS	**Q**uality **A**ssurance **S**ystem	
QUIS	**Qu**ality **I**nteroperability and **S**tandards in e-learning	*http://TISIP.no/QUIS/*
TCV	**T**otal **C**onsumer **V**alue	Sum of different student values concerning the education
TCC	**T**otal **C**onsumer **C**ost	Sum of different costs concerning the education
WP	**W**ork **P**ackage	The QUIS project consists of 9 different WPs

QUIS Work Package 8

1. Introduction

The QUIS-project (QUality, Interoperability and Standards in e-learning) is a Transversal project in EU's eLearning Programme. The activities for the QUIS project are all directed towards Quality in e-learning, Interoperability and re-usability of e-learning material and development of standards. The project is also looking at cost effectiveness and cost efficiency in e-learning. The project is building on, and further developing results from earlier EU projects. The most important of these are the MENU project (2002-0510 / 001 - 001 EDU-ELEARN, http://www.hsh.no/menu), the MECA-ODL: Methododical Guide for Analyses of Quality in ODL delivered via Internet, (87901-CP-1-2000-1-ES-MINERVA-ODL), the GreTel Leonardo project (D/00/B/F/PP-112216) and the on-going Leonardo project, Neworkers (E/03/B/F/PP-149.035) and the Socrates Minerva project E-LEN (101421-CP-1-2002-CY-MINERVA-M)

This report is the final result from Work Package 8 of the QUIS-project, January 2004 – December 2006. Work Package (WP) 7 and 8 are titled "**Cost Effectiveness and Cost Efficiency in E-learning – In the perspective of the User, the Provider and the Society**". In our preliminary report WP 7 published in December 2005 we gave a detailed description of earlier research conducted in this subject area. We recommend you to read the WP 7 report if you are not familiar with e-learning or the terms cost effectiveness and efficiency. There you can find the formal definitions of words.

Our goal is to produce a state-of-the-art economic model that can be used at Higher Education Institutions (HEI) throughout Europe when it comes to ordering, producing, running or consuming education and e-learning. Our hope is that this report can bring more cost consciousness into the education area. A lot of factors regarding the decision-making in e-learning will be discussed. Furthermore some example models we have designed will be discussed. These models will be accessible at the QUIS website *http://TISIP.no/QUIS/*

The focus will be cost effectiveness but some non-economic factors will be presented to give a wider view of the area. The efficiency is more difficult to deal with as it includes pedagogic matters which are outside the goal of this report. However it has to be mentioned since low efficiency would cause low cost effectiveness.

1.1 A model for cost effective e-learning

In the search for a cost-effective model for e-learning there are many aspects to be considered. What is the target group? From whom the demand comes from? Who is paying the bill? Who develops the courseware and how is it developed? Who are delivering the e-learning to the end user and how is it delivered? How is the infrastructure? How is it administered? Other important areas are examination, evaluation, cooperation/competition, financing, et cetera.

It is important to consider all these aspects when we are trying to develop a cost effective model for e-learning. Looking at the different aspects and how they influence the way e-learning can be offered in a cost effective way, made us realise that it is not possible to develop just one general model for cost effective e-learning. In this report

we would like to present the different factors affecting cost in e-learning, and hopefully you as the reader can extract useful information that will help you on the way to cost effective e-learning.

The main target groups of this report are education providers and other people working with the planning, development, offering and administration of e-learning. The report is also relevant for decision makers who are involved with different kinds of education e.g. politicians. People outside this the main target group may also find this report informative and interesting.

The main goal of this report is to present our experiences and findings in this project combined with relevant theory from the WP 7 report to help the readers of this report become more cost effective with their e-learning. If we look at the structure of our report we have divided the process of working with e-learning into a number of stages and activities, *(Figure 1, Organization of the report)*. In addition to these stages we have some chapters especially focusing on subjects that are very important if the education provider wants to be cost effective with their e-learning. These subjects will affect the planning, development and offering of the e-learning.

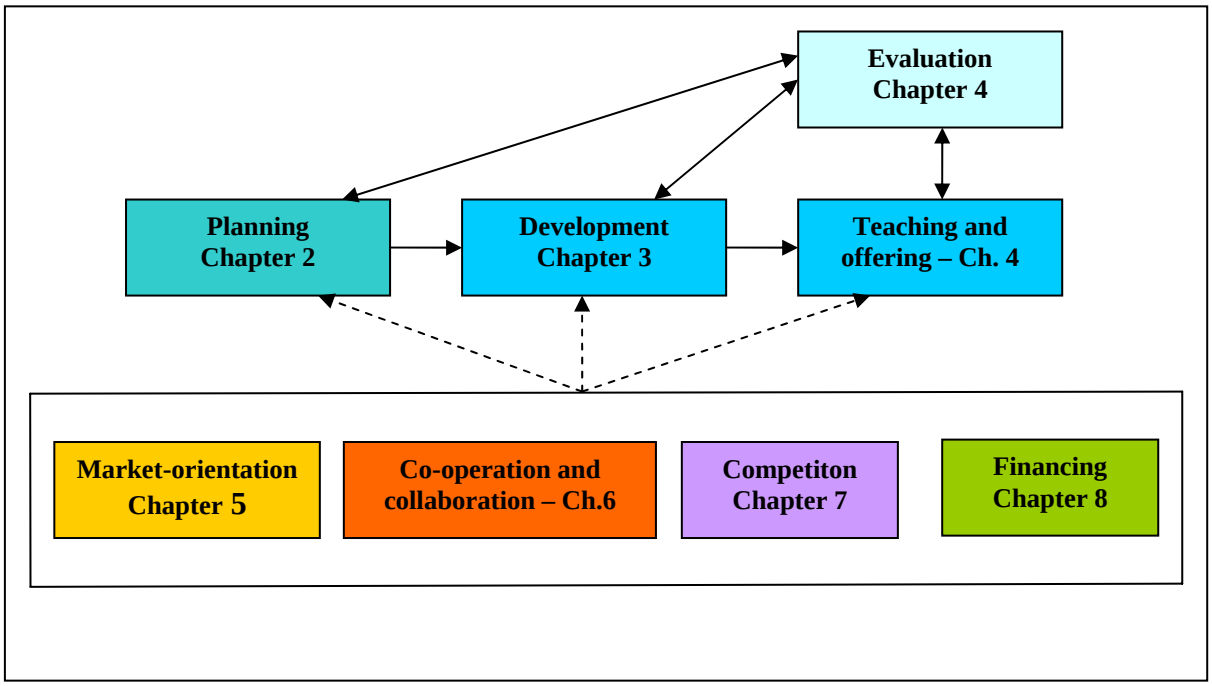


Figure 1, Organization of the report

Chapter 1 – Introduction of the report

Chapter 2 – Planning – in this chapter we look at the upfront planning process before we start the development of the e-learning content and offering. We look at different subjects and activities that should be addressed at this early stage of the e-learning development and offering process.

Chapter 3 – Development – in this chapter we look at the actual development of the e-learning content. We focus on the developers and some models for collaboration and cooperation in the development to become more cost effective in the eyes of the education provider. Further on we focus on learning objects and their characteristics in a cost perspective.

Chapter 4 – Teaching and offering – in this chapter we start by looking at the characteristics of the "typical" e-learning student. We further focus on the importance of motivating the students and how this can be done. We look at e-learning pedagogy and the way it should be implemented. Next up is the teacher and the importance of having the right teacher with the right knowledge ant the right motivation and why this is important if the e-learning are going to be cost effective. We further focus on educational platforms and Learning Management Systems (LMSs). We look at students activities in e-learning and how they are connected to the LMS. After this we focus on the examination process and different kinds of examination and how examination can become more cost effective. We end chapter 4 by looking at evaluation of e-learning courses and the evaluation process in general.

Chapter 5 – Market and market orientation – in this chapter we look at the importance of being market orientated if the EP would like to become cost effective in the eyes of the customer. The EP must set focus on the needs and wants of their customers while monitoring their competitors to stay competitive.

Chapter 6 – Co-operation and collaboration – in this chapter we focus on how co-operation and collaboration can make the e-learning more cost effective for the parties involved. We focus on co-operation and collaboration in the planning, development, offering, administration, support and marketing of e-learning. We also focus on collaboration and quality assurance.

Chapter 7 – Competition – in this chapter we look at internal and external competition related to the EP. We look at threats and opportunities in becoming cost effective when there exists internal competition within the EP and outside in the external market. We focus on the concept of Customer Perceived Value (CPV) and how the EP can become more competitive than its competitors.

Chapter 8 –Budget and financing – in this chapter we present some useful models for budgeting costs. We look at resource allocation and a just model for payment to people who take part in different e-learning activities. We also present some relevant examples from education providers.

In this report we will also try to use some examples making it easier for you to see similarities with your e-learning offering. There are many aspects if you are to offer cost effective e-learning and the positive thing is that even just focusing on a few of the aspects might make your e-learning more cost effective. We would like to recommend that you also read our preliminary report from Work package 7 where we did some literature research in the area of e-learning and costs. In the WP 7 report we presented reasons why students, companies, education providers and the society should get involved with e-learning in a cost effective perspective.

The EP tries to combine external demands with their own interests. The economy is just one of the factors influencing what kind of education an EP offers. The design of the educational system in each country will affect how much the education provider focus on economic factors and how they can become more cost effective. In an open market were there are no subsidies from the society, and the EPs main income is student fees, the EP will have to relate to the market economy. If on the other hand there are hard regulations and all income is governmental subsidies, the economic factors will often be thought of as less important. This can be a fatal mistake.

We are trying to address the economic factors, but in our work of creating cost effective models we have to address many non-economic questions based on political or purely personal opinions and meanings. Depending on the education system in each country the EPs must create their own models. Only very simple general models or models for special cases can be created without looking into the different aspects concerning the individual EP.

It is possible to create a cost effective model for the students or the EPs or the society if we look at them separately. For the EP it is possible to create a simple and accurate economic model concerning the offering of a specific e-learning course. We can look at the actual costs, variable and fixed, and the total income from students and the society (subsidies). A model like this can show us if the economy is sound or if we have to make some changes in the running of the specific course. The challenge is that there are many non-economic factors that in the end will influence if the EPs offering will be cost effective in a wider perspective.

One example of a purely economic and rather straightforward model is the web based model "*Calculating the costs of online courses*"[1] created by Brian M. Morgan. This is a web based model to help schools make cost/income estimations if they consider offering e-learning. In Morgan's model the schools can fill out a web form with all their costs and income related to their courses. The model then calculates the economic result. The positive thing about this model is that you do not forget a lot of costs that are easy to miss. The importance for everyone involved in e-learning (administration) to use this kind of models should be obvious, but still many EPs fail to do so before they get involved with e-learning. A disadvantage with this model is that it is based on the educational conditions in America and it will therefore to some extent not always be applicable for the educational conditions in Europe.

If an education provider is going to offer cost effective e-learning he must know what he is doing. The upfront planning of the course is essential if one is to draw synergies and be effective. Now let us start by looking at the first stage in the process of delivering cost effective e-learning, the Planning. We will look more or less closely at the different aspects in the planning stage and why they are important. We will present general theory and findings and also use some real life examples where that is helpful for better understanding.

[1] http://www.marshall.edu/distance/ Brian M. Morgan, Marshall University, Indiana, USA

1.2 Our own background and acquired experience

The authors of this report are working in Norway and Sweden, both handling education and specially e-learning; TISIP (Norway) and Mid Sweden University (MIUN), dept of Information Technology and Media (ITM). These institutions have collaborated offering Computer Science e-learning courses since 1987. *(Figure 2, QUIS partners)*

TISIP (*1*) is a Norwegian Research Foundation who is offering e-learning in higher education. They have for the last 13 years in collaboration with Sør-Trøndelag University College been a large supplier of e-learning courses with credit points within the area of ICT. TISIP is also a publisher of textbooks within the area of ICT. Tor Atle Hjeltnes is working as a Business Developer at TISIP and as an assistant professor at Sør-Trøndelag University College within the department of informatics and e-learning.

MIUN (*3*) is a network university with campus in 4 different cities in the middle of Sweden. 14 000 students, 1 000 employees, 50 programmes, 500 courses and 40 % of the student on-distance and a motto “flexible learning” sums it up. ITM is the biggest institution at MIUN. Börje Hansson is working as e-learning coordinator at Mid Sweden University, department of Information Technology and Media (MIUN/ITM).

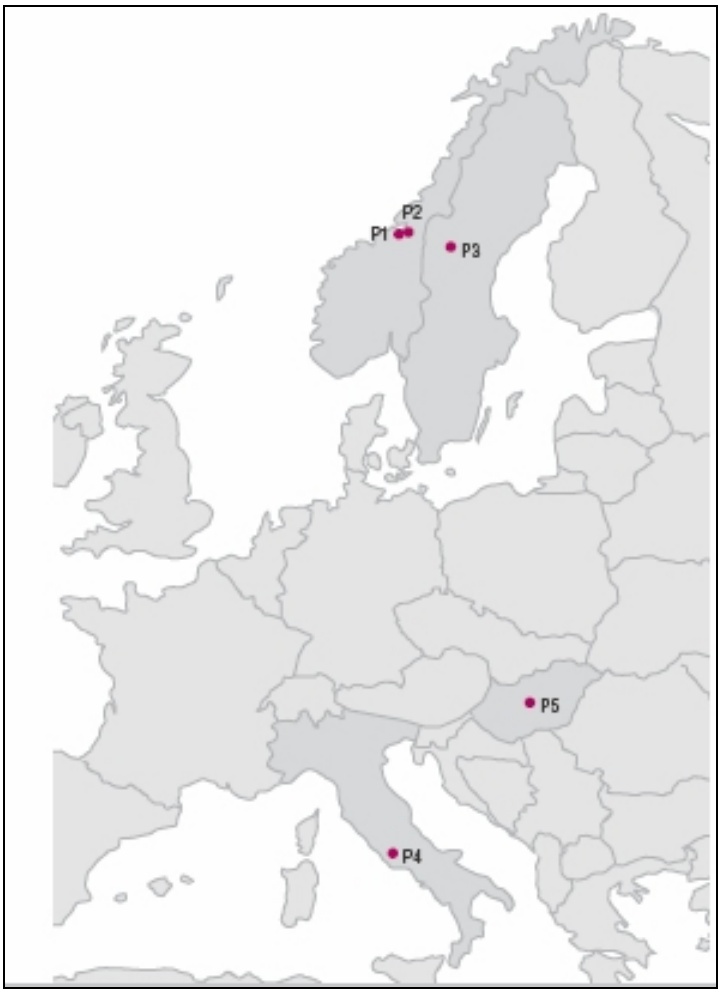


Figure 2, QUIS partners

2. Planning

Developing and offering an e-learning course or an e-learning program is an extensive task. Upfront planning before we start the course development is essential if we want to increase our chances of succeeding and being cost effective. The development of an e-learning course or an e-learning program is in many ways similar with the development of a service or a product in other market areas, and there we have seen that upfront planning and research are key factors if we want to develop a high quality product that will succeed in the market (Robert G. Cooper, Winning with new products). Research has shown that, very often, too little money is spent on upfront activities and planning. Spending to little money on upfront activities and planning will usually result in negative consequences in a cost effective perspective in a longer perspective.

A clear "product" definition and focus on the market and the customers are very important. Market orientation has been a key to success in many business areas and many of the ideas introduced by Robert G. Cooper and Philip Kotler will also be relevant and important when we are developing and offering education in general and e-learning in particular. Let us start by looking at some of the areas and activities in the upfront planning "stage", and we will explain why we have to consider these areas and activities in order to become cost effective.

2.1 Where does the demand come from and why?

As an education provider (EP), private or public, it is important to consider where the educational demand is coming from. It is too simple to think or say that the demand is coming from the students who are following the e-learning courses, and that's it. It is true that the students are following the courses, but the demand could come from someone else, for instance a company or the government. Considering that the demand can come from different sources, it is important to look a bit closer on their specific needs and characteristics. No matter how cost saving and effective our e-learning courses are developed and offered, we will not be cost effective if we are not able to meet the specific educational needs from our potential customer target groups.

A student has many reasons for demanding education, both traditional and through e-learning. The students might want to expand their knowledge base in order to get a better job, do the job they already have better, or it could be part of the student's need for personal development. It is important to map the student needs in order to be able to offer them the education they want. In our first report *QUIS Work Package 7* we looked at reasons why a student would consider following an e-learning course or a program. We will not go further into this now but refer to the WP 7 report.

Companies, organizations and the society in general will also have many reasons for demanding e-learning. Companies typically demand education in order to stay competitive. Knowledge is a key to success in industry and commerce of this decade. The companies might also demand different kinds of education for their employees in order to motivate them or to make sure that they are up to date. Making sure that people stay updated is also one of the reasons why the government has a demand for education. Knowledge is the key to success in our knowledge society. You can read more about reasons for companies and countries (societies) to demand e-learning in the WP 7 report.

In general we can say that no matter where the demand is coming from it is important for the education provider to map it, in order to deliver what their customers want and to stay competitive. Finding out where the demand is coming from is important. If we know that, we also know where in the market we should listen and who we should monitor to find new market opportunities.

2.2 Who is ordering the education

As an educational provider it is important to consider who is ordering the e-learning. By ordering we mean, *who is actually telling the educational provider to deliver an e-learning course or a program*. Sometimes the demand for education and the actual order comes from the same source. This could typically be a big company or the government.

For compulsory education it is usually the government who decide what kind of education the schools should offer. In many countries both public and private schools offer compulsory education ordered by the government. Fulfilling the guidelines set by the government is essential and often also obliged by law if one is to receive educational tasks and funds from the government. One can of course argue that it is the students and not the government who are placing these orders, because without student interest there would not be any students anyway. This is at least partially true when it comes to higher education. The “orders” from the government to the education providers are to a large degree a result of student interests, wishes and demands.

When the actual order for a new educational program or course does not come from the government, it usually comes from a company or an organization representing a number of people who have some special educational needs. There are many private education providers who have specialized in offering tailor-made courses for companies and organizations. These courses are often quite expensive and tailor-made. The high expenses can be defended by the companies ordering the education because of the overall benefits the tailor made course brings the company or the organization.

When we look at the different parties ordering e-learning courses from the education providers we must not forget the individual students. A single student does not have the financial power to pay an EP for the development of a new educational program, but still this does not mean that the students do not have anything to say when it comes to which educational programs that should be developed and which courses that should be offered. The EP should listen to potential students and look at trends to uncover new subject areas where there is a potential market for new courses. The education providers should be market-orientated listening to the government, companies, and individual students.

As a conclusion we can say that if we find out who are actually ordering e-learning courses within our subject area, we can address these actors with our marketing and try to get them into dialogue to get new orders from them. Our goal must be to listen to their demands and try to deliver what they want.

2.3 Who are paying the costs

Where the demand is coming from and who is actually ordering the courses are important, but still every education provider should pay extra attention to whom is actually paying the bill for the student following the e-learning courses offered by the

EP. Sometimes the demand, the actual order and the payment comes from the same source. This is typically true for tailor made courses in larger companies. The situation can be that a company needs to educate their employees in some special tool. If the specific company are the only one who need this specific learning program they might get into contact with an educational provider and order a specific course tailor-made to meet their needs. If this is the case the company usually also is the one who ends up paying the bill for the development of the course and the offering to their employees. This is the case sometimes, but not always. Here is another example.

The government effectuates a new business law which creates a new demand for knowledge. Now there is a demand for knowledge and the next thing that happens is that a consultant company contacts an education provider and asks them to develop an e-learning course in the area of the new business law because this is an area where many people will need some training. When the course is developed there are many individual students who will attend the course and the students themselves are paying their own course fees because they want to stay updated on the latest and most relevant laws in the subject area of business law.

Through these scenarios and examples we can see that there are different interest groups involved, and that the education providers have to listen to more than one actor in the market if they want to stay competitive and get new assignments.

Considering who is actually paying the bill is also important when the education providers are going to decide on their marketing, offering and pricing model. The education provider can not just focus on the students and their needs. The person, company or government who are actually paying the bill must also find their money's worth. It is not enough to satisfy the students if they are not the ones who are paying the bill. If the part paying the bill is not satisfied they will probably find another education provider to fulfil their future educational needs, even if the students are satisfied. There must be a positive perceived value for all the parties involved. This means that the total value must be higher than the total cost.

2.4 Who are developing and delivering the courses

In the planning stage it is important for the EP to look at who is going to develop and deliver the courses. We can divide the education providers into two main groups, the private and the public providers. In the public group most of the e-learning providers are higher education institutions (HEI) like universities and college universities. There are some other public education providers who are offering e-learning courses, but when it comes to offering courses which are not part of a compulsory educational program, most of the providers are HEIs. When the education is part of a compulsory program, the students usually have been forced to attend the courses at campus and e-learning has often not been an option. This kind of compulsory education has traditionally been paid by the government and e-learning has not been a priority so far. Now it looks like this will change to some degree in the future due to the introduction of more and more computers and informatics in schools, also at elementary level. For children growing up today computers are an important part of their lives.

In addition to the public education providers, we have the private ones. Private providers are both developing and delivering e-learning programs and courses. They offer their courses to independent students, companies, organizations and the

government. The private developers and providers differ in size and educational level. Some offer basic courses, which often are tailor-made for a specific company, while others offer courses and educational programs on a higher educational level. Some private "educators" are only developing the courses, while others only offer and deliver courses which have already been developed by others. Both the private and public educational market has a growing target group due to the introduction of e-learning and e-learning solutions. We will look more closely at the process (the stage) of developing and delivering courses later, now we are just focusing on the importance of considering who are going to develop and offer the courses when we are in the planning stage.

In the planning stage this is important because the overall costs of developing an e-learning course will usually be different if we are to do the job ourselves instead of buying or ordering the course form someone else. Another reason for upfront planning before the development is the fact that the education provider might not have the competence or the skills that are required to do the job, and that this will lead to extra development costs. Who are developing the course will also affect the time it takes to develop the course and "time is money". The planning of the development is also very important when the EP is to decide which e-learning solutions he wants implemented. It is a smart thing to start budget the costs in advance of the actual development. You can read more about this in *Chapter 8 Financing*. If the costs of development and offering turn out to be very high, there might not be a market for the actual course even though there was a demand in that market in the first place. The potential customers might be interested in the course, but they might not be willing to pay a very high price. This fact is one of the reasons why upfront market analysis is important.

2.5 (Upfront) Market analysis

Market analysis might not be the first thing we think about when we are planning an e-learning course. This is to some degree understandable, but it does not mean that it is worthless to go thru with a market analysis. Education providers often only focus on the technical and pedagogical aspects of the e-learning course, at least until the course is planned and developed. Focus on the market sometimes only comes as a result of too little students signing up to attend the course and then it is often too late. If we have to make changes after the course has been developed this can be very difficult and expensive and in the worst case impossible due to lack of money or due to learning objects (LO) that can not be edited or modified. We will address learning objects in *Chapter 3.2.*

As we have mentioned earlier it is important that there are some students interested in the course and its content, and that there is someone willing to pay the bill covering all the costs involved in the planning, the development and the offering of the courses. By doing some market analyses we will hopefully get some useful information and answers to important questions, such as:

- Where does the demand come from?
- Who are our potential customers?
- What would they like to learn?
- What are the most important value creating factors and activities for the students and those who are paying the course fee?
- How much are they willing to pay?
- Who are our competitors?
- In what way would they like to learn?

Finding these answers as early as possible will be very important for the EP, at least if the EP is a private one who has to make money in an open market with competition. If the total cost of planning, developing and offering the e-learning courses in total per student is higher than what the "students" on average are willing to pay, we most definitively have a problem. If this turns out to be the case we either have to reduce our costs or give the students (and the other stakeholders) greater value so that they will be willing to pay a higher price to enter the e-learning course.

According to product development theory (Robert G. Cooper[2]) one of the most important success factors is thorough upfront planning and market research. Developing new e-learning courses can be quite similar to developing new industrial products. We need upfront market information if we want to be sure that we are developing and offering a competitive "product" compared to our competitors and in the eyes of our customers.

Market analysis can be expensive but it does not have to be. By using secondary information we can find out many things about our potential customers and our competitors. Our goal must be to find as much relevant information as possible using a small amount of money. One source of useful information can be our former students. Asking them to fill out a questionnaire is an easy and inexpensive way of getting useful information. Another good idea is subscribing for relevant newsletters following the market trends in the EPs subject area. The same is monitoring our competitor's e-learning courses, both when it comes to their different subject areas and the way they are actually offering their courses. Attending one of our competitors' courses as a student can give us useful information on how we can increase the value of our courses. The upfront market analysis will help us to find our target group, and it will help us to maximize the value of the customer, either the customer is a student, a company or the "society". The students will only perceive the e-learning as cost effective if they feel that they are getting value for their money. Through market analysis the EPs can uncover how they can create value for their students.

2.6 Marketing

Deciding which marketing channels and which marketing activities one should use is also partially an upfront activity. If the e-learning courses developed are part of a compulsory educational program we may not have to spend any resources on marketing. If we are a HEI or a private education provider who are trying to sell our courses in the open market, the right kind of marketing could be the key to our survival. We will not focus on marketing in this report, but just state the fact that the cost of marketing can be substantial. The cost of marketing alone can be higher than the cost of planning, developing and offering the e-learning course. This fact makes it important to look at which marketing channels we can use, and the cost of using them.

The average marketing cost per student must be taken into calculation when we are deciding the course fee. If we forget the cost of marketing when we are looking at the cost and the income potential of the course, we might end up offering courses at a price where we lose money. If this again leads us to raise the participant fee, we might not get

[2] Robert G. Cooper. *Winning at new products - Accelerating the Process from Idea to Launch*. 2:e Edition. 1993. ISBN 0-201-56381-9

any students to attend our courses because of the fact that we have to price ourselves out of the market to cover our marketing costs. One way to reduce marketing costs can be to make an alliance with other education providers. Read more about this in chapter 6, Collaboration and co-operation.

2.7 Resources

Before we start developing an e-learning course or an e-learning program it is important to take a look at which resources we will need. Financial resources are one thing, but there are other resources that need to be considered. Even if we have "enough" money we might not have the proper skills or people with the proper motivation to develop a "state of the art" e-learning course. Human resources are very important in both the development and the running of an e-learning program. Developing e-learning material is both a pedagogical and technical challenge, and both the technological and pedagogical staff that earlier has been working with traditional campus education might need some training and new skills before they can do this job. One solution is to outsource some of the tasks involved in the development and offering of the e-learning program.

Mapping the resources needed and available will help us when we are going to estimate the cost of the entire e-learning program. Estimating the cost is essential when we are making our price strategy, and testing that price strategy through upfront market analysis. The more information we have gathered and the more questions we have received an answer to before we start developing the e-learning course, the better are the chances that we can offer and deliver an e-learning course that will be a success both economically and in the eyes of our customers.

The cost of developing and running the e-learning course must be budgeted before we start the course development. You can also read more about this and find some examples in chapter 8, Budget and Financing.

2.8 Financing

As already mentioned it is important to map the need for resources and financing. Whether the e-learning will be financed by state funding or through customer fees this job must be done thoroughly. Planning, developing and offering e-learning can be expensive and therefore we must map all the costs involved. By mapping all the costs before we start the development of the course we will hopefully be more able to see where we can save money and become more cost effective. One of the challenges in mapping all the costs is the fact that some of the costs are direct costs, while others are indirect. Indirect costs can be difficult to map and trace, but they are an important part of the total costs.

Another important factor when it comes to mapping the cost is the difference between fixed and variable costs. In general we can say that the development of an e-learning course often is more expensive than the development of a traditional campus course. This is a challenge because e-learning will often lead to high fixed costs upfront. The positive thing about e-learning courses is that they can potentially be offered to a large number of students at relatively low variable costs if we use the technology in an intelligent way. Here we will refer to our *WP7 Report* and *Chapter 8.2* in this report for more detailed information on fixed and variable costs and their importance.

2.9 Customer value

Trying to offer the highest **Customer Perceived Value** (CPV) possible is very important if we are to succeed with our e-learning offering. Trying to find the different customer value creators and customer costs is something that should be done before we start the development of the e-learning course. Read more about this in *Chapter 5 and chapter 7.2*.

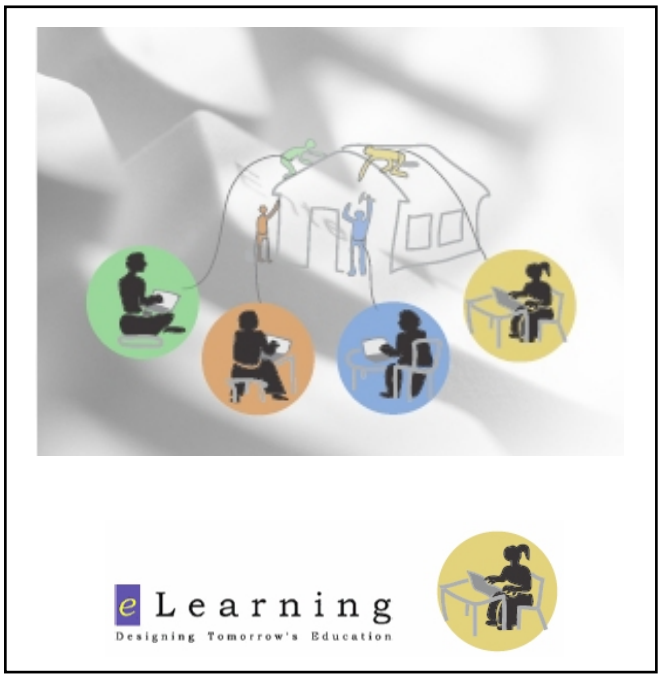
2.10 Conclusion

Upfront planning before we develop and offer the e-learning course is very important. Thru the planning stage we should get some useful information about the market, our customers and internal resources. This information will help us become aware of critical areas and tasks, involved in developing and offering e-learning, and how they will affect the future income and cost.

It is not possible to get all the answers at this early stage of the development process, but still it will be useful. In general we can say that too little effort is being made in upfront planning activities. All theory shows that it is cheaper to get things right the first time, instead of having to do large adjustments later on in the upcoming stages and activities.

It can be a smart thing to make a document containing all the relevant information we can find upfront. If there are answers that we can not get upfront because of too high costs or uncertain information we should be aware of the questions and look for the correct answers in the following stages.

Focus on customer satisfaction, either the customer are a student, a company or the society, is a key to success and a key to becoming cost effective. Increased costs on making the customer satisfied must result in higher income potential thru increased prices or a higher number of e-learning students. If this is not the case we will not be able to become more cost effective.



3. Development

We have now looked at some of the critical aspects and activities in the planning stage. The next stage is the development of the actual course and its content. We will look at important aspects regarding who should be the developers and the importance of how much and what kind of content we are developing. Being able to understand and manage the content development is crucial if we would like to become cost effective.

3.1 Who are developing the e-learning content

Developing course material to be used in e-learning can be both expensive and challenging. The cost of development is often closely linked to the kind of e-learning media and tools the education provider prefers. Producing video and animations are usually more expensive than producing plain text. The choice of which media to use must be taken in both a market, economic, technical and pedagogic perspective. This is a complex and difficult choice. When the choice of media is made the education provider should consider the possibility of reducing the development costs by working together with another education provider or a content developer. One of the reasons why this is a good idea is the fact that most of the companies who succeed with their business, focus on activities within their own core competencies[3]. For a traditional education provider who has offered teaching through a physical classroom environment, a shift to offering education thru e-learning will be a challenge. One of the challenges is to develop digital learning material in a way that is pedagogic and cost effective. Let us look at the different possibilities the EP can choose between.

The educational provider can acquire all the e-learning competence they need and develop the e-learning material themselves. If the EP has some prior knowledge of how to develop digital learning material this could be a possibility. One problem is the fact that there are many different media that can be used in e-learning and that providing every employee who is responsible for an e-learning course with the necessary knowledge is likely to be very expensive. One solution can be that the EP chooses one employee who specializes in each of the electronic medias used and than he will get the job of helping the others with their course development. We are talking about local cooperation within the education provider. A strategy like this must of course be accepted by the employees before it is implemented. The positive thing about this strategy is the fact that all the necessary knowledge about developing course material will exist within the walls of the education provider, and as time goes by the competence in the different pedagogical and technical areas will be transferred among the employees. It can be a smart economic investment in the long run to educate the employees in the relevant e-learning technology and pedagogy. The negative thing about this strategy is the fact that many employees will have to use very much time and resources to learn e-learning technology, which they might not have an interest in. Another negative scenario is that what they learn soon can be "outdated" due to the fast development in these new technologies.

Development through collaboration and use of a professional developer. Instead of the education provider acquiring all the necessary knowledge about the development of an e-learning course they can hire a professional e-learning content developer to

[3] Robert G. Cooper. *Doing it right - winning with new products.* Ivey Business Journal. July/August 2000

collaborate with them or to do the entire development work for them. If they hire a professional who will collaborate closely with them in the development of a course, one positive synergy might be that the employees at the education provider learn some new technological skills that will reduce the amount of help they will need from the specialist in the future. This can be a very important long term cost reducing factor.

Most course material must be updated after some time, and if the course material is produced in some advanced media which is not within the competence of the employees at the education provider they are likely to face substantial costs when they would like to update the course material. If the EP should update the content they must either hire the professional developer again to do the job, or they must throw away the "old" material and start all over again. This can be expensive and must be taken into consideration before the education provider starts the course development. It is important that the EPs also have a long term perspective when they are looking at costs, or else they risk being "cost effective" only for a short period before the costs backfires. E-learning traditionally have high fixed development costs compared with traditional class room education, but this does not mean that it can not be even more cost effective in a long term perspective.

Buy already developed course material from another education provider or a professional content provider. To buy the learning content from another education provider does not sound very cost effective, but if buying material is *part of a cooperation strategy*, where the different education providers are buying from each other this can turn out to be very cost effective. We will look more closely at this possibility later in *Chapter 6*.

Buying complete e-learning course material from a content provider has until recently not been a popular solution, but with the introduction of learning objects things might change. One does not necessarily have to by all the course material from the professional content supplier, just the parts that are cheaper to buy than to develop them selves. The education provider can for example produce text documents by themselves and just buy content developed in advanced media which is not part of the EP's knowledge base. This can be cost saving. Let us look some more at content development and Learning Objects (LO)

3.2 Learning Objects

With the introduction of Computer Based Learning (CBL) and e-learning, the term Learning Objects (LO) has become a part of the educational vocabulary in education. Simply said LOs are small chunks of learning material that have been digitalized. LOs can be defined in many ways and on the web-pages of Wikipedia[4] we find the following definitions of Learning Objects:

"Any entity, digital or non-digital, that may be used for learning, education or training"

"Any digital resource that can be reused to support learning"

"Web-based interactive chunks of e-learning designed to explain a stand-alone learning objective"

[4] www.wikipedia.org December 2006

From the definitions we can see that there are different views of what an LO is, but this is not a problem for our work in this report. In this report we would like to look at the LOs and try to say something about how they could and should be developed and used to make e-learning more cost effective. To do this we must look closer at the media type, the size, the context, the content, the cost, the reusability, the metadata and the storage of the LOs.

The concept behind the LOs is that we break down the learning material into smaller units of learning. This has several potential advantages when it comes to cost saving and increased effectiveness. We will summarize the benefits after we have studied the LOs and their nature more closely.

3.2.1 Different types of media

When we are developing digital LOs we have to decide what kind of media we would like to use. Text, audio, video and animations are some of the different media types that can be used to produce high quality LOs for e-learning. In traditional campus education the “learning objects” have been the textbooks and the teachers. Talking about learning objects in this report we mean digital learning objects.

- Text - The easiest way to produce digital learning objects is usually to produce digital text files. The size of a learning object is in our view much smaller than a text book, but large enough to contribute to actual learning.

- Audio is another media that can be used to produce LOs. Audio files can be used by themselves or they can be put together with some text or linked with a PowerPoint presentation, and this can result in very learning effective LOs for the student. A teacher could record his lectures digitally and then make the audio file available to the students.

- Video is a media which can be used to produce learning objects. Producing high quality video files can be a challenge, and it is often quite expensive. This does not have to be the case, and filming campus lectures and making them available for downloading or direct streaming by the Internet can be very learning effective and not too costly. A few years ago downloading video files was a technical and infrastructural problem due to Internet lines with low capacity. This is still a problem in some parts of Europe even today, but the infrastructure is getting better and better every day.

- Animations can be very effective learning objects. The challenge with animations is that it can be very difficult to produce them. One of the interesting things about making animated learning objects is the fact that children growing up nowadays are very familiar with animations from their computer games and therefore this is a type of media that they relate well to.

As we can see there are different kinds of media which can be used when we are producing learning objects. We will now look a bit closer at some of the other aspects concerning LOs and we will summarize later.

3.2.2 Size/granularity, content and context

Granularity is a measure of the size of the components (wikipedia.org) or the learning objects. The size of the LOs is important when it comes to the price of development, the potential of reusability and the context of the LO. It might be cheaper to develop a small number of large LOs in an e-learning course instead of a large number of small ones, but this might not be a smart economic decision in the long run. Large learning objects will usually be less reusable than small ones. The reason for this is the fact that large LOs usually are not context free and that they have a tendency to end up being tailor made for just one course, leaving them unusable as learning objects in other courses, at least without being rewritten.

Small LOs are easier to make context free and therefore they usually are better fitted for reuse in other "similar" courses. Reusability can be an important cost saving factor in e-learning and it can make e-learning more cost effective because the development costs can potentially be divided over several courses and a large number of students.

Some will argue that it is not possible to make good courses using context free LOs. This can be true if we only use context free LOs. The way to go is to develop some context free learning objects where this is possible and then fill in the context around the LOs afterwards. This makes sense in courses and within subject areas where there is a possibility that the learning objects can be reused, but this is not always the case.

3.2.3 Cost

The cost of producing the LOs can differ a lot depending on which type of media is being used and on who is developing them. Hiring experts can be expensive but if the result is much better than what the education providers can produce them selves this might justify the additional costs. If the improved quality leads to much higher customer value, this again can lead to a much larger number of students. This again might lead to a relatively much larger income which is positive in a long term economic perspective.

In the table below (*Figure 3, Different media types*) we have tried to present some key information on LOs that will be helpful when EPs are to decide which media they shall use and how much it will cost. We have tried to gather the information related to the different kinds of LOs. As we can see there are differences between the LOs and it is a challenge to know when to use the different types. Let us summarize the table and make some recommendations about when we should use the different types of LOs.

Media type	Cost	Context free	Reusable	Update	Network capacity	Expert help
Text	Low	Yes/no	Yes/no	Yes	Low	No
Audio	Medium	Yes/no	Rarely	No	Medium	Yes/no
Video examples	High	Yes/no	Often	No	High	Yes
Video lectures	Medium	Rarely	Rarely	No	High	Yes/no
Animation	High	Yes/no	Yes/no	No/Yes	High/medium	Yes
Electronic test (MC)	Low/medium	No	Yes/no	Yes	Low	No (sometimes)

Figure 3, Different media types

Text – Text based LOs are relatively easy to produce and they can be produced at a low cost. A learning object can typically be a small unit of text together with some pictures. The LO can be accessed by the students directly on their computers or downloaded and printed on paper. The teachers are able to produce the text LOs them selves without any help from an experts and this can be cost saving. It is possible to modify the text LOs, because this is just the simple matter of editing a text file. If the LO is not to extensive it should be possible to make them context free in many subject areas. A text-based LO will be reusable if the content is relevant and the context is right. The text LOs can be downloaded by students who have little Internet capacity. One potential negative thing about text-based LOs is the fact that they do not take advantage of all the new technologies and possibilities within modern e-learning. E-learning based on text LOs can appear to be similar with letter correspondence courses used some decades ago. This does not have to be the case because one can mix text-based LOs with other kinds of LOs to make the e-learning more interesting and modern. One should consider the target group and their expectations before one decide on which LOs to produce. Producing only text-based LOs to save money can be fatal if the students do not find them appealing and therefore do not sign up for the course. In general we can say that text-based LOs are most appealing to students who already have some higher education, because they are familiar with text-based education from their prior studies.

Audio – Audio based LOs can be easy to produce. The teacher can produce a script and record it. Another solution is to record audio from a lecture and make it available for downloading by the students. This job can be done without help from an expert, but it is important that the sound quality is the best. The costs can be kept at a reasonable level if the teacher is able to produce a script within a reasonable amount of time. A problem with audio-based LOs is that they can not easily be updated. Editing an audio file is not an easy thing to do. Usually one will have to produce a new audio file from scratch. This fact is important to consider when we are deciding on the length of the audio LOs. If we are operating within a subject area where there will be need for constant changes it will be smart to produce small LOs. This will reduce the cost of updating some of the LOs if this must be done later on. Another thing that one should consider is the type of media file that we are producing. Converting the audio file into different relevant audio files is a good idea. Podcasting is the latest version of making lectures available digitally in an audio format. With Podcasting the student can download the audio file in mp3-format to his or her mp3-player (e.g. iPod) and then for example listen to the lectures while cleaning the house or driving the car. The positive thing about audio LOs is that the students can follow the e-learning course asynchronously. This means that the EP and the student do not have to be online at a certain time if the lecture recorded will be made available to the student through downloading from the Internet. To download audio files the student need a medium fast Internet connection if this should not take too much time. Audio files are a good supplement to text based LOs.

Video – We have divided video into video examples and video lectures in the table. The reason is obvious if we look at their different characteristics.

Video lectures can be made in several ways and the price of producing them can be relatively moderate if the EP has the right equipment and a studio or a classroom for this kind of activities. The teacher will usually need some help with the actual filming of the lectures, and help with editing if this is necessary. If the lectures are film from classroom lectures the necessary preparation from the teacher can be rather small, if an "expert" takes care of the technical activities (light, sound, angles). The investment in video equipment will be a one time investment and it can usually be defended if the equipment will be used for production of video LOs in several courses.

The video lectures are usually within a context and they can not be edited. Because of the context, video lectures can usually not be reused in other courses in similar subject areas. The ideal length of a video lecture will vary, but if the subject area is in rapid change it is a good idea to reduce the length with the same argument as for audio LOs and editing. One challenge with video is the fact that it takes a lot of Internet capacity to download them in a reasonable amount of time. Video lectures are a good supplement to other LOs.

Video examples are another way of presenting learning material. Video examples are usually made to pinpoint or set focus on certain parts of the subject in matter. Producing video examples are usually quite expensive because it takes a lot of preparation from the teacher and the technical staff. There must be a script and the scene must be set in a way that is relevant. We can compare this with the job of producing a movie. The video examples are usually not to long and they can not be edited. Because of the costs involved it is a good idea to produce video examples in subject areas that can be reused to reduce the cost per student. If there are a lot of students in one course and the video

example will increase the learning capabilities of the students a lot this can also defend the high cost of producing them. With video examples the students Internet capacity can be a problem. In the last years there have come some new tools that make it much easier and cheaper for EPs to produce video lectures and video examples by using screen capture video functions combined with audio comments from the teacher. This can be a good alternative if we want to make an instructive video based on things happing on the screen of the computer.

Animations are a new kind of learning objects. They are usually quite expensive to produce because of the need of a script and the expensive use of programming. There must be an expert involved and if the teacher in charge of the course does not have these expert skills there must be close cooperation between the expert hired to do the job and the teacher. This kind of cooperation is often very time-consuming and it therefore takes a lot of resources. Because of the cost the teacher should try to make the LO reusable in several courses. It is possible to update the animations but this can be very expensive. One very positive thing about animations is that they can be made interactive. The student can do something and get a response. The more interactive the animations must be, the more it usually costs to develop them. Downloading animations can take a lot of Internet capacity but this must not be the case if we use the right tools for the job. Animations are usually a supplement to other LOs in a course. As we mentioned earlier it is interesting to notice that animations, thru video games, are a familiar way of learning for children growing up today.

Electronic tests (multiple choice - MC) are the way of the future in e-learning and they can be much cost saving made the right way. Producing good questions in a pedagogic way can be a challenge, but done in a good way, within relevant subject areas, they can be reusable and very time and cost saving for the teacher and the EP. Today we se that there are a lot of research going on to develop tools for better ways of testing and evaluating students thru electronic tests. The technical challenges of producing MC are not too big, but the pedagogical aspects can be difficult. In general there are many challenges with electronic tests but we see progress in this area. We will not go into detail, but recommend you to do some search on the Internet to find more relevant information if you think that this is interesting for you and your e-learning offering.

3.2.4 Standards, metadata and repository

With the introduction of LOs and LMSs in e-learning one has seen that there is a need for some common standards. If the LOs are going to be reused in different LMS the LOs and the LMS must support the same standards. The development of standards has been going on for several years both in Europe and in America. The most recognized standard today is the IMS SCORM standard. We will not go into this standard in this report but we will invite you to take a look at the topic map we have developed in WP4 in the QUIS-project http://www2.tisip.no/QUIS/index.php. Here you will find all the information you will need and a list of relevant references.

Metadata is data about the data. SCORM is a standard of how to write metadata and which metadata to use when you are describing a LO. The metadata is used to describe the LO in a good way making it possible to search for relevant LOs in the repositories where the LOs are stored. The repository is a database where we can store our LOs making it easier to search for them.

In a cost perspective we increase the chances of selling and reusing the LOs if it is possible for people inside and outside the EP to search for relevant LOs. If the LOs are designed to be “stand-alone” LOs, it could be possible to sell the LOs directly to the student from the repository with out having to implement them in a LMS or combining the LO with other LOs.

Metadata and standards can be difficult to relate to if one does not have any experiences with this in the past, but it is necessary to look into this if one would like to develop LOs that can be reused in different courses and in different LMS.

3.3 Conclusion

The process of developing the e-learning course and content is not a small job. There are many things that the EP must consider. Two important questions are who should develop the content and what kind of content should be developed. The total cost of development depends a lot on the choices we make.

Investing in high quality content and different overlapping LOs will result in satisfied customers, but at what price. If the teachers do not have the right knowledge and skills when it comes to e-learning this can be very expensive. To hire people to do the development is one solution, but this is not always a smart choice when it comes to the total costs involved.

The EP must look at the income potential and try to find the optimal solution between investment in different kinds of developers and different kinds of LOs, and choose the solutions which have the best income/cost ratio, because this will be the most cost effective solution in the eyes of the EP.

There is a trend that students of today like to be entertained more than just to be educated. If we develop a course built up on LOs in a way so that the students are being “edutained” at a reasonable price and with a good grade, the students will perceive the e-learning as cost effective. This might not be true for all students but for many of them.

Read more about the economic aspects of the content development in *Chapter 8*, there we present a payment model for teachers and other developers involved with e-learning.

4. Teaching and Offering

After the planning and the development stage we have now come to the stage of teaching and offering. In this chapter we will discuss a variety of questions related to the realization of education and the way the EP offer it to their students. We will try to focus on factors influencing the economy if we want to become cost effective. We will look some more at: Who are the students? What are their motives for studying? How the EP organizes their education related to the flexibility offered in e-learning. We will also look at different educational platforms (Learning Management System – LMS) and the students activities in the LMS. In the end of the chapter we will discuss examination and the importance of course evaluation.

In order to reduce the number of students who leave school and make sure that the students get good study results, it is important to know the target group of students in the course and adapt the pedagogy and learning activities to the needs of the target groups. This will hopefully result in satisfied students who will spread the word and help the EP get new students in the future. In an economic perspective it is important to reduce the number of dropouts, while being able to recruit more new students for future e-learning courses. We will look more at this in *Chapter 4.2*.

It is possible to organize e-learning in different ways, with more or less support and more or less flexibility for both the students and the teachers. If this is done in the right way there might be good economy to gain thru happier students and more effective teachers. Thru e-learning we can increase flexibility concerning time, place and sometimes the learning method and this can help us in becoming more cost effective.

A good web-based system or an LMS is the foundation for the e-learning and it has to be chosen carefully with regard to the specific needs in our e-learning courses. Different LMSs have different functionality to offer both teachers and students. Interaction between the student and the teacher but also between the students is a determining factor for the students learning process. The LMS must support the relevant student activities or else it can lead to dissatisfied student and lower efficiency. We focus on the LMS in *Chapter 4.7*.

The examination can be more than just the end of a course; it can be an important part of the actual learning process, a quality check for the EP and a proof for the students of their knowledge. Both the examination and the course evaluation are an important part of the EPs quality assurance system and it has impact on the EPs chances of becoming cost effective.

Lets look some more into each of the subjects that we have introduced here.

4.1 Who are the e-learning students?

There are a number of economic factors depending on our knowledge about who our students really are. If these factors are not addressed in a proper way it can increase the costs for the students, the EP and the society.

Cost effective and efficient e-learning should:

- Address the students in the primary target group, who will benefit from the e-learning in a personal and/or a professional way. By doing this the EP will not waste the students, the societies and the EPs resources.
- Use pedagogy suitable for the relevant e-learning situation and the target group. E-learning based on the latest technology and with relevant content can still be a disaster if the pedagogy is not suited for the relevant target group.
- Be available through the right kind of media and learning objects, text, audio, video, etc. The media should support the learning activities and contribute to increased student value and increased income for the EP.

If we are not able to meet these demands this might lead to; lower throughput, dissatisfied students and teachers questioning their educational skills. This will again affect the economy negatively in a number of ways for the EP, the student and the society. To meet the demands of the students and be able to offer a cost effective solution we must know our e-learning students. The students have to be investigated both as individuals and as being member of groups with different demands. There might be substantial differences between on-campus and e-learning students. The e-learning students are often studying part time something that might explain some of the differences we see when they are compared to traditional on campus students. A number of reports[5] show that e-learning students are a more heterogeneous group regarding

- **Age.** There are more elder students following e-learning courses and there is often more variation in age. The students in the target group are typically in the age between 20 to 60+ years. This is something that the EP must have in mind when they are offering e-learning.
- **Gender.** Women appreciate the flexibility in e-learning courses and therefore they are overrepresented in e-learning courses *(Mårald och Westerberg[6])*, this is especially the case in technical courses compared with traditional campus courses.
- **Life situation**. On campus full time students will often relate and spend a large part of their life and their spare time to the campus education and the after hour student activities. E-learning students are often part time students and they are often in a different life situation with jobs and families that take up much of their time. It is important that the EP offer their e-learning courses so that they can be combined with other demanding activities outside the schools sphere.
- **Experience with higher education, exam**. E-learning students are often well educated and they are following e-learning courses as part of their further education. The fact that they have prior education will affect their view on e-

[5] e.g. Gunilla Mårald och Pernilla Westerberg. Vilka var de? Nätuniversitetets studenter ht 2003. (USER 2005). See WP 7

[6] www.ucer.umu.se/PDF/arbetsrapporter/Natunivarbetsrapporter/NätunivGM3feb 05.pdf

earning and further education. It is important to remember that this is not always the case and the e-learning offering must be suited for both newcomers and experienced students.

- **Study technique/learning style**. Students with a background education may be familiar with different learning styles and techniques unlike those we use in e-learning and therefore it is important that the e-learning offering is explanatory and understandable. Younger students are often more receptive when it comes to new technology and new learning styles.
- **Their motives**. Among e-learning students the motives for following a course might not be a good grade on the final exam. E-learning students are often following the course to get new relevant knowledge, and not another diploma to hang on the wall. This is not always the case, but the EP should have this in mind when they are offering their courses. If the EPs economic model only generates income if the students pass their exam, the EP should offer the course in a way so that the students will do just that. The students motives for attending a course will also influence the EPs possibilities to motivate the students.

In (*Figure 4 Differences between e-learning and on-campus students*) we can see the results from one Swedish report[7] looking at the differences between e-learning and on campus students at one Swedish university.

	E-learning	*On-campus*
Age 30 or younger	*50 %*	*78 %*
Women	*24 %*	*10 %*
Former higher education(more than 1 year)	*50 %*	*3 %*
Working full time	*30 %*	*0 %*

Figure 4, Differences between e-learning and on-campus students

If the EP in their e-learning offering is able to adjust to the characteristics of their students they will increase the chances of succeeding. If the students have signed on to an e-learning course and the EP has not adjusted their offering to the needs and demands of their students, the students might drop out or finish the course with little knowledge. This can result in increased costs and less income for the EP, meaning the e-learning is not cost effective. Let us look at some of the costs that are related to unsatisfactory e-learning offerings, resulting in student drop outs.

Student costs: The students have both direct costs e.g. student fees, literature, computers and indirect costs e.g. lost salary and lost career opportunities. The students might have taken up loans to finance the studies, money that they will have to pay back even if they are not finishing their education. Another important cost factor is the time laid down in unsuccessful studies that could have been spent elsewhere. Another

[7] Börje Hansson och Larsa Nicklasson. (2006). *Distansstudenter vid Mittuniversitetet/Institutionen för Informationsteknologi och medier. Vilka är de, varför avslutar många inte sina kurser och vad kan vi göra åt det?* (Uppsala Universitet 2006)

potential problem when students drop out is the fact that they might loose confidence in them selves and therefore will not take part in more education in the future.
Society costs: The money spent on different scholarship and funding arrangement will be lost if the students drop out. The society will not get access to new valuable knowledge, creating tax income and wealth to the society. The society will not get full return on their money spent on subsidising the EP and the students if they drop out. If the students loose their motivation they might even end up being unemployed, costing the society enormous amounts of money.

EP costs: The EP will not get income from their students. The drop outs will not pay and new students will not apply because of the fact that former students are unsatisfied. If students drop out many EPs will loose money since the government will not subsidise the students who have not finished their exam. An indirect cost if many students fail is that the teacher might be unsatisfied and unmotivated.

We can see that there are many costs that can arise if we do not succeed with our e-learning offering, and to succeed with this we will have to adjust the offering to the student needs.

The question about who the students are is strangely enough seldom thoroughly investigated, neither before the course is created, nor later on when it is running. Sometimes some research has been done but unfortunately the EPs seldom adjust and adapt to the actual needs of their student target group. The EP should adapt their offering in terms of pedagogy, technology, delivery methods and examination methods (we will discuss this in following chapters). With a fairly homogenous student group it is easier to adapt the e-learning offering than if the students have varying background.

The EP should get to know their students and their target groups and adjust their offering to their needs to reduce the costs. The EPs should also make an effort to inform the students what they are actually offering so that the students can make a smart decision on future education. This will also reduce the number of drop outs.

4.2 Motivating the students

Student motivation is a key to success when we are offering e-learning. If the EP is able to keep the students motivated there are smaller chances that many students will drop out. Motivated students are usually on top of the learning situation something that can be a potential advantage in more than one way. Motivated students can provide accurate feedback to the EP when it comes to the quality of the content and the offering of the e-learning. Motivated students will often be learning effective and get good results, something that contributes to make the EP more cost effective.

E-learning students are often a heterogeneous group of students and the EP communicates with them thru electronic media. This lack of face to face communication can be a barrier when we are trying to uncover how we shall motivate our students to make them satisfied and help them get good results.

In order to motivate e-learning students in the actual learning process the EP should focus on the content, the information and the communication.

Content - Relevant and up to date content are very important if we want to keep the students motivated. The content must be easy available and flawless. In e-learning there might be less student – teacher communication and therefore the digital learning objects and the students opinion of them will have great impact on the students overall impression of the course. A good teacher in a classroom situation can be very motivating for the students. In e-learning the content may have the "role of the teacher" and therefore it must be adjusted to the target groups needs and wants to keep the students motivated.

Information and communication – Enough and relevant information are very important to motivate the students. If the students at all times know how the e-learning will be offered and what they can expect they will be more satisfied. The students must not be kept in the dark. If the students know the progress of the e-learning course before they start they will most likely be more motivated to follow the planed progress them selves. In e-learning the students are often living far away from the EP and therefore all relevant information must be easy available on the web.

Good communication between the students and their teachers are very important (if this is a part of the e-learning offering). The teacher plays an important role in motivating the students in e-learning. Positive and relevant feedback on exercises and friendly e-mails asking the students if they are on the right track can be very motivating. If the students try to contact the teacher or any other person involved with the e-learning offering, it is important that they get response as quickly as possible. There must be formalized system so that the students can communicate and get feedback within a certain time limit. If the students are sending in a question or an exercise and get no feedback, this can turn out to be very negative for their motivation.

Student motivation is of course closely linked to many of the aspects that we discuss in this report. Student satisfaction and "customer value" will of course affect the motivation of the student. Our main goal with this chapter is to say that the EP should do an extra effort just to motivate the students to follow the course and do a good job. If the students follow the intended progress they will most likely manage the course and therefore also find the course more interesting and motivating. This is a positive self enhancing circle.

4.3 E-learning pedagogy

Let us start with a quotation:

> *Only a few are born… with pedagogic skills. Most have to be taught the technique, the methods as well as the right temperament.*
>
> Archibald Douglas, 1883-1961, Lieutenant General

In education, pedagogy is very important. Most teachers have some kind of pedagogic education. To be able to discuss pedagogic tools we have to have a view on learning and knowledge. *Gunn Imsen*[8]describes five different views on learning:

1. Learning as increased knowledge. Knowledge is something outside the student that you can fill them with, as if they where vessels.
2. Learning as memorizing. The student has to memorize facts and later on be able to recall them.
3. Learning as acquiring usable knowledge. The knowledge is detached from the education and has to be valuable and usable in real life.
4. Learning as an abstraction of information. Learning is processing new information and combining it into new knowledge.
5. Learning as an interpretation of the reality for increased understanding. The context is the student's own life.

If the learning is to be effective it must: increase the student's knowledge, affect or change the student in some way and be useful to the student. The learning has to be an active and social process where the students' are not only receivers of knowledge, but instead take part in creating their own knowledge by sharing and discussing it with others. It is important to realise that every aspect of the e-learning course, even the examination, are vital in the learning process.

The ongoing development in ICT (Information and Communication Technology) and e-learning can lead to new learning opportunities. By offering tools for interactivity the students can be "forced" to be more active and social, communicating with teachers and other students. This does not mean that the students automatically will be more interactive or social when they take part in e-learning. It is up to the teacher and the EP to offer the students activities in a way that is including and social for the students, based up on an underlying pedagogic idea. To do this the teacher must have relevant knowledge and skills within pedagogy suitable for e-learning. There may be large differences between the pedagogy used in e-learning and traditional campus education.

The greatest possible advantage when we are offering e-learning is that:

- The learning material can be offered in different ways suitable for students with different learning styles e.g. text, audio, video, etc. (But it still has to have an underlying pedagogic idea to be activating.)
- The teacher can be able to have more contact with each student through the use of individual exercises with personal feedback and online discussions.

These possibilities have to be used in a way that is relevant in the actual course and to the students in the specific target group.

[8] Gunn Imsen [1993] som ut fra en svensk intervjuundersøkelse [Säljø 1979]

Without going deep into discussions about different sorts of intelligence, learning styles and the latest pedagogic technique, we can state that the students are individuals with different; reasons for studying, background and possibilities, and they should be treated as individuals. To be able to able to do this the teacher must be up to date on e-learning technology and pedagogy, or else the teacher will have to find someone to cooperate with in the e-learning development and offering. We will now look some more at the teachers and how they fit into the teaching and offering of e-learning.

4.4 The teacher

We will now look some more at the teacher and they way they play an important role in the teaching and offering of e-learning. We will also look at some other important aspects concerning the teacher if we want to make e-learning more cost effective.

4.4.1 Knowledge and skills

The importance of having teachers with the relevant knowledge and skills to develop and offer e-learning has been mentioned earlier, but we would like to emphasize it. A teacher with the right knowledge and skills will be able to contribute in making the e-learning more cost effective. There are several reasons why this is the case.

When the teachers have the right skills they will more likely be able to do things right the first time. This means that they will be able to take part in the planning and developing of the e-learning course and that they will be able to offer it to the students in a good way, taking advantage of the possibilities in the e-learning technology. Being able to use the technology and being able to see the different possibilities and opportunities can be cost-effective for the EP and learning-effective for the student. Doing things right the first time will also result in satisfied customers who get what they expect in a professional and good way. If the customers are satisfied it will usually result in loyal customers and a good reputation in the market, something that will attract new customers.

Every EP should map the e-learning skills of all their potential teachers. Most teachers who are not familiar with e-learning will need some training before they can take part in the planning, developing and offering of e-learning. How much training that will be needed will differ among the teachers due to their background and the way that the EP organize their e-learning activities, for example which kind of learning objects they would like to offer. The EP should do some calculations of the cost of upgrading the teachers' skills compared with the value of having teachers with up to date e-learning skills. Like we have mentioned earlier not all teachers will need skills and knowledge of how to develop e-learning material, just knowledge of how to offer and administer an e-learning course. Anyway the EP must consider this thoroughly. When the EP is considering this they should also look at the teachers' motivation for taking part in the e-learning offering.

4.4.2 Teacher motivation

Having motivated teachers is an important key to success in all kinds of teaching and offering, and e-learning is no exception. Motivated teachers will in most cases be better teachers. This implies that teachers who are motivated for doing their job will develop and offer better courses and they will more likely be better able at motivating and taking

care of their students in a better way. This again will result in higher student satisfaction and higher customer value.

In order to get motivated teachers there are several efforts that can be done by the EP. The first and most important factor is the one we have mentioned above, making sure that the teachers have the proper knowledge and skills. People are often afraid of things that are new or unknown to them. Change can be a scary thing and people are reluctant of being scared. When teachers get the right training and knowledge they will most likely be more motivated to take part in e-learning. If an EP would like their teachers to focus on developing and offering cost effective e-learning the EP must inform their teachers about this, and explain to them in which way they can contribute to this. Reading this report can be a start.

Another way of motivating the teachers to take part in e-learning and making it more cost-effective is to be sure that the teachers are rewarded in a proper way. The reward can be in form of money or status. Lets us explain this a bit closer. In earlier years e-learning has been regarded as a less worthy type of education in many HEI, and this is still the case in many parts of Europe. One of the reasons why this has been the case is the fact that e-learning has only been seen as an advanced type of letter correspondence courses that anyone could take part in, regardless of prior knowledge. Now in the year of 2006 we are glad to see that this trend is changing, with e-learning being viewed as equal to traditional campus education when it comes to status. It is very important that the EPs signal that e-learning is just as important to the EP as the campus education. In this way the teachers will not be reluctant to take on and be involved in e-learning, because it is seen as inferior to campus education. It is important that the EP involves some of its best teachers in e-learning, setting a good example to the other teachers who might be reluctant to join because of the second-hand rating.

As a summary we can say that teachers will be motivated if they have the right knowledge and they get recognized for the job they are doing (satisfied students, status, and money). This is also apt for other kinds of education, not just e-learning. In chapter 8.4 we present a model for teacher payment in e-learning.

4.4.3 Work site and working hours

Teachers like many other work groups have traditionally been working full hours in the daytime at their work site (typical at campus for most teachers). This working routine has not been questioned earlier, but with the introduction of e-learning courses offered to people who take part in further education there might be some other solutions that can be more flexible for the teacher, the EP, and maybe even for the student.

People who take part in post graduate e-learning courses often do this, after working hours, in the evenings and through the weekends. This is possible if the EP allows it, due to the flexibility in e-learning. It can be possible to follow the courses on the Internet in an asynchronous mode. This again means that the teachers responsible for these courses do not have to work in the day time, and at the campus site, to support the students. Since most of the students are working after hours this will be the time of day when they face potential problems and would like to take part in discussion forums. This will also be the time when they would like to get in contact with their teachers.

Based upon a model where the teachers get a pre-determined work load (number of hours paid) to be in charge of an e-learning course they could be offered more flexible working hours. The teacher can work on the weekends and in evenings if that is what they prefer, instead of working fixed hours at campus in the day time. Teachers can do their job when their students are active and from distant locations as long as they have access to the Internet. This possibility might make e-learning more attractive than campus education to some of the teachers (not all of them) and this can be a good thing.

4.4.4 Not for everyone

The last thing we would like to emphasize about the teachers when we focus on cost effectiveness and e-learning offering is the fact that the teachers are different in nature. Not all teachers should be involved in e-learning. If the teachers do not have, or get, the proper motivation and skills it might be better if they do not have to work with e-learning. The e-learning will not be cost effective if the teacher are not motivated or have the proper skills. Some teachers should only be campus teachers.

The EP has to do some research to find out which teachers are suited to do the job. The teachers suited should then get the proper training and motivation to deliver high quality cost effective e-learning. The conclusion must be that motivation, skills and knowledge is important if the teacher should take part in e-learning development and offering. Motivation and skills are important to save costs and to satisfy the students. The teachers must be presented the potential benefits for them selves and their students if they get involved in e-learning.

As we also explained in *Chapter 3* about development, the teacher with the right kind of knowledge and skills will reduce the EPs cost in the development and offering of e-learning. A reasonable teacher payment model is a tool for the EP to motivate teachers and keep costs at a healthy level compared to the number of students following the courses.

The teachers have an important role in both the development and offering of the e-learning, and therefore they will also be a key factor if we are supposed to offer cost effective e-learning in the eyes of the students and the EPs. In the end they will also have a key factor when it comes to cost effectiveness in the eyes of society, because a cost effective solution for the EPs and the students will also in most cases be a cost effective solution to the society.

4.5 Educational platform

In the chapter about teaching and offering we find it natural to look at the educational platform and student activities within the platform. An e-learning course will need some platform/Learning management system (LMS) to present the e-learning to the students and the EP will most likely need the LMS for some of the activities related to student administration. Different LMS offer students, teachers and administration different functionality:

- Distribution of the study material
- A communication central between student - teacher and student - student
- Handling response and questions from students
- Manage written exercises, quizzes and examination
- Facilitate for students to use different media in their studying, if the teacher want to.
- Function as an information channel to new students, where they can look at and perhaps test other courses.
- Function as an information channel to existing students, where they can find relevant information.
- Support for different kinds of media e.g. text, pictures, streaming video, conferencing possibilities.

It is important to choose a system which has the wanted and needed functionality, within reasonable costs. The cost for an LMS can range from zero (freeware) to millions of Euros, and the price does not always reflect the functionality. The EP should always start to analyze their requirements when it comes to functionality. It is wise not just to focus on the e-learning situation of today, but also look at the needs of tomorrow. It will usually be very costly to change LMS, even if the EP changes between two freeware systems. There are cost related to the integration of the new system and system knowledge. The employees at the EP must learn the new system and much of the learning material might become useless due to different standards if the EP switch systems.

Worth noticing is the difference between open source, freeware and commercial LMSs

- **Open source** - you/your technicians have full access to the LMS source code. This means they can figure out how the system is working and from that knowledge adapt it to the EPs demands and adapt it to the EPs requirements by writing additional code/programs.
- **Freeware** – Can be free of charge and you can use it freely, if you do not need any to change it. It might not be open source, so if you need to adapt it you might have to pay the supplier since you do not have access to the source code.
- **Commercial** – The EP must pay to get the software licences. The LMS can be open source, but most often the EP must ask the supplier to develop and adjust the functionality they want at a high cost. The positive thing about this is that the supplier must guarantee for the functionality that the EP has paid for. The EP can buy external student support.

It is also possible to develop a new LMS from scratch. This might be a substantial investment, but it has its advantages. We will come back to that later.

4.5.1 Costs, fixed and variable, direct and indirect

As we already discussed there are a lot of different costs connected to e-learning.

- Fixed costs that do not change with the number of students/courses given.
- Variable costs depending on number of students and the number of courses

The fixed and variable cost can be put into to groups, direct and indirect cost. The indirect costs will often be more difficult to estimate because of the fact that they often are not closely linked to one specific e-learning activity. E.g. when the EP buys a new LMS they might have to spend money on integration and adjustments to exiting system resulting in need for memory upgrades of all the EPs computers and investment in new supporting software. These types of costs can be difficult to foresee but they may be substantial.

4.5.2 Pro and cons with the different LMS solutions

Let us look some more at the different LMS solutions and their pro and cons.

Develop your own LMS

- **Full control over the design**, you get just what you need. You do not have to pay for tools that you do not need.
- **Adapted to the needs and demands of the specific EP**. Easy to develop and integrate special applications.
- The **technicians** developing the systems are often the same technicians that will run and administrate the system. They know the system and they can train the staff in how to use the system.

- **Big uncertainty** when estimating the time for implementation and thereby the cost. Development projects tend to require much more time and money than ever foreseen. There is no one to share the development costs with.
- Design, construction and development can be very **time consuming**. The time to market is usually crucial.
- There are often a lot of **problems with new systems**. Testing is expensive and time consuming, but the same are large errors if the system are put into operation to early.

Freeware LMS

- **Easy to try before you buy**. You can in a short time have a system up and running for evaluating purpose. Just download it and try it out.
- **You are not bound to any specific supplier**. At any time you can change LMS (not positive from other perspectives mentioned earlier).
- There may be **communities/discussion groups that can be of help** with matters concerning the freeware.

- **How free is freeware**? A standard configuration may be free, but as soon as you have **any special demands, you have to pay**.
- **No guarantee for a continuous development** from the supplier. The system may go out on date if it is not updated according to new technology.

Buy a commercial LMS

- You will get access to a high quality **operative system**, hopefully. If there are problems you can complain to the supplier. If you pay a lot of money for a commercial LMS you do not have to accept errors without claiming compensation.
- A lot of different systems with a variety of functionalities make sure that you can **find what you need**. The cost is sometimes proportional to the amount of functionality you want.
- **Support and further development can be more secure**. Companies are anxious to keep you as a satisfied customer.

- Rather **expensive licence fees**, there is often a fixed cost when you buy the system and usually there is an annual licence fee per student.
- You are **bound to one supplier** as soon as you have decided on their system. Even if you not are satisfied it can be costly to break an agreement. The suppliers are aware of the transaction costs for changing LMS so they "know" that you will not leave them in a hurry even if there are some problems.
- **Difficult to change to another system** unless they support the same standards.

Added to the total cost of implementing the LMS you have to include all hardware costs for servers, backup, and the network. Sometimes you will need hardware and software updates for all the computers. These are direct costs that should be included in the total cost estimation.

4.5.3 Other costs

Often it is difficult to include those "other" **costs related to the LMS** e.g. for operating the system. These costs may be substantial. It is easy to forget that the LMS is just a tool (more or less expensive) and that you need employees to keep it running smoothly.

- **Technicians operating the system**, handling backup, making updates, fixing problems on servers and student computers, adapting the system to your needs.
- A **technical support**. Handling technical questions from all users. On how to install, run and administrate the LMS.
- A **pedagogic support**. Staff with knowledge about how to plan and develop high quality e-learning.
- **Administrative staff** with relevant knowledge.

The total cost is a mix of fixed and variable, direct and indirect costs they are often difficult to estimate. This being the fact it is still important to try to estimate the costs for the actual system since they can vary a lot depending on the size of your organisation, integration with other related systems, etc. Let us look at an example.

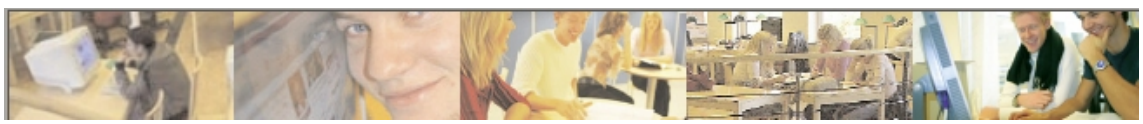
Here is an example from MIUN/ITM, just to put some figures on costs when it comes to choosing an LMS. At MIUN/ITM they have been using WebCT since 1998. These are the costs for the LMS-system including the necessary data base in year 2006:

- *Software*
  - *WebCT licence for up to 15 000 students* *30 000 EURO/year*
  - *Oracle database system* *6 000 EURO/year*
- *Hardware*
  - *Servers, incl. backup etc.* *27 000 EURO/year*
  - *Client computers, demands for certain web browser, java support etc. on student computers* *student pays*
- *Technical system management, including technical support* *13 200 EURO/year*
- *Helpdesk for users, manned daily* *190 000 EURO/year*
- *Distance pedagogic development/education* *190 000 EURO/year*

The WebCT licence is for up to 15 000 students but MIUNs actual number is around 10 000.

Worth noticing is that the costs for the LMS licence and hardware are in the same range and approximately 6 EURO/student/year together. The 6 EURO per student is only a fifth of the costs spent on support and development.

For the moment MIUNs WebCT licence allows up to 15 000 students, but earlier MIUN had a licence covering up to 8 000 students and then they paid 25 350 EURO/year. An example will show how WebCT turned out for MIUN:
In MIUNs old licence they paid 3.17 EURO/year/student and was balancing on 8 000 students. They were lucky to attract 500 more students giving them increased income. MIUN then had to change their licence and start to pay the 30 000 EURO for up to 15 000 student. This means that MIUN now pay 3.53 EURO/student/year for our 8 500 students, instead of 3.17 EURO/year/student. Those extra 500 students cost MIUN 4 650 EURO or 9.3 EURO extra/students, not so much compared to the increased income from 500 students, but what if there had been only 50 extra students. Basic math show us that the breakeven point, where the increased licence cost is paid is 1 500 students. In this example it did not matter but it is important to be aware of this effect with these kinds of licenses.



4.6 LMS and its integration to other student administrative systems

In chapter 3 about Development we looked at the importance of standards when we are developing Learning Objects. If the LOs are developed following certain standards supported by the LMS, it will be possible to reuse the LOs in different LMS.

The use of standards is necessary not only for learning material and different LMS. The same problems exist when it comes to the LMS and the surrounding student administrative systems. Administration of students in the LMS consists of two parts; the teachers' administration of student activities and examinations, and the exchange of information with the other student administration systems provided by the administrative staff. These two groups have different demands on the LMS but they are using the same underlying database. The teacher needs an intuitive way of managing their students and the administrative staffs depend on a system that is safe and secure.

The LMS system has to be able to both receive and deliver data in a standard way. Accepted students have to be imported into the system and student results have to be exported, preferably without having to type them by hand. Manual typing is time consuming and very costly. The EP must demand that data can be sent between the LMS and the student administrative systems according to approved standards.

Dealing with LMS, it is easy to forget that the system must be possible to integrate with other existing administrative systems. The focus must not only be on the learning activities the LMS can offer. Even small adjustments to the LMS to adjust them to the administrative systems can be very expensive. Another potential problem is that the adjustments to the LMS sometimes must be made by the staff at the EP since they are the only ones who know both the LMS and the administrative systems.

The solution might be standardization in all aspects concerning LMS, administration system and learning content. Unfortunately many LMS are specialized instead being standardized. Since these maladjustments between your different systems can be very costly it is important to look into them before you choose which LMS to buy.

4.7 Student activities in the LMS

In this chapter about teaching and offering we have now looked at the LMS and costs related to the LMS. We have also looked at the LMS and integration with other administrative systems. In this chapter we will look at student activities in the LMS. The students activities within the LMS e.g. exercises, discussions, projects, etc. are an important part of the students learning process. These activities are arranged by the teacher and they will differ in different courses due to different subject areas, the teachers´ pedagogical background, access to resources and the tools and functions in the LMS.

The teacher can offer the students different activities where they do individual work or collaborate with other students. The pedagogy chosen by the teacher should be the foundation when the teacher is deciding which activities the students should take part in. Too often teachers stick with traditional pedagogy and activities used in traditional campus education, if they do not have the right knowledge and skills when they are developing and offering an e-learning course.

Another potential problem is if the LMS do not support the activities the teacher would like to offer the students. If the tools and functions in the LMS do not support the pedagogy and the activities the teacher would like to use there is a potential problem. The teacher has to adjust to the technology, and the pedagogy might be suffering. We suspect that the development of LMSs sometimes is driven by technicians who do not have the relevant pedagogical background. The teachers and others with the relevant pedagogical background should be involved in the development of LMSs in the future. Let us present a disturbing example:

In Sweden there was recently held a national conference (autumn 2006) to look at "Open LMS" and future development of LMS. There were seminars encouraging the EPs to use open/free LMS. A review of current available systems was presented and demonstrations were held to show how they could be implemented. A metaphor was used comparing the development of LMS with the aircraft industry's way of building planes. The LMS could be custom-tailored from a standard model, promising the EPs that all of them could get their own tailored made LMS fulfilling their demands.

There were about 60 persons attending the conference. The people present were system administrators, system designers, network administrators and programmers and ***only three persons*** *were teachers with pedagogical background. No students were present at the conference.*

This may lead us to believe that the need for a new LMSs and new functionality does not come from the teachers and the students. This also might explain why the teachers sometimes feel that the systems are technical and not very pedagogical. If people with pedagogical background do not clearly express their needs, other interest groups will lead the evolution in a direction fitting their purposes. Demands for new functionality in the LMS should also come from teachers and students since they are the ones using the LMSs and their functionality.

In the subject area of LMSs the development is very fast and sometimes chaotic. The competition between the LMS suppliers can be positive, but even so the end users must be able and allowed to express their needs, otherwise there is a risk that technicians will lead the development in their own way, not focusing on pedagogy and the teacher/student needs.

This example from Sweden shows that it is not obvious that the teachers and the students are the ones who are influencing the way LMSs are developing. The LMS suppliers will most likely listen to the teachers and their need for functionality, but this is not obvious. This can be a potential problem if teachers can not find certain functionality when they are planning e-learning activities for their students. If the teachers are not informed and have the right knowledge the problem could also be the other way around, the functionality exists in the LMS, but the teacher does not know it.

Earlier in this report we have seen that e-learning can be organized in a several ways through different media and activities, and that this will affect the total costs. Looking at different activities we can distinguish between the teacher and student activities in e-learning. All student activities' are part of the learning process and they can be

- Individual (what the students are doing on their own) independently of others like reading, writing, thinking.
- Interactive (what they do together with other students, the teacher or interaction with the LMS and other kind of software).

Interaction with the LMS, without any human contact is one of the potential cost saving and value creating benefits with e-learning. This kind of interaction can be of great value for the students and it can reduce the workload on the teachers. Through the LMS the students can interact with the system and get feedback without being in contact with the teacher.

The interactive activities can be performed

- Asynchronous (e.g. mail)
- Synchronous (e.g. telephone-/videoconference, directly with the LMS).

The e-learning course will be based upon the content produced and presented by the teacher (or others) and the different student activities.

- The content (often learning objects)
  - **Belonging to the EP**
    - Written lessons/exercises, pure text
    - Audio lectures
    - Video lectures
    - Text, supplemented by pictures, sound, animations
    - Custom-made video
    - Animations
  - **Belonging to others**
    - Links to material on the web (free)
    - Content bought from another external content suppliers

- The activities
  - **Individual activities**
    - Working with exercises
    - Writing reports
    - Listening to audio files
    - Watching video files
    - Interacting with learning objects
    - Doing experiments or e.g. doing programming exercises
    - Doing quizzes, if these are self-correcting it's a form of interactivity.

  - **Activities in cooperation with others**
    - Discussions with other students, asynchronous or synchronous
    - Producing materials, reports, etc together with others
    - Asynchronous communication with teacher
    - Synchronous communication with teacher
    - Interaction with the society (e.g. trainee or within a project)

We can combine the activities in different ways when we are offering them to the students. Different students have different needs and by combining the learning material and the activities in different ways we can satisfy more students. One of the advantages with e-learning is that one e-learning course set up to support alternative study techniques. If the EP has developed diversity in their learning material, different kinds of learning object covering the same subject area, the EP will be able to offer more students their preferred way of acquiring new knowledge. This will lead to more satisfied students, but to a higher cost for content development, maintenance and offering. If we offer the students different types of learning material (LOs) covering the same topics and different learning activities within one course, then the examination must test which knowledge the students have acquired, and not focus on the way they have acquired it. This will be discussed more in *Chapter 4.8 Examination*.

We will now look at some of the activities the students can perform inside the LMS. We will also look at the cost aspect, not forgetting that we are trying to become more cost effective.

4.7.1 Written exercises

The most common activity is written exercises. The teacher must be able to publish the exercises and the students must, in its simplest form, be able to return answers. This can be done through a mail system but it is easier for the teacher if the answers are collected in some form of repository in a LMS.
A more pedagogic approach is to focus on the students' learning process. Instead of students delivering exercises that will be marked, there can be a discussion between the teacher and student to increase the students understanding and support the students learning process. In this case the LMS has to support two-way communication. It is of great values if documents can be edited and commented upon by two persons simultaneously. This of course puts higher demands on the LMS and it will most often affect the price. The communication between the teacher and the student will increase the "teaching" costs.

4.7.2 Quizzes

A special form of written exercises is quizzes. They can be of different type and contain multiple choice, short answers, essays, calculations, etc. Quizzes are meant to support the learning and keep the student focused on the goal either by preventing them from going further until they pass the quiz or just giving them feedback on their progress.
If they are automatically corrected by the LMS it will save teacher time, and still be of great value to the students. The autocorrecting function can be advanced and provide the teacher with statistics about the students progress and results.

4.7.3 Discussion groups

Another common activity is participation in discussion groups. The students can discuss with other students and the teacher. The LMS can give support for discussion groups created by the teacher or the students. The discussion can be used to; build social network among students, solve problems related to the education, or as a part of the learning process. If the discussions are part of the examination the LMS has to support "tracking" of the individual students activities. This has to be done in a way that is secure against loss of data and falsification of students' identity, accordingly putting greater demands on the system. The will affect the price of the LMS and the cost of teacher involvement.

4.7.4 Projects

Project work where students are working together to investigate and solve problems are an e-learning activity that should be supported by the LMS. If the project is part of the student examination the teacher should, through the LMS, be able to monitor the students work throughout the project. Sometimes the teachers are only interested in the project result and not the process of getting to the results.

In order to cooperate in the project the students should have access to some common virtual “project room” through the LMS, where they can meet each other without being physically present. The students might also need a repository for documents and other results. A more advanced LMS can support a conferencing system with audio/video and the possibility to share desktop/documents.

The LMS or education platforms functionality will affect the price. From the cheapest solution with just a repository (even mail will do) to a complex product giving you everything. The EP should choose a solution that will cover their needs. If the teacher does not understand how and why they should use a virtual conference, they will most likely not implement conferences as a student activity even if the LMS offer online conferencing.

4.7.5 Blogg

Blogg is new tool that have become popular. Bloggs are a combination of a personal online diary and a modified discussion group. In e-learning the students can use a blogg to describe their thoughts and receive comments and repose from others, the students or the teachers. As a learning tool it shows the process of learning and resembles the earlier mentioned discussion groups, but it is more private/student focused. The learning process can be monitored by the teacher and be a part of the student examination.

You can find free blogging tools but if the activity is to become a part of the examination it should be integrated in the LMS, for safety reasons.

4.7.6 Wiki

Another new tool that is also being tested in e-learning is Wiki. It is a web based tool that gives the users the possibility to create, edit and collect documents. On the web it is used as on open reference work where everybody can write and publish articles. The special thing about Wiki is that the system is open and everybody can edit or comment the documents published by others. There can be some editors who are in charge of supervising the material published. All corrections and comments are traceable back to the person who has contributed with them.

As a learning tool a group of students can build a common searchable knowledge base. It can be open to others or just a part of their learning process. It can be used as a tool for common documents in project work. Wikipedia.org is a good example.

Wiki is also free but if being used for examination purpose it should be integrated in the LMS.

4.7.7 Audio, video and other special tools

Some advanced LMS support the possibility to create, edit and publish picture, photo, audio and video files. These files can be a part of the students work and activities. Only advanced LMS have support for all these tools.

On the next page is a table (*Figure 5, Different student activities in the LMS*) with different student activities, their characteristics and cost. As we discussed earlier it is important to activate, interest and motivate the students. The way to do this will depend on the student target group and the learning goals. More advanced and expensive tools available in the education platform or the LMS do not necessarily have to be better if they will not be used by the teacher or increase the student perceived value of the course.

What tools you should choose must be based on the; course goal, pedagogy and available resources (technical, pedagogical and financial). It is not cots effective to pay for and integrate activities, tools and solutions that the teacher and students will not need.

Activities	Costs to			Context free	Reusable	Expert help	Flexible in time
	Create	Manage	Examine				
Written exercise	Low	Med/High	High	Yes	Yes/No	No	Yes/No
Multiple choice	Med/High	Low	Low	No	Yes/No	No/Yes	Yes
Discussion group	Low	Med/High	High	No	Yes	No/Yes	Yes/No
Project work	Low/Med	Low/Med/High	High	No	Yes/No	No	No
Blogg	Low	Low	High	No/Yes	Yes	No/Yes	Yes
Wiki	Low	Low	Medium	No/Yes	Yes	No/Yes	Yes

Figure 5, Different student activities in the LMS

You have to balance the costs to create, manage and examine the activities. Project work can be a low cost activity and it can be easily managed (depending on the amount of feedback and support you plan to give students during their work). If the project is a part of the examination of the students it will most likely consume more teacher time to set the right grade on the process and the results.

4.8 Examination

The last two activities we will look at in this chapter - Teaching and offering, is the examination of students in e-learning and course evaluation. Let us start by looking at examination. The examination can also be an important economic factor. The examination activities can be quite costly, but they can have a positive impact on the total e-learning budget if they are managed in a consistent way. The focus should as always be on student satisfaction. The direct cost for the examination is more or less clear so we will start by taking a closer look at some other factors involved in the examination of the students.

An incorrectly realized examination may lead to both direct and indirect costs. A problem can be that the exam is not examining the right goals or it can examine the goal, but in the wrong way. Let us look at one example. The goal of a course is that the student should be able to draw a triangle using a pencil, a paper and a ruler. If the examination then only asks questions about how many sides a triangle has and the sum of the angles, the exam is not checking the right goal. On the other hand if we on the exam ask the student to create a triangle on the computer, the goal may be right but the activity checking the student knowledge is wrong.

It is important that the level of difficulty is according to what the students should have learned in the course.

- If we pass students who have not reach the course goal i.e. too **low demand**, it will be misleading. In the short run we may attract some students if the word spreads that we are “selling” good grades for free, but it will be devastating in the long run. The EP will get a bad reputation and consequently fewer students will apply. The students following “low demand” studies will also be less competitive when the word spreads in the labour market.
- If we on the other hand have too **high demands** on the students and their exams the throughput will decrease and this will lead to fewer students. Sometimes high demands and many drop outs are thought of as a high quality indicator, but this is actually misleading the students and it will most likely not be good business in the long run.

There can be several reasons why some students get bad results on their exams. One reason can be lack of relevant information, e.g.

- The prior knowledge of the students following the course may be too little. The goal could be right, but “the wrong” students have applied.
- Students did not put enough work into their studies. They were not aware of the effort they had to put into the education.
- Students were discontented with the course content. The information about this was not clear.
- The pedagogic approach was wrong for the target group. Pedagogy differs between departments “traditions”, and the students in the target group have not received the relevant information, meaning that they thought that they would get something else because of their prior academic experiences.
- The “distribution form” was not right for the students. If the students are used to on-campus learning methods, they might get dissatisfied being presented e-learning activities and e-learning pedagogy.

With the right information the EPs are more likely to get the "right" students, who will be satisfied and who will get good results on their exams. Unsatisfied students who are not reaching their goals will not perceive the e-learning as cost effective. This will in the end for sure result in the e-learning not being cost effective for the EP either.

4.8.1 Centralized/decentralized

The examination can be centralized i.e. simultaneously on campus, at the same time and place, for all students. This is typical for traditional written exams. Written exams are what most students are used to in traditional campus education. In e-learning we have some other potentially more cost effective examination possibilities. The examination can be decentralized and this can be favourable in a number of ways:

- **Where they want to, when they feel like it**. The students could take their exams when they are ready for it and somewhere near their home. This will provide more student flexibility. The students do not have to travel to get to the exams (cost saving), and students can follow the e-learning course in a tempo that suites them. There are of course some challenges. The cost may be higher due to extra administration and the production of question for the exams. Some of this could be solved if the exams are generated electronically from a database with relevant questions.
- **In different place but at the same time**. The exam is sent out to different schools to a location near the home of the students following the e-learning courses on distance. The date and time is fixed for all the students independent of where they are going to take their exam. In this way the students will not have to travel very far to take their exam, and the teachers only have to produce one exam for all the students. Another version of this could be a web-based exam where the students can do their exam over the Internet or through the LMS wherever they are located at a set time and date. When the exam is web-based there is always the problem of authenticating the students and making sure that the students are not getting any help from other people to answer their exam. There are some solutions to this problem, but we will not go into them here.
- **In the same place but at different time**. If we want better control over who is actually doing the exam we can force the students to show up at campus but we can give them freedom when it comes to when they would like to take their exam. This can be costly if the teacher must write many exams. On solution is to use electronic tests generated from a repository or a database.

Over we looked at different possibilities when it comes to time and space when the students are taking their exam. All these solutions depend on the teacher to grad the exams (more or less). In the examples over the control over the students are quite firm. More firm control from the teacher over the students may contradict the flexibility we want to offer to the e-learning students. In the examples the teacher is responsible for the entire examination. We can use other forms of examination letting the students themselves have some responsibility for their own and/or other students' examination with less teacher control and hopefully lower costs and more flexibility. This will hopefully also lead to higher student value.

- **Peer review**. Students can mark each other's examination
- The LMS can **automatically grade** the examination
- The student can **mark his own examination** according to some standard

These different ways to examine the students can be followed by some kind of a written final exam graded by the teacher. Teachers generally spend a lot of time developing and marking exams and their value as a single measurement of the student's knowledge can be discussed. A combination of self-correcting quizzes administrated in the LMS and the teachers continually monitoring the activities can be cheaper and also a better means of accomplishing learning if it is done in the right way.

4.8.2 Ways to examine

In table on next page we have compared some different ways to go through with the examination (*Figure 6, Different examination forms in the LMS*). As we can see quizzes and written exercises are most flexible and least costly, especially if the quizzes are automatically corrected. Quizzes are more costly to develop but they are cheaper than say written exercises to grade. A mix of quizzes and a written exam can be a cost effective way to grade the students. Quizzes and written exercises also have the advantage of activating the students throughout the course, if the are used through the whole learning process. The examination forms with high fixed costs, e.g. high costs for the development of the actual "exam, will be more cost effective it the number of students taking the exam is large. This is especially the case if the variable costs are low.

In courses where the collaboration among the students is the main goal, projects and discussion could be the favourable solution. This is likely to be more costly, but by introducing some kind of peer review the EP can save some teacher time and salary costs.

Examination	Continuous Examin-ation	Flexible		Sure of ID	Re-usable	Expert help	Costs to		
		Time	Place				Create	Administer	Grade
Written final exam, web	No	Yes/No	Yes	No	No	Yes/No	High	Low	High
Written final exam, campus	No	No	No	Yes	No	No	Medium	High [1]	High
Project work	Yes/No	Yes/No	Yes	Yes/No	Yes/No	No	Medium	High/Low	High
Quizzes	Yes	Yes	Yes	Maybe [ID]	Yes	Yes/No	Med/High	Low	Low [2]
Written exercises	Yes	Yes	Yes	Maybe [ID]	Yes	No	Low	Low	High
Discussion	Yes	Yes/No	Yes	No	Yes	No/Yes	Low	Low	Med/High [3]
Blogg/Wiki	Yes	Yes/No	Yes	No	Yes	No/Yes	Low	Low	Medium

Figure 6, Different examination forms in the LMS

[ID] Is it possible to be absolutely sure who is answering? Quizzes and Written exercises can be individualized and the LMS can track who is answering so it is more probably that it is the right person.

[1] If it includes student's travels, otherwise Medium.

[2] If automatically corrected, otherwise Medium/High.

[3] If governed by the teacher for grading purposes.

4.9 Evaluation and feedback

Evaluation could actually partly be discussed together with examination since they both are vital parts of the EP's QaS (Quality and Assurance system). The evaluation is not something that the EP should do after the course is finished. The evaluation is a process that should run through the entire process of developing, planning and offering of the course. Self-evaluation done by students can be a vital activity to motivate them in their studies. If the students do not evaluate them selves and the course while they are taking it, it could be similar to an archer who shoots all his arrows into the dark and only afterwards checks what the target is and if he has been able to hit the target. Continuous evaluation is an important step towards quality in e-learning.

Evaluations as a quality check have to cover everything from the curriculum - the progression of the course, the syllabus – course goal, the learning activities, the grading and the learning effect of each individual student. The evaluation should not only focus on the students and their goals, but also the teacher, the EP and the society's goals. Thru the evaluation we should be able to find out if the course has been cost effective, as intended. If it has not, the EP should use the evaluation to make it more cost effective in the future. This should be an iterative process where the EP can become more and more cost effective each time they offer a course. Sometimes the EP can do adjustments and become more cost effective while the course is being developed and offered.

The society might be interested in how well the educated students are fitted for future work, and evaluating that might have to be done later on in the future. In this report we focus on evaluation concerning students, teachers, the course and the course administration.

For the evaluation to be a part of the QaS it have to be carefully prepared using the ordinary steps in an iterative quality check: planning, modelling, realization and follow-up. The figure (*Figure 7, The evaluation process*[9]) below shows the different activities involved. The teacher may not be the only one involved in the evaluation since it demands a lot of time and sometimes special knowledge to create and analyze the feedback and results. The actual evaluation of the course offering is best realized inside the LMS. If the teacher feels that he/she is not capable of creating and analyzing the evaluation activities, some specialist might be of help. Every EP should have a strategy for handling evaluations and its connection with QaS.

The evaluation process can be time consuming both for the student and teacher, so it is important to be aware of its value. It is rather easy to implement evaluation activities in most LMS. Here the students can be urged to take part in an evaluation (realization). The planning, development and analysis of the evaluation activities can be very expensive.

[9] *http://www.aitel.hist.no/~svendah/*

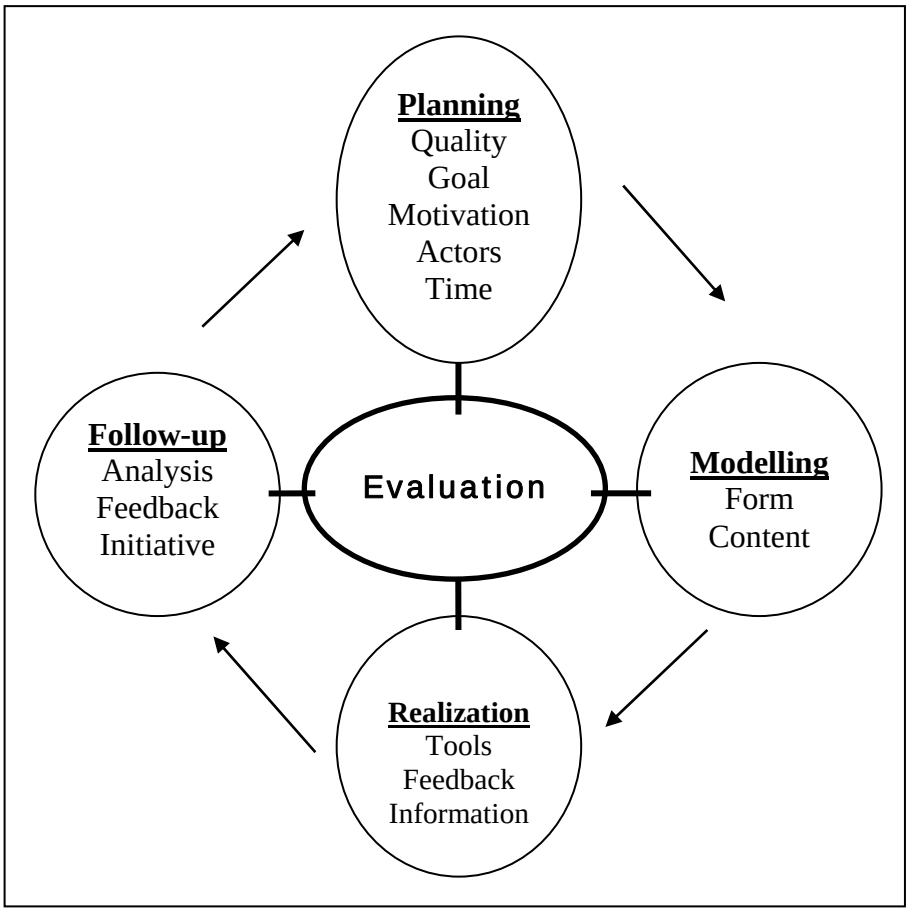


Figure 7, The evaluation process

Let us look at the figure and the evaluation process a bit closer. We can evaluate all the activities we have presented this far in our report, the planning of e-learning, development of e-learning and the teaching and offering of e-learning, (*Figure 8, The iterative evaluation process*)

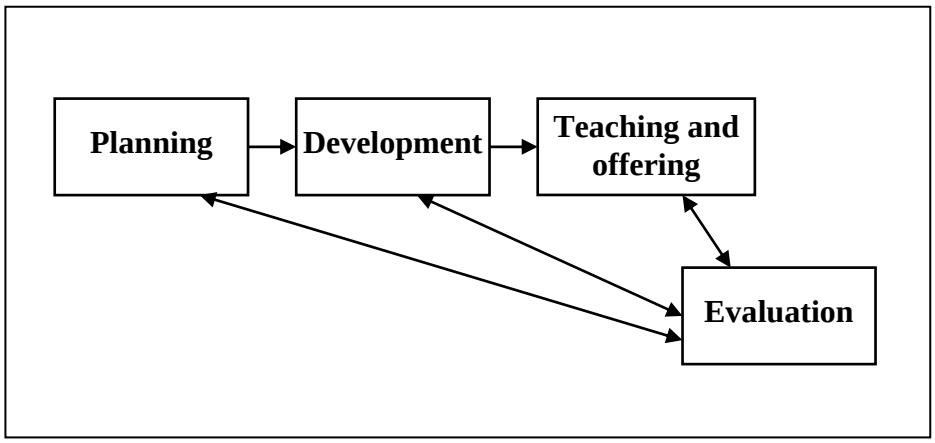


Figure 8, The iterative evaluation process

The evaluation can be an iterative process something which is illustrated in the figure with the arrows pointing in two directions. We can evaluate each activity separately or evaluate all the activities at the end of the course. The advantage of evaluating each ongoing activity is that we as an EP can do changes and adjust to our students and the feedback from other relevant persons involved in the e-learning more rapidly, increasing their perceived value, e.g. become more efficient and effective.

Let us look a bit closer on the activities/stages in the actual evaluation process in (*Figure 8, The iterative evaluation process).*

In the planning stage the EP should look at the most important aspects to think through before the evaluation starts.

The Planning

- *Why evaluate? Motivation and responsibility*
- *What is the goal of the evaluation, what is it that we want to find out?*
- *Who is the target group, who will be evaluated and who is going to carry out the evaluation?*
- *When should we evaluate and how often?*
- *How can quality assure the evaluation?*

The evaluation should be modelled according to the results from the planning.

The modelling

- *What type, kind and form of evaluation should be used?*
- *What is the content of the evaluation? What are the relevant questions?*

Next up is the actual realization of the evaluation.

The realization

- *How should the evaluation actually be realized/conducted?*
- *Which tools can be used to carry out the evaluation?*
- *How can we assure that people take part in the evaluation?*
- *Who will take part in the evaluation?*
- *Who "follow up" the evaluation?*

Finally there must be some work afterwards to assemble the results and to make sure that the results form the evaluation will lead to improvement in the activities that have been evaluated.

The Follow up

- *How to adapt and interpret the material and results from the evaluation?*
- *Which activities should be effectuated due to the results from the evaluation?*
- *How can we ensure good effect and reasonable resource consumption?*

As we can see the evaluation process can be quite thorough. Through the evaluation of the planning, development and offering of the EPs e-learning it is possible to make adjustments to become more cost effective. If the EP would like to become more cost effective it is important that they continuously evaluate their e-learning and observe the effect of the changes that are being made. The EP should not just make changes to their e-learning trying to become more cost effective without checking if this actually is the case.

Evaluation is important and it can take a lot of resources. Therefore it is important that the evaluation will provide relevant information and results that can help the EP become more effective, providing the parties involved higher perceived value, otherwise it is a waste of time and money.

4.10 Conclusions

In this chapter we have mentioned a lot of factors an EP have to consider and be aware of when offering and running e-learning courses in a cost effective way for the students, the society and the EP.

1. It is important to define the course goal. The EP must be sure that the knowledge and content if relevant and that they have found the right way to examine it. The form of examination is very important because it will guide the EP and the students through the learning process. If there is a problem defining the goal of the course, the EP can start by focusing on the examination. If the EP is able to figure out what they will examine and how they will do it, the goal will be easier to define.

2. Define a student target group. There should be more than just prerequisite knowledge. Find out who they are, e.g. their study background, life situation and motifs for studying. Knowledge about the students is crucial to be effective and efficient. The EP should attract the right students and the right students should be attracted. If an e-learning course is going to be profitable and cost effective there must be a target group who are interested in what the EP has to offer. If the students are interested this will reduce the number of drop outs.

3. Student motivation is a key to success when we are offering e-learning. If the EP is able to keep the students motivated there are smaller chances that many students will drop out. Motivated students are usually on top of the learning situation something that can be a potential advantage in more than one way. Motivated students can provide accurate feedback to the EP when it comes to the quality of the content and the offering of the e-learning. Motivated students will often be learning effective and get good results, something that contributes to make the EP more cost effective.

4. Choose an e-learning pedagogy fitting the need of the students in the target group focusing on the learning objectives. Then secondary the EP should find out what tools to use (buy). Determine the learning activities and the way to organize the course. Student freedom and flexibility are to keywords. The EP can potentially save teaching costs if they choose pedagogy and a LMS where the students can interact with the LMS and each other and not just the teacher.

5. Focus on the teacher and not just the students. The teacher will have an important role in the development and offering of the e-learning. Make sure that the teachers who are involved with e-learning get the relevant e-learning knowledge and skills. Without pedagogic and technical knowledge the teacher can not contribute to make the e-learning more cost effective.

6. Make sure that the teachers understand the different variables that will affect the total cost of offering an e-learning course. Let them be aware of their role as a value creator and cost provider. Make sure that they read this report before they take part in the planning, development and offering of e-learning. There must be a shift in the thinking that the teachers should only focus on the pedagogic aspects, while the management and the administration will take care of the costs. This way of thinking will in most cases not result in cost effective e-learning.

7. Choose an LMS capable of handling (and offering) the tools needed. If the EP already has a LMS they might have to adjust the e-learning offer to the tools available. If the system offers effective administration this might be cost saving. Teaching the teachers and others how to use the LMS can be very costly. The price of educating implementing a new LMS and teaching people in how to use it is very often more costly than buying the actual system software.

8. Make sure that the LMS can be integrated with the other administrative systems. Even minor adjustments to connect the LMS and the existing administrative systems can be very expensive. It is also important that the LMS support general standards for learning objects. If this is not the case the EP might become less cost effective because of the fact that it is more difficult to share learning material with others.

9. It is important that the teacher consider the different student activities that can be offered to the students in e-learning, and that the LMS support these activities. Different activities have different costs, and the teacher should try to reduce the cost while making sure that the students reach their learning goals and stay satisfied. The goal must be to increase the perceived value of the students while reducing the cost of the EP. Some activities demands a lot of involvement from the teachers and this must be considered by the EP management and the teachers. Low costs and high benefit is the key to becoming cost effective.

10. The examination is important if the e-learning are going to be cost effective. There are many alternatives when it comes to who the students should be examined. The EP and the teacher must once again look at the student needs and wants before they decide on their choice of examination. Another important factor when it comes to examination is the fact that the exam must check if the students have learned what they are supposed to have learned. This means that the choice of examination form will depend on the learning goals and the learning activities in each e-learning course. It is very important that the students get information about the course goals ant the examination form before they are signing up for the course. This will increase the chances of students being satisfied and that the students will work in a reasonable way to get a good grade.

11. Evaluation is very important if the e-learning are going to be cost effective. The EP can use the evaluation to find out if they are cost effective and how they can become more cost effective in the future. The evaluation is a process in it self with four different stages. The last stage, follow up, is crucial if the evaluation are going to be of any value. The evaluation should be done iterative, focusing on all the activities involved in the planning, development and offering of e-learning. Finding the right way to evaluate the different activities is crucial to get the right feedback and avoid spending money on evaluation that will not result in reduced costs, increased income or higher perceived value for the parties involved. The evaluation will help you conform if you have done the right things and become more cost effective.

5. Market orientation

We have in the previous chapter looked at the planning, development and offering of e-learning. In the next chapters we will address some other areas that are crucial if we want to become more cost effective. Some of these areas have already been mentioned, but now we would like to look closer at some of them.

We have already said something about the importance of market analysis and that it can be crucial when we try to sell our courses, we must offer the students what they want. We have also looked at marketing and the high costs involved at reaching the potential customers. In this chapter we will look some more at the market and how we can succeed in reaching the market and sell courses to students and companies. We will try not to repeat ourselves so we will urge you to read about customer value, marketing and market analysis in *Chapter 2* if you have not already done this.

It is important that the EP is able to find its target group. The target group must be large enough and it must be interested in subject areas within our core competencies. Finding the target group must be done by looking at the potential customers and their needs (market analysis), while we at the same time analyze the potential competition. It will not help us much if we find an interesting target group but are not able to meet the competition in the market due to too strong and too many competitors. The key to success and a cost effective solution is market orientation.

Market orientation is almost like a religion when it comes to developing and offering products. The e-learning course is the EPs product. Throughout history, and still to day, there are many different ways of approaching the market. Product-, production- and sales orientation are some of them, but when it comes to being cost effective nothing beats market orientation. Two of the inventors of the market oriented way of thinking are Philip Kotler and Robert G Cooper. Cooper focus on the product development and Kotler focus on the marketing and selling of the products. Both of them have mainly focused on traditional hardware products, but their results are also interesting when we are looking at e-learning and how e-learning can become more cost effective.

The philosophy behind market orientation is to focus on the customers and their needs, while monitoring the competition. The development and offering of e-learning must be done in terms of the customer, while focusing on saving costs and reducing the time to market. The customers' needs and their perceived value change over time, and the only way to meet their needs are to listen to the market and implement changes to increase customer value to meet the competition something which is also apt for e-learning and education.

By listening to the customers and analyzing the competitors the EP should in theory be able to offer customers the highest perceived value (CPV) and in that way become cost effective in the eyes of the customers, read more about CPV in *Chapter 7.2*. By delivering the highest CPV the EP will attract the customers and hopefully earn back the money invested in the development and the offering of the e-learning, when the e-learning is offered at the terms of the customers. This is of course a very simplified way of looking at things. Market orientated EPs will be able to stay at top of the situations because they are always listening to the market and they are adjusting their offering when it is necessary. It is important to remember that being cost effective is not just about reducing the costs; creating value is just as important. By creating and offering

higher CPV we will get more customers and we can charge the customers a higher price. This will result in a better cost/benefit ratio for the EP, meaning that it will be more cost effective. The big challenge is of course not just to increase the CPV, but be able to deliver higher CPV than our competitors. When we are considering target groups we should make sure that we can deliver high enough CPV and stay competitive before we start developing a product towards our target group. If the cost/benefit ratio is better and the CPV is higher than our competitors it means that we are more cost effective.

We have already mentioned that marketing is expensive, and this means that it is good economy to try to keep the existing customers and making sure that they are satisfied. Satisfied customers are potential candidates to recruit new customers.

Unsatisfied customers are also very important to the EP. It is important to find out why the customers have not been satisfied. Unsatisfied customers can tell us something about how the EP can improve and become more competitive in the future. Unsatisfied customers are very dangerous for the EPs business because they can spread words about their bad experience. We would recommend all EPs that are offering e-learning to send out questionnaires all their students to check if they are satisfied (part of the evaluation mentioned earlier) and if this is not the case the EP should try to make the students satisfied (with reasonable effort and within reasonable costs). In marketing theory they say that it takes ten satisfied customers to compensate for one unsatisfied customer. We have no reason to think that this is not the case for e-learning.

For those who find market orientation interesting and would like to read more about it we can recommend *Winning with New Products* by Robert G Cooper[10] and *Marketing Management* by Philip Kotler[11].

[10] Robert G. Cooper. *Winning at new products - Accelerating the Process from Idea to Launch*. Second Edition. 1993. ISBN 0-201-56381-9

[11] Philip Kotler. *Marketing Management*. Eleventh edition. 2003. Prentice Hall. ISBN 0-13-049715-0

6. Co-operation and collaboration

We have already said something about cooperation but since we find this possibility very interesting when we want to make e-learning more cost effective we have dedicated a separate chapter to this subject. There are many ways to co-operate and collaborate when offering and developing e-learning to make e-learning more cost effective.

Cooperation between educational providers is also interesting in a European perspective and cooperation (Joint Study Programs) is also an important part of the Bologna process. Let us look at the different areas that are suitable for cooperation in e-learning when we focus on cost effectiveness.

6.1 Develop and share course material

In *Chapter 3* we were looking at development of learning objects and course material. One way to develop a course is to do this in cooperation with a content provider or another education provider. The education providers can collaborate in the development of a single course or even a single learning object or they can cooperate in developing a course or an education program where they are developing different parts of the relevant content. When educational providers are **cooperating** in the development of different parts of an e-learning course there are some important challenges which can be different from the challenges we meet when we are **collaborating** with an EP to develop a course. We can look a bit closer at the challenges and the potential benefits. In (*Figure 9, Co-operation in development of LO*) we see a model where two EPs are co-operating in the development of different learning objects in a course.

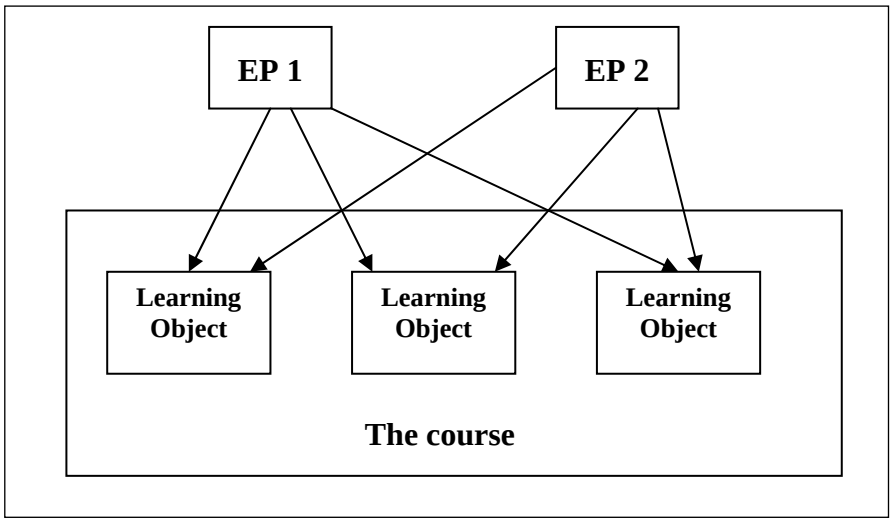


Figure 9, Co-operation in development of LO

The positive thing about a close co-operation in the development is the fact that both EPs will know all the content developed in detail and that they have agreed on the content before or while they are developing it. After the development process both EPs can offer the course content and be comfortable with the way it has been developed, since both EPs have taken part in all of the development. The EPs can choose to offer the course separately or they can offer the course together with the potential cost

savings that this implies. By developing the course material together the EPs have shared the development costs and they can both offer the course to their students. The total cost of developing the course material together is hopefully less than if each EP had to develop all the material by them selves. The challenge of developing the course through close co-operation is the fact that the co-operation might be very time consuming if there are pedagogical or technical dissensions between the EPs. Another potential problem with this model is the fact that the communication between the EPs can be a challenge. To deal with some of the potential problems by close co-operation we can look at a different model that might give better results when it comes to reducing the development costs (*Figure 10, Collaboration in development of LO, reduced costs*)

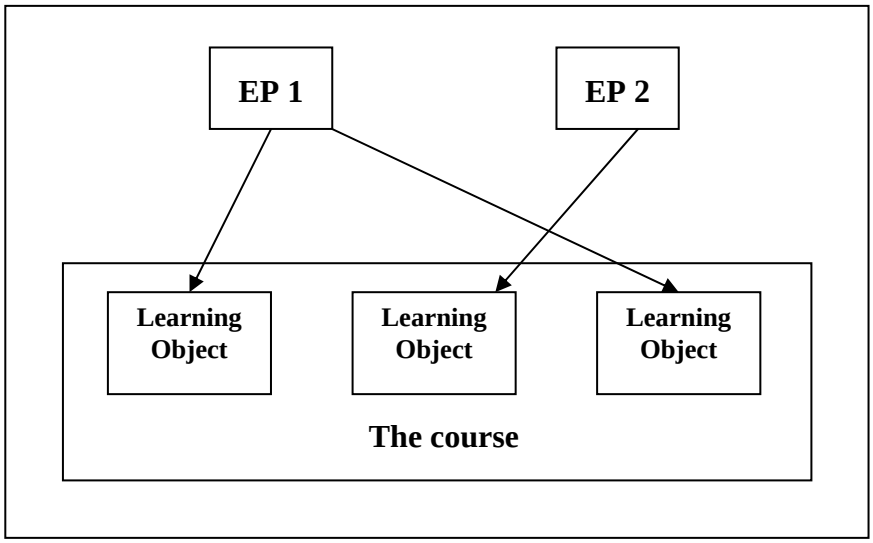


Figure 10, Collaboration in development of LO, reduced costs

In this figure we see a different way of working together in the development of a course. Instead of co-operating in the development of each of the learning objects in the course, the EPs can divide the development of the LOs among themselves. In this way they share the costs of developing the course and they do not have to collaborate as closely as they did in the model in (*Figure 9, Co-operation in development of LO*). This does not mean that they do not have to communicate with each other, but the communication can be on a higher level and mostly upfront of the actual development. The fact that they do not have to work that close together is also a potential problem. If they do not have a mutual understanding before they start the development of the different LOs, the course will might not end up very consistent and in the worst case it could become contradictory. Quality assurance and quality standards are the keywords here. If the EPs divide the work among them in a good way they might save both time and money by using the model in (*Figure 10, Collaboration in development of LO, reduced costs).* The model can also be represented on a higher level where the EPs are not collaborating or cooperating in the development of single courses but rather on the development of study programs. This is an interesting model, with some new challenges when it comes to quality assurance and accreditation. Read more about this in *Chapter 6.4 Quality Assurance*.

6.2 The running, administration and support of e-learning

The running, administration and support of e-learning are crucial if educational providers are to succeed. We have already partly discussed these aspects earlier in this report, but know we will look some more into how e-learning can be more cost effective if we choose to cooperate with others when we are offering and delivering these services.

Administration is not a small job in e-learning. There are many tasks that must be fulfilled. Some of these tasks are distinctive for e-learning while others are mutual for all kinds of learning and education. In general we can say that the educational provider need some kind of registration and information system to fulfil the different administrative tasks related to their employees and students. Developing an administrative system for the e-learning activities that can manage all their tasks can be very expensive, often too expensive. In general we can say that all the services an e-learning student needs when he is to register, pay and follow an e-learning course, should be available to the student online by the Internet. Many suppliers of traditional campus education do not have this kind of online functionality available for their students, their employees and their administrative staff. Some educational suppliers have some of the services online but not all of them. There are several possible solutions to this problem and which one of them is the most cost effective will vary among the different educational providers.

One possible solution is that the EP develops a new tailor made administrative-system. This can have its advantages, but it can be quite costly. By developing a new tailor made system the EP can make sure that the system will meet all their needs and it can be integrated with other systems involved in student administration. The biggest problem with this solution is that it can be extremely expensive and time consuming.

Another solution can be to do some further development on an already existing administrative-system used by the EP. This can be a good solution, but it is not always possible to make changes to existing systems. The system provider of the existing system can stop this possibility, for example through copyright laws, hidden source code or lack of system support. To adjust an already existing system might also be very expensive if the existing system is very complex.

A third solution that is similar to the first one is to develop a new administrative system in co-operation with other e-learning providers. By co-operating the EPs can save costs on development and updates. The problem might be that a system like this also must be implemented with other systems used by the EP and that the different EPs might not have the same systems.

The last solution is to buy a standard system from a software supplier who has a system that works for administration of e-learning and the activities involved. This can be a good solution, but there will usually be some challenges when the software is standard and not tailor made for the EP, their needs and their existing systems.

A positive effect of developing a system together with others is that the EPs in theory also might share the administrative staff if this could reduce the total costs for both EPs. This might also be the case for the technical support and student support functions. There is no sense in having two centres for administration and support of e-learning, if

two or more EPs can cooperate on one centre and save money. One cooperating centre might do a better job than two centre belonging to two different EPs, because of the fact that they get more specialized on their task when they get more students to work with.

We can conclude by saying that both the needs of the administrative staff and the students must be met. Satisfied students and employees are very important if we want to succeed. The satisfaction of the students, teachers and administrative staff must be seen up against the total costs, before the EP decides on their administrative system solution.

6.3 Marketing

The right kind of marketing can be the key to success for an educational provider. The problem with marketing is the fact that it is very expensive and all the money spent on marketing must be earned back, usually through student fees. One way of reducing the cost of marketing is to cooperate with other EPs. This can be cost saving in more than one way. We will explain this by an example of how this is done for government approved e-learning courses in Sweden.

In Sweden they have made a web-portal called netuniversity.se. In this portal all the universities and college universities can register their e-learning courses free of charge. Today there are more than 3000 e-learning courses registered in this portal and categorized by subject area. By gathering all the e-learning courses in one portal, the portal becomes a natural source of information for those who are looking for an e-learning course. The more courses that are entered into the portal, the higher are the value of the portal to the customers. Making a joint portal is also positive when we look at the costs of marketing. Instead of every university having to spend a lot of money on marketing to inform potential customers about their e-learning courses, the universities can contribute with some money to market the portal where potential students can find all the available courses. This way of thinking and collaborating can also be implemented in other countries and by private EPs.

Some might argue that by entering a portal where everyone gets the same marketing possibilities is no good because it will not make “our” e-learning course stand out from the crowd. This could be true, but we will argue that investing enough money on marketing to stand out in the crowd in most cases is too expensive anyway. If one can become visible through a portal at a low cost, one can invest the “saved” marketing money on making the courses better and ensuring that the customers are satisfied. Satisfied customers will spread the word and more and more students will pick our courses from the portal in the future. Satisfied customers will also result in resale which is very important if we are to succeed.

Another way of collaborating with marketing is to recommend new courses to students who are already following a course. This kind of collaborating can be within one EP or between different EPs. The way to do this is that the EPs can sit down and go through their list of courses and find courses that are relevant to each other and make an agreement that the EPs will encourage the students to take one or several specific courses to continue their learning. This strategy have turned out to be a success at Sør-Trøndelag University College, where resale stands for more than 60 percent of the total external sale each semester. This strategy will only work as long as the students are satisfied with the courses they are following.

6.4 Quality assurance

Quality assurance and cooperation are closely linked together. When we are developing and offering e-learning it is important that we are able to deliver high quality to all the parties involved. When we were discussing cooperation and development we saw that EPs can develop courses together and that this hopefully would provide the right quality in the eyes of the EPs involved. Another model of current interest to EPs is the model presented in (*Figure 11, Collaboration in development of LO, JSP*)

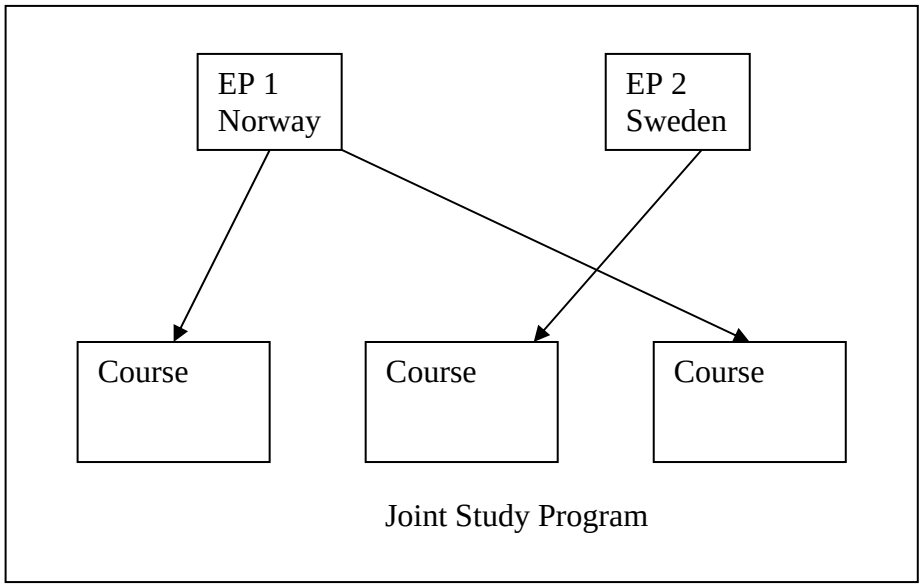


Figure 11, Collaboration in development of LO, JSP

In this model the different EPs are developing and offering different courses that can be part of a joint study program (JSP), or offered to students outside a study program. Approving and recognizing courses between different EP has for a long time been a difficult challenge. The different EPs do not necessarily trust each other when it comes to other EP's quality. This is typically a problem between EPs who have origin in different countries. A student following a two year bachelor program in economics in Australia can not "automatically" expect to get those two years approved if he wants to go back to Norway and finish his bachelor in economics there, even if the courses "look" the same and are using the same text books. One way for EPs to deal with this problem is to establish quality standards and formal cooperation with one or a few other EPs. By working together and deciding on quality standards, different EPs can offer courses from other EPs and even offer JSPs together, it can be cost effective. This way of sharing courses and learning material can be very cost saving for all the parts involved. The EPs can save money on development and still get access to a bigger market. To realize this opportunity the different EPs must co-operate together and set focus on quality in both the development and the offering of e-learning courses. To find out more about quality assurance systems (QASs) and e-learning, read quality assurance report produced in work package 3 in the QUIS project available at the project website[12]

[12] http://www2.tisip.no/QUIS/index.php

7. Competition

Internal and external competition is something the education providers have to consider if they are going to offer and deliver cost effective e-learning. The competition can be internal and/or external. Being able to deal with competition is absolutely necessary if we are going to succeed. Developing and offering high quality e-learning is a waste of money and resources if we are not able to sell it or offer it to enough students because of too strong competition.

7.1 Internal competition

By internal competition we mean competition within the education provider. If the EP has been offering traditional on campus education in the past, an internal conflict or internal competition between those who are working with campus education and those who are working with e-learning might arise. If an e-learning course is being developed to be offered through distance education but also results in the fact that on-campus students would like to follow it instead of the traditional on campus course there might be a problem. Typically this can be the case if different teachers are responsible for the campus and the e-learning course. Both teachers would like as many students as possible to follow their course, and the campus teacher might feel threatened by the introduction of the e-learning course. The campus teacher might loose some of his students and with his students some of his income, if the number of students is part of the teacher payment model. This fear is understandable, but there is a solution to that problem. Instead of developing two different courses, it might be possible to develop only one course but deliver it in two or more different wrappings. The content in both courses can be the same and available through the Internet. In addition to the online solution the students on campus can be given a number of lectures on campus. These lectures might also be filmed and be made available for downloading by the Internet if this can be done within reasonable costs. In this way the cooperation between the campus and e-learning courses (teachers) can result in positive synergies to both teachers and students in both courses.

Some times a fully joint model with the campus and e-learning course is not for the best, but still the core content, the exercises and the exams might be the same. This solution can be positive in many ways and it will most likely turn out to be more cost effective than a split course solution, with two independent courses.

There will be savings when it comes to development and offering of the courses when we are more or less talking about delivering one course, not two. It might not be necessary to engage two teachers; one teacher might do the entire job. If there are two teachers and one is familiar with e-learning and one is familiar with campus education they might learn from each other. There will not be an internal conflict of interest because now we are talking about one course, not two. One might achieve economy of scale because now we have one course with many students instead of two courses who are “competing” about the students. Hopefully the customer value will be higher for both campus and distance students because the total course offering will be more extensive, meaning that the students have greater possibility for variation, and it might be easier to follow the course in a more suitable way, adjusted to their preferred learning techniques.

As we can see, internal competition can be a problem but it can also be a good thing if we are able to deal with it. There must be a reasonable teacher payment model that equals the work of the campus and the e-learning teacher, see chapter 8.4. In this way we will reduce the competition inside the education provider. By saying this we do not mean that a little competition must be a bad thing, but it is not smart to spend time and scarce resources on internal fights when we have external competitors who are trying to take our market share.

7.2 External competition

One might ask what external competition has to do with cost effectiveness. The answer is everything. If we are not able to compete with our external competitors we will not get any income or funding and that means no students. Looking at external competition we to some degree have to distinguish between privately and publicly funded education providers, at least this was the case some years ago. In the private funded market there has always been competition among the different education providers. This trend is also showing it self in government funded education. The EPs have to be competitive if they want to stay alive and earn money. Being cost effective is very important and it is a way of staying ahead of our competitors.

We can start by looking at public funding and education. In many European countries there are more student seats than there are qualified candidates. This means that there are not enough students for all the publicly funded EPs. This again will result in competition among the different EPs to get enough students and the best students.

By introducing e-learning and distance education the EPs can attract a larger student group. This is a result of better availability and a better and more comprehensive student program. Cost effective e-learning will also make it possible for the EPs to reduce the average student costs and in that way be able to stay alive even if the student number is reduced or the public funding is being cut down.

By introducing e-learning in a joint solution with the traditional campus courses like we described in an earlier chapter, the publicly funded EPs might also be able to sell their courses in the private market and in that way increase their overall income without having to invest extreme amounts of money. This is not a simple job but it can be done if the EP operates in a subject area where there is a private market, and if the publicly funded EP can be competitive.

Now we will look at external competition in the privately funded market. Being competitive here is all about being cost effective. This means increasing customer value while keeping the overall costs at a minimum. Let us look some more at customer value and how we can be cost effective and competitive. In (*Figure 12, Customer value*) next page, we illustrate the concept of Customer Perceived Value (CPV)

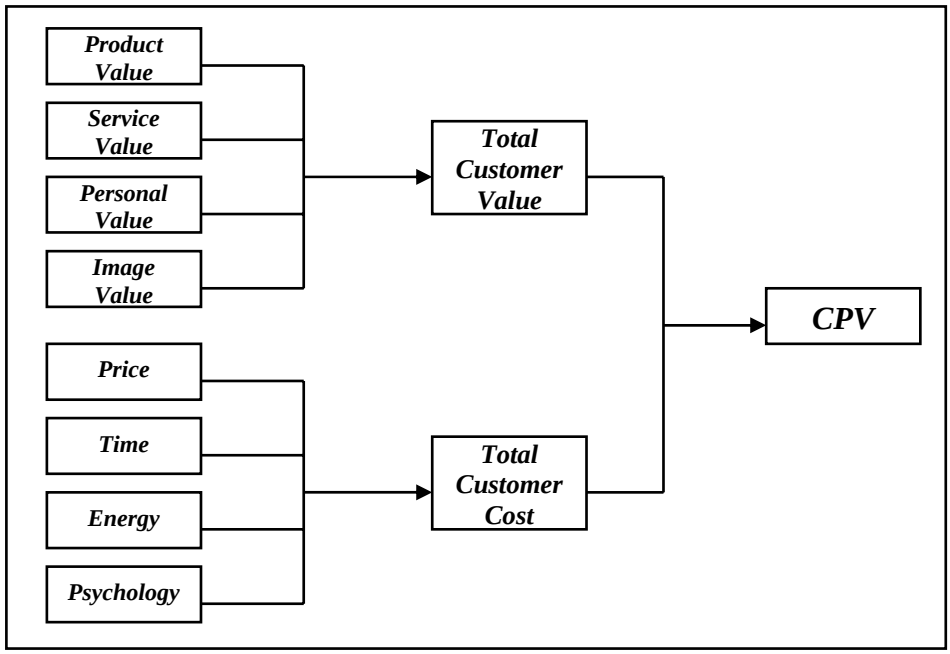


Figure 12, Customer value

When the customers are considering which courses they should follow they will choose the course with the highest perceived customer value. This means that the student will look at the total customer value and the total customer cost before they decide which courses and which EP they would choose. The course with the highest CPV will be the course which is most cost effective in the eyes of the student, see figure below (*Figure 13, Student CPV*). Most students will not reflect on the term cost effective, but if we look at the under laying factors this will most often be the case. A challenge is of course that not all students will have the same opinions on value and cost. The EPs must do some research to find out which costs and values that are the most important ones and relate to them, be market oriented. Very often the EP will find out that there are many things that can be done to increase the CPV without spending a lot of money. As we can see from the figure it is not just about increasing the value, it is just as important to reduce the costs. The gap between the value and the costs should be as big as possible. The company with the largest gap will win the customers.

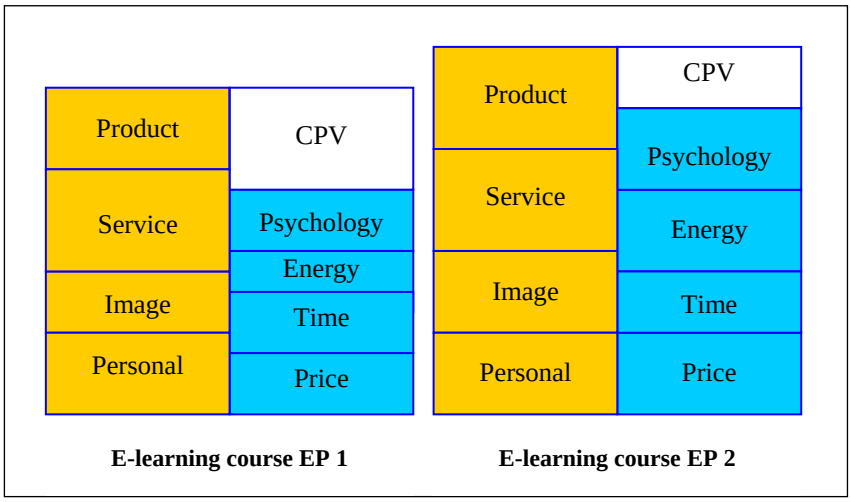


Figure 13, Student CPV

Let us look some more on the connection between cost effectiveness and CPV. Look especially at the highlighted text in the quotation under.

Greville Rumble[13] explains effectiveness in general this way:
"Effectiveness is concerned with outputs. An organization is effective to the extent that it produces outputs that are relevant to the needs and demands of its clients. This implies the existence of criteria by which the organization's success in this respect can be measured.
Schools can be effective but not necessarily efficient. For example, students can be taught programming very effectively, but if the cost of doing this is ten times the cost of any comparable programme, then it has not been very efficient.
Organizations need to be both efficient and effective. ***An organization is cost effective if its outputs are relevant to the needs and demands of clients and cost less than the outputs of other institutions that meet these criteria.*** *Organizations that pursue efficiencies to the extent that the quality of the output is jeopardized or poor may cease to be effective."*

The EPs should focus on increasing the CPV (for the selves and the students) and this can be done by increasing the total customer value or reducing the total customer cost. It is important that the EPs are not just looking at the students' CPV, but also have in mind their own value and cost. The goal will be to maximize both the students and the EP's perceived value (and the societies).

When the EPs are looking at external competition it is very important to focus on the CPV. This is understandable because most of the competition among the EPs are about getting new students and making sure that existing students will continue. It is a good thing to increase the CPV, but this must be done within reasonable costs. If increasing the CPV will result in an overall loss of money for the EP this might not be a smart thing to do. The EP must make sure that it can cover its expenses and still stay competitive. To which length the EP has to go to increase the CPV to attract new and existing students is often closely related to the market situation. The market situation and the external competition should be analyzed before we decide to develop and offer a new e-learning course in the open market. If the competition is too strong there might not be any possibilities for us to enter the market with our courses and make enough income to cover our expenses.

When we are looking at external competition and customer values it is important to remember that there can be different interest groups when we are selling an e-learning course. Making sure that the student is satisfied is important, but some times this is not enough. If the student is an employee in a company and the company is paying the course fee, it is important that the company is satisfied. The company perceived value must be high enough. If the student is satisfied but the company paying the bill is not, there might be a problem. Because of this it is important to also look at the cost and the value of the company when we are going to offer a course. You can read more about advantages that companies will get by introducing and offering e-learning to their employees in the QUIS WP7 report.

[13] Rumble Greville, 1997, *The Cost and Economics of Open and Distance Learning*, Cogan page Ltd

8. Budget and financing

Now we have looked at many aspects and areas that all are important if we are going to offer cost effective e-learning. It is a bit of a challenge to satisfy all the parties involved in e-learning. In the last chapters we will look at some pricing strategies and the importance of the EP to focus on the income potential and the variable and fixed cost in controlled and open markets. We will also present one example from MIUN/ITM where we look at the costs involved with different strategies for acquiring content and offering an e-learning course. Further we will look at a model for teacher payment (and others) in the process of developing and offering e-learning, that will be helpful to manage and get an overview of the costs. The last model is an example from MIUN showing the complex task of resource allocation in an e-learning course. This example will not be totally relevant for most EPs, but it shows some of the complexity that an EP has to deal with.

In general we must say that everything we have discussed in this report until now must be taken into consideration when the EP decides what models they would like to implement, when it comes to charging the customer (student, company, the government), decide on marketing and pay the teacher and other staff for all the activities involved in planning and offering e-learning. We have pinpointed the important areas that one should focus on, and it will be up to each EP to build a functioning cost effective solution based upon their characteristics. This should be possible with all the information we have presented.

8.1 Different ways the EP can charge their customers

When the EPs are going to offer an e-learning course or program, they have to decide in which way they should price their e-learning. Finding the right pricing strategy is very important for the EP. With the wrong pricing strategy the EP will never turn out to be cost-effective. The reason is that with the wrong pricing strategy the customers will not buy the e-learning course and the EP will lose money. The only ones who will be happy if the EP chooses the wrong pricing strategy are the EPs competitors.

When it comes to finding a price strategy we are well aware that some education are funded solely by the government, and that the government may have fixed rates. This is an exception that we will look at some more in the next chapter, but in general we can say that the government pays per participant. We will now look at some of the possible pricing strategies that may be used in a competitive market, ref xxx.

Price per participant – This is the most used model for pricing e-learning. Each participant that follows the e-learning course pays a fixed course fee. The payment is usually taken in advance. This pricing model is easy to cope with for the students. In the eyes of the EP this can be a pricing model with great risk, at least if the EPs have high fixed cost related to the e-learning course. If the number of students is to low the EP risk losing a lot of money, on the other hand this pricing model can turn out to be very profitable if the number of students turn out to be high. Up front market analysis is very important to reduce the risk involved and to set the right price.

One time fee – this is similar to a subscription model. The buyer buys access to the entire e-learning course for a period of time. Within this period the buyer can follow or access and use the e-learning course or materiel as much as they want. A company may

pay a one time fee so that all the employees can access the e-learning course or material when they want, and as often they want, in a set period of time. The size of the fee is usually adjusted to the number of people getting access to the e-learning course. This pricing strategy can also be used on individual students.

Pay as you go – here the customer gets access to all the learning material but they only pay for the parts of the course that they are actually following. This payment model is very interesting and it is becoming more and more relevant with the introduction of learning objects. The students who need access to a lot of learning objects will pay more than a student who has some prior knowledge or skills. The e-learning becomes more tailor-made and the student will see it as more cost effective. This again will result in more satisfied students, which is positive for the EP. The danger of this model is of course if there has been spent large amounts of money on development of different kinds of LO, and very few are buying them.

Time based payment – this is a pricing strategy where the customer pays for the number of minutes he/she has access to the learning material. This model can be relevant for video-lectures, podcasting and other LOs that can be streamed online to the customer. This is also the case for other interactive solutions.

As we can see there are many different pricing strategies. This is just some of them. For the EP it is very important to find the right strategy for their target group. If the EP has different solutions and different target groups they might also have different pricing strategies. It is important to try to see the whole picture and the consequences of the chosen pricing strategy. What might turn out to be the best strategy today might not be the best strategy in the long run.

When the EPs have decided on their price and their pricing strategy they will probably have better chances of calculating their income. This again can help them when they are deciding on how much money they are going to spend in the development and offering of their e-learning courses. This means that the pricing strategy should be considered before the course is being developed.

8.2 Government and privately funded e-learning – fixed and variable costs and income

When the EPs are selling their e-learning to different customers they will try to set a price that will cover all their costs related to their e-learning, fixed and variable, direct and indirect. If the EPs spend a lot of money to develop high quality content, they can raise their prices to their customers. The customers will hopefully pay the extra cost because of the extra customer value the high quality content will give them.

In government funded education the EP’s income is fixed. The EP will get a certain amount of money per student. The EP must spend its money wisely because it can not turn up the prices to the students. This means that the EPs can not invest large amounts of money in high quality e-learning content. Or can they?

If the government is paying a fixed price per student and there is an open market, there are possibilities for EPs that would like to invest in high quality e-learning content. The key to success is low variable costs and a large student number. Let us look at three

examples. One example where *the number of students is fixed and the income per student is set by the government*, one example where *the number of students is not fixed (open market) and the income per student is set by the government* and a last example where *there is an open market situation (the students can choose where they want to follow a course and which course they want to follow) and the EP them selves can set the price the students have to pay*.

First example (fixed student number, income per student set by the government):
The income per student (p.s.) is 500 Euro.
The number of students is 30.
The fixed costs (mainly development of e-leaning content) are 9000 Euro.
The variable cost per student is 200 Euro.
We will now find out if we can afford these costs with this income.
Result = Income – Costs = Income – (fixed costs + variable costs)
*Result = (500 * 30) – (9000 + (200 * 30) = 15000 – 15000 = 0*
Result per student = Income per student – (fixed cost p.s. + variable cost p.s.)
Result per student = 500 – (9000/30 + 200) = 500 – (300 + 200) = 0

If we would like to invest more money in the development of e-learning content the fixed cost per student will be higher and we will lose money unless we are able to reduce the variable costs per student, because the income per student is set by the government. The total cost per student is 500 Euro and it is the same as the income per student.

Second example (the number of students is not fixed (open market), income per student set by the government):
At first we choose to keep the fixed cost at 9000 Euro to see how many students that will sign up for the course. In the open market only 25 students choose to sign up for the course because the content is not very good. Will the EP make enough money to cover their costs? Let us look at it:
The income per student is 500 Euro.
The number of students is 25.
The fixed costs (mainly development of e-leaning content) are 9000 Euro.
The variable cost per student is 200 Euro.
Result = Income – Costs = Income – (fixed costs + variable costs)
*Result = (500 * 25) – (9000 + (200 * 25) = 12500 – 14000 = -1500*
Result per student = Income per student – (fixed cost p.s. + variable cost p.s.)
Result per student = 500 – (9000/25 + 200) = 500 – (360 + 200) = -60

Now we see that because of the lower student number of we lose money because our costs are too high. The fixed cost per student is now 360 Euro and the variable cost is the same as in the first example and the government will still only give us 500 Euro per student.

We decide to invest more money in the development of the e-learning content material (we increase from 9000 Euro to 12000 Euro fixed cost), because we think that the CPV for many of the potential students then will be higher, and hopefully more students will choose to follow our e-learning course. When the new course starts 50 students have registered. We would like to see how the budget turns out now.

The income per student is 500 Euro.

*The number of students is **50**.*
*The fixed costs (mainly content to the e-learning course) are **12000** Euro.*
The variable cost per student is 200 Euro.
Result = Income – Costs = Income – (fixed costs + variable costs)
*Result = (500 * 50) – (12000 + (200 * 50) = 25000 – 22000 = 3000*
Result per student = Income per student – (fixed cost p.s. + variable cost p.s.)
Result per student = 500 – (12000/50 + 200) = 500 – (240 + 200) = 60

Because of higher total income (increased number of students) and reduced fixed cost per student we see that we are now getting a positive result. The investment in better e-learning content paid off even if the variable costs are the same and the income per student is the same (set by the government).

Third example (the number of students is not fixed (open market); income per student (course fee) is decided bye the EP, not the government):
We now decide to invest even more money in the development of the e-learning content material (14000 Euro fixed cost) because we want to increase the total customer value even more, and hopefully also the CPV. We also choose to set the student price at 800 Euro per student, raising the price the student has to pay to follow the course with 300 Euro. We are now trying to sell the course without government funding. The number of students signing up for the course at this price is 25. We now have to find out if this will give us a positive result.

*The income per student is **800** Euro.*
The number of students is 25.
*The fixed costs (mainly development of e-leaning content) are **14000** Euro.*
The variable cost per student is 200 Euro.
Result = Income – Costs = Income – (fixed costs + variable costs)
*Result = (800 * 25) – (14000 + (200 * 25) = 20000 – 19000 = 1000*
Result per student = Income per student – (fixed cost p.s. + variable cost p.s.)
Result per student = 800 – (14000/25 + 200) = 500 – (560 + 200) = 40

We can see that the result is positive. The fixed cost per student is much higher, but the increased income per student is even higher.

By watching these “made up” examples we see that there are many opportunities if we want to make some changes. We could also have invested money in making the e-learning course “self-going” and in that way hopefully reduced the variable costs per student. If the variable costs could be reduced more than the increase in fixed cost while maintaining the same student interest, we could get an even better result. We have also through these examples seen that the fixed costs per student decrease when the total number of students increases. This means that if most of the fixed costs are related to content development, it will be positive for the total cost per student if a course can be offered several times with the same e-learning content or if the content could be reused in other courses (reuse of Learning Objects).

It is important to keep track of all the income, the fixed costs and the variable costs, and how they influence on each other and the CPV (no matter who the customer is). Being able to control the income and the costs is not easy.

8.3 A working model - comparing costs for different ways to organize and offer e-learning

We will in this chapter present an economic model used at MIUN/ITM to show the impact of different ways an EP can organize e-learning.

As we have discussed in this report an e-learning course can contain a lot of different activities that will affect the economy. In chapter 3 we focused on the development of the e-learning course and the learning material. The EP has different alternatives if they want to offer an e-learning course:

1. You can **buy the entire course** from another EP and even let them run it for you. You only register the students, take care of your internal administration, register the results, get the revenue/fees and pay your provider.
   The income and costs are probably directly connected to the number of students, so it should be possible to keep it profitable.
2. You can **buy the course material** and offer the course yourself. The same as above but you have to take the risk of being forced to run a course with too few students to keep it profitable.
3. You **develop the entire course yourself** and run it. The risk of losing money is all yours. You have to pay for development up front and if you have too few students in the course you will not be able to cover the teacher and the development costs.

There is also possible to make a mix of the three alternatives presented over. We will show this in an upcoming example.

Before you decide if you would like to buy or to develop the course yourself you have to do some calculations. You have to figure out the costs for developing the course your self compared to the costs of buying it form another EP. You must also try to estimate the potential income during the course's lifetime.

There are different types of costs and income for EPs when they are offering a e-learning course:

Costs for:

- **Developing the course**. The main cost are salary for the people (the teacher) who are developing the course material, but in some cases there are costs for buying material, doing translation, buying hardware and software, video production, etc.
- **Salary costs** for teachers and instructors offering the course, including overhead costs for rooms, laboratories, library, administration, etc. i.e. running the course.

Income, student fees + revenue (depends on the pricing model)

- **Per registered student**. The revenue will often be divided into one part for each registered student, regardless of their study result.
- **Per examined student**. The rest of the revenue after the students has completed the course.

There are also other considerations that you have to have in mind, time to market, the work load on your staff, the possibility to hire former students as instructors, risk of losing control over the education, e-learning acceptance from the staff and the staffs need for e-learning competence and knowledge. Of much importance is also the discussion about quality. If the EP does not have enough competence of our own it might be better to let somebody else create the learning material. The EP will need both technical and pedagogic knowledge within e-learning.

Let us have a look at the model they are using at MIUN/ITM. Here you can se that fairly simple calculations can give valuable information when you should decide on how the e-learning should be organized, in-house development and offering or buying from another EP.

When MIUN/ITM took the decision to buy education from the Norwegian content supplier TISIP, they started by looking at purely economic factors concerning their own institution, as mentioned above.
In their case about half the total revenue was paid at the registration of the student.

They had more alternatives than the ones mentioned above when they were considering how to organize their e-learning. If they chose to buy a course they could:

- ***Buy the whole course** from TISIP including examination.*
- *Carry out the **course in their own LMS**, but still buy course and all management from TISIP*
- *Buy the teacher from TISIP but have their **own instructors**, either a teacher or a student.*
- *Buy **only access to the website** at TISIP but running the course them selves.*
- ***Buy the material and offer it independently** of TISIP.*

If they instead decided to develop their own course the corresponding alternatives would be:

- *Let a teacher take care of all the tutoring.*
- *Let a cheaper instructor, often a more advanced student, handle written exercises and questions.*

Let us look at their first and most simple model used for cost calculations. In this early stage they had only 4 alternatives:

1. *Buy the course from TISIP,*
    a. *Use their own student instructor*
    b. *Buy instructor from TISIP*

2. *Develop their own course*
    a. *Teacher as instructor*
    b. *Student as instructor*

We can start by looking at some basic figures: the average salary/hour for teacher and instructor (Figure 14, Salaries, first model) below.

***For teacher**: Average salary 38 666 (EURO/year)*
Actual working hours teaching 1 360
Social security expenses 153 %
OH-cost 199 %
*(38 666/1 360)*1.53*1.99=86.56 (EURO/teaching hour)*

***For instructor**: Average salary 12.2 (EURO/hour)*
Social security expenses 153 %
OH-cost 199 %
*12.2*1.53*1.99=37.2 (EURO/teaching hour)*

Comparison between buying course (7,5 ECTS) or develop our own	
Salary Teacher	87
Salary Instructor	37
Registered students	300
Throughput	50%

Figure 14, Salaries, first model

Next we look at the number of students, throughput and revenue + fees (Figure 15, Income, first model). From this we get the total income, in this case only revenues.

Registered students	50			A - Buy	course		B - Own	course
Throughput	50%			instructor	instructor		instructor	instructor
				our own	TISIP		teacher	student
INCOME:		/student		a	b		a	b
Registered student		484		24 191	24 191		24 191	24 191
Examined student		506		12 651	12 651		12 651	12 651
		Total revenue		36 842	36 842		36 842	36 842

Figure 15, Income, first model

Next MIUN had to define their own costs, depending on how they choose to allocate the resources (Figure 16, Resource allocation, their own course, first model). They use a total of 4.67 hours/student. For administration they estimate 1 hour and the same for examination. The 2.67 hours for teaching can be allocated to a teacher or a cheaper instructor. If they instead of buying the course develop it them selves this would take 340 hours.

COSTS:								
Develop own course								
Internal costs:	**hour**	**€/stud/hour**						
Administration A	**1**	87		4 328	4 328			
Administration B	**1**	87					4 328	4 328
Instructor teacher	**2,67**	231					11 556	
Instructor student	**2,67**	99		4 968				4 968
Examination	**1**	87					4 328	4 328
Course development	**340**						29 432	29 432
		Own costs		**9 296**	**4 328**		**49 645**	**43 057**

Figure 16, Resource allocation, their own course, first model

In case of buying the course from TISIP they where using a model were they paid 281 EURO/students if TISIP supported with teacher but 220 if they use their own staff as instructors (course leader/teacher from TISIP). For those students not examined they got a discount of 65 % on both alternatives. (Figure 17, Resource allocation, buy course, first model)

Buy course		**€/student**						
Own instructor		220		11 000				
TISIP instructor		281			14 056			
discount for not exam	**65%**	143		-3 525				
discount for not exam	**65%**	183			-4 518			
		Total costs €		**20 071**	**22 976**		**49 645**	**43 057**

Figure 17, Resource allocation, buy course, first model

Finally they get the result for these different ways of allocating resources. AVG average if buying or develop their own (Figure 18, Result/revenue for 50 students, first model).

Result:		**16 893**	**18 916**		**-12 803**	**-6 215**
Result/revenue		**2,20**	**2,66**		**0,74**	**0,86**
NB only change values in Yellow fields		AVG	1,95		AVG	0,80

Figure 18, Result/revenue for 50 students, first model

On next page we see the complete model.

Comparison between buying course (7,5 ECTS) or develop their own

Salary Teacher	87 €			1 €=	9	SEK	
Salary Instructor	37 €						
Registered students	50						
Throughput	50%						
			A - Buy course		**B - Own course**		
			instructor our own	**instructor TISIP**	**instructor teacher**	**instructor student**	
INCOME:		€/student	a	b	a	b	
Registered student		484 €	24 191	24 191	24 191	24 191	
Examined student		506 €	12 651	12 651	12 651	12 651	
		Total revenue	**36 842**	**36 842**	**36 842**	**36 842**	
COSTS:							
Develop own course							
Internal costs:	**hour**	**€/stud/hour**					
Administration A	1	87 €	4 328	4 328			
Administration B	1	87 €			4 328	4 328	
Instructor teacher	2,67	231 €			11 556		
Instructor student	2,67	99 €	4 968			4 968	
Examination	1	87 €			4 328	4 328	
Course development	340				29 432	29 432	
		Own costs	**9 296**	**4 328**	**49 645**	**43 057**	
Buy course		**€/student**					
Own instructor		220 €	11 000				
TISIP instructor		281 €		14 056			
discount for not exam	65%	143 €	-3 525				
discount for not exam	65%	183 €		-4 518			
		Total costs	**16 771**	**13 866**	**49 645**	**43 057**	
		Result:	**20 071**	**22 976**	**-12 803**	**-6 215**	
		Result/revenue	**2,20**	**2,66**	**0,74**	**0,86**	
NB only change values in Yellow fields			AVG	2,43	AVG	0,80	

Figure 19, Comparison between buy course/develop them selves

It is now easy to play around with the figures regarding number of students and throughput and look at the results. We can notice that with 50 registered students and a throughput of 50% the results are as in (Figure 19, Comparison between buy course/develop them selves)

The low figure for throughput only 50% is based on their experience from this type of courses.

Alternative	Result/revenue
1 a	2.20
1 b	2.66
2 a	0.74
2 b	0.86

Figure 20, Result/revenue for 50 students, first model

Our interpretation is that alternative 1 b (Figure 20, Result/revenue for 50 students, first model), buying everything from TISIP triples the result compared to developing their own course. The least profiting alternative is to develop our own course and let an expensive teacher instruct it. Remember that this is the case with only 50 students. In the examples in chapter 8.2 we saw that the number of students can affect the profit potential and that the fixed costs per student decrease when the number of students increased, and this will most likely be the case in this model example also. The fixed costs are closely linked to the development costs.

Let us try to find the break-even point, where the non-recurring (fixed) cost for development is "paid". If we use an average cost for teacher and instructor we notice (Result/revenue for 600 students, first model) that if we can guarantee that there will be more than 600 students (with 50% throughput) during the course lifetime/duration, it will be cheaper to develop the course ourselves. We calculate an expected lifetime of 3 years before the content needs to be updated or renewed.

Alternative	Result/revenue	Average
1 a	1.85	1.95
1 b	2,06	
2 a	1.63	1.95
2 b	2.29	

Figure 21, Result/revenue for 600 students, first model

Worth noticing is that in this simple model we have not counted for all the OH-costs, so for a course to be profitable it must have a result/revenue close to 1.5. But it gives a possibility to compare between the different alternatives.

As both costs and income in connection with buying from TISIP are directly coupled to the number of students the only way to increase the result/revenue is to increase the throughput, since the income per student is set by the government.

The calculations show that the choice between developing and buying the course could be rather easy if we just consider the economic factors in this model and know the number of students that will register and finish the course. The problem is that there are other factors that we need to consider. This report has shown that there are ways to become more effective in the process of developing and offering e-learning. Some of the factors that MIUN/ITM has considered are:

- ***Time to market****. If by buying a course they can offer it one year earlier, it could be an advantage over other universities, and they will also get income earlier.*
- *The* ***workload for our own staff****, at this point they were rather busy.*
- *They had a lot of* ***former students that were willing to work*** *as instructors, but sometimes they had to take the course themselves first.*
- *In this early state there were* ***few of the teachers embracing e-learning****. They had to set up good working examples to convince the teachers that e-learning was appreciated by students and a possible way to reach a new group of students.*

MIUNs decision was to buy some of the courses, everything included, where they did not have competence of their own. But in some courses use their own instructor and develop their own courses. The economic calculation was not the only factor to consider but it clearly showed some of the economic reality.

Through the years MIUN have updated and refined their model and also renegotiated the agreement with TISIP. MIUN have found that it is very important to have these results on paper in discussions with the management. Not until they could show the management the economic calculations they accepted that buying courses from TISIP not only gave them an advantage in reducing time to market but that it also was good business.

8.4 A payment model for developing and offering e-learning (the teacher and other experts)

In the chapter about teacher motivation we emphasized the importance of having a payment model that would encourage the teacher and other people involved in e-learning to do a good job and take part in e-learning activities. From the examples over we can see that it is important to have control over the variable and fixed cost involved in e-learning development and offering. Many of these costs are related to the payment model of the people who are actually developing and offering the e-learning and the e-learning material.

It is a good idea to separate the costs of developing and offering the e-learning. The cost of development is usually a fixed cost. The total costs will be the same if there is one hundred persons or one person who is going to follow the course. When it comes to the offering of the course, the cost to a large extent will be variable, depending on the number of students following the course. Looking at these facts it is a good idea and potentially a cost effective one that the payment model for developing and offering e-learning reflects these facts. Now we will show you how this can be done by an example taken from TISIP's payment model.

At TISIP the payment-model for those who are working with e-learning is divided into six different activities, administration, content production, content update, student guidance, comments and feedback on exercises and censoring (external). Let us look some more at each of the activities and why this model is working well when it comes to fixed and variable cost and how it makes e-learning equal to campus education in terms of payment and salary.

Let us start with some background information about the e-learning courses. Each e-learning course is divided into twelve modules (weeks) of work, each containing a new lesson and exercise each week (usually written by the teacher). The students send in their exercises to get feedback on the work they have done.

Administration – this involves the activities of publishing the lessons and the exercises (the LOs) in the LMS each week and then writing the final exam. For this activity the teacher gets a fixed number of hours per lesson and exercise.

Content production – the first time a course is being offered the lessons and the exercises must be written (developed). The teacher gets paid a certain number of hours for each of the modules produced. TISIP uses a fixed number of hours for each module but this number could of course be adjusted according to the size and complexity of the module.

Content update – for each course that already has been developed the teacher gets a certain number of hours to update the modules. This is relevant for a course that has been offered before. This update is important to make sure that the content written earlier is up to date when it comes to content and relevance. This is quality assurance.

Student guidance – the teacher gets a fixed number of minutes per student per module to give guidance to the students and to mark the students' exams. The more modules the teacher is responsible for and the more students he has the more he is getting paid.

Comments and feedback on exercises – The teacher gets a certain number of minutes paid for each exercise he comments and gives feedback on. The more exercises and students the teacher is giving feedback to the more he is getting paid.

Censoring – Some exams need an external censor or en extra internal censor and they are getting paid for a certain number of minutes for each exam they mark.

By using this model different persons can do the different activities involved in the development and offering of the e-learning courses. People can also share one or more activity between them selves. We can see that the cost of developing the course and its content will be a fixed number that can be decided before development starts.

The EPs costs related to the offering and running of the e-learning course when it comes to teacher payment will be variable, increasing with the number of students taking the course. This makes it possible for the EP to budget their costs and match their costs against the expected amount of income according to their pricing and market strategy. TISIPs model is calibrated so that a teacher will get the same amount of money if he is responsible for updating and running an e-learning course with 30 students or are responsible for a class on campus (30 students). In this way it is possible to equal the on-campus and e-learning education. In this report we choose not to present the numbers and figures in TISIPs payment model, because each EP has to adjust the model to their financial situation and the salary level in each country.

8.5 An cost model for e-learning teaching and offering

In the last example in this report we look at a MIUNs model for allocation of resources to different courses and the possibility to change the allocation to see if MIUN could reduce their costs.

Salary Teacher	86 €	**Revenue registered**	484 €	**Prognosis/Applications**	200%
Salary Instructor	37 €	**Revenue examined**	506 €	**Prognosis/Finally regist.**	80%
Salary Stud. Inst	27 €	**Throughput**	50%		

Figure 22, Salaries, throughput and prognosis, final model

Also in this model we have to start with salaries, revenue and throughput (Figure 22, Salaries, throughput and prognosis, final model, salary for the teacher, the instructor and the student instructor. Since this model start with is a prognosis MIUN use their preliminary number of students who have applied and from that number they forecast the expected number of students who will apply. Based on earlier experiences they estimate that they will have twice as many applications at the deadline for applications than at the preliminary deadline. They expect that only 80 % of those who have applied will actually register and follow the e-learning course. Below you see actual figures for 5 courses at MIUN autumn 2006.

The early prognosis was 195 registered students but the actual number turned out to be only 140. Instead of the expected +200% they only received +145%. The model must be adjusted for further use, and MIUN should do some evaluating activities to find out why the model used earlier did not turned out to be correct. The model based on earlier experiences gave MIUN quick and important feedback, even if it was negative. (*Figure 23, Number of students and income, final model)*

Distance courses autumn 2006

	Students				Income	
	Applications		Prognosis	Finally	Revenue	Revenue
	1:a	"+	applications	registered	Registered	Examined
Course A	57	2	91	47	22 748 €	11 891 €
Course B	24	8	38	27	13 068 €	6 831 €
Course C	20	2	32	36	17 424 €	9 108 €
Course D	11	3	18	13	6 292 €	3 289 €
Course E	10	0	16	17	8 228 €	4 301 €
TOTAL	**122**	**15**	**195**	**140**	**67 760 €**	**35 420 €**
Should have been			244	195		

Figure 23, Number of students and income, final model

Next MIUN look at the allocation of resources (Figure 24, Resource allocation, final model).

This takes place under "Hours" +"Cost". Here MIUN can try out different allocation models by distributing time between teacher, instructor and TISIP look at the cost per course.

	Hours		Costs			
	Teacher	Instructor	Teacher	Instructor	TISIP	Total
Course A	204,5		17 508 €		1 859 €	19 572 €
Course B		67,5		1 854 €	3 855 €	5 777 €
Course C	76	90	6 507 €	3 312 €		9 985 €
Course D	85,5		7 320 €			7 405 €
Course E		99,5		2 734 €		2 833 €
TOTAL	**366**	**257**	**31 335 €**	**7 900 €**	**5 715 €**	**45 573 €**

Figure 24, Resource allocation, final model

MIUN can find the relevant cost for each course depending on the number of students, the throughput and the allocation of resources.

- ***Course A**. Course material bought from TISIP. Course administered by a teacher from MIUN.*
- ***Course B**. Course material and a teacher bought from TISIP, with a student instructor from MIUN.*
- ***Course C**. Course material developed at MIUN, with an internal teacher and an internal instructor helping with exercises and discussions.*
- ***Course D**. A teacher at MIUN taking care of everything.*
- ***Course E.** A student instructor taking care of everything.*

For all courses MIUN have a fixed model for allocation teacher/instructor hours per course and student

- *40 hours independent of number of students. For starting-up a course*
- *1 hour per student for examination and administration*
- *2.5 hours per student for student contacts.*

MIUN can choose how to distribute these resources on teachers, instructors or TISIP, at different cost. This will of course affect the result (Figure 25, result/revenue with actual number of students, final model). The Result/cost varies in the range from 40% to 390%, depending on both the resource allocation and the number of students.

	Result	Result/Costs
Course A	17 650 €	91%
Course B	14 995 €	239%
Course C	18 535 €	189%
Course D	2 919 €	40%
Course E	10 656 €	390%
TOTAL	**64 754 €**	

Figure 25, result/revenue with actual number of students, final model

Later in this chapter you van find the complete final model (Figure 27, Resource allocation, final model).

If we look at the model presented over and try to look at the effect of the resource allocation if there are 100 students in every course. Result/cost now varies in the range from 97 % to 588 % (Figure 28, Resource allocation 100 students, final model). As we saw in our first model the most expensive way to allocate resources is if MIUN use their own teacher in a course bought from TISIP (Course A) or their own teacher in their own course (Course D). But if we look at (course B) with the teacher from TISIP and an instructor from MIUN, the result is better. As an extreme (Course E) MIUN use a student instructor who can manage everything, something that gives the best result, result/cost 588 %. The conclusion is obvious; ***teacher time is the main factor to be aware of if they want to reduce their costs.***

As we can see the salaries including social security expenses and overhead cost have a substantial effect in this model. And furthermore it boosts the overhead costs, as most of the OH is distributed among MIUNs institutions based on total salary paid, only in some cases it is linked to the number of students. This can cause some dynamic effects that are very difficult to foresee but they can be considerable. As an example the central OH-costs e.g. administration, library, etc are fairly stable even if the amount of students decreases, or at least adjusts very slowly. If e.g. the department of ITM at MIUN due to fewer students have to discharge 25 % of their labour force, their contribution to the central OH costs would decrease. ITM will reduce their salary cost and their OH costs, instead some other department with a steady number of employees will have to pay more of the total OH costs...

Actual figures for 2006 are (Mid Sweden University/Dept of Information Technology and Media) (Figure 26, Salaries, social security expenses and OH, MIUN)

Average gross salary/year	*36 900 EURO*
Social security expenses	*+ 53 % on gross salary*
Local OH	*+ 77 % on (gross salary + social security exp)*
Central OH	*+ 22 % on (gross salary + social security exp)*

Figure 26, Salaries, social security expenses and OH, MIUN

It means a total overhead of nearly 100 %, on the gross salary and the social security expenses. Therefore it is vital for ITM that they can maintain an average profit per course of at least 100 %. The models presented are crucial for MIUN/ITM. Without the models ITM would have problems finding the right combinations. With high OH-costs it is vital to make sure that everyone is actually working. One teacher without full workload (but with full salary) would actually cost ITM twice his salary + social security expenses.

One question to ask is why is not every institution using a model similar to this one? Many EPs have their focus set on research and if, as in Sweden, basic training is financed by the government the focus on costs turn out to be less interesting. But as we have shown, there is a lot to gain from even simple calculations. These models, continuously updated, also make the budgeting easier.

	Students				Income		Hours			Costs			Result	Result/ Costs
	Applications		Prognosis	Finally	Revenue	Revenue								
	1:a	"+	applications	registered	Registered	Examined	Teacher	Instructor	Teacher	Instructor	TISIP	Total		
Course A	57	2	91	47	22 748 €	11 891 €	204,5		17 508 €		1 859 €	19 572 €	15 272 €	79%
Course B	24	8	38	27	13 068 €	6 831 €		67,5		1 854 €	3 855 €	5 777 €	14 189 €	249%
Course C	20	2	32	36	17 424 €	9 108 €	76	90	6 507 €	3 312 €		9 985 €	16 713 €	170%
Course D	11	3	18	13	6 292 €	3 289 €	85,5		7 320 €			7 405 €	2 261 €	31%
Course E	10	0	16	17	8 228 €	4 301 €		99,5		2 734 €		2 833 €	9 795 €	358%
TOTAL	**122**	**15**	**195**	**140**	**67 760 €**	**35 420 €**	**366**	**257**	**31 335 €**	**7 900 €**	**5 715 €**	**45 573 €**	**58 230 €**	
Should have been			244	195										

Salary Teacher	86 €	**Revenue registered**	484 €	**Prognosis/Applications**	200%
Salary Instructor	37 €	**Revenue examined**	506 €	**Prognosis/Finally regist.**	80%
Salary Stud. Inst	27 €	**Throughput**	50%		

Figure 27, Resource allocation, final model

Distance courses autumn 2006

	Students	Income		Hours			Costs			Result	Result/Costs
	Finally registered	Revenue Registered	Revenue Examined	Teacher	Instructor	Teacher	Instructor	TISIP	Total		
Course A	100	48 400 €	25 300 €	390		33 389 €		3 956 €	37 735 €	36 355 €	97%
Course B	100	48 400 €	25 300 €		250		6 868 €	14 279 €	21 397 €	52 553 €	249%
Course C	100	48 400 €	25 300 €	140	250	11 986 €	9 201 €		21 577 €	52 513 €	248%
Course D	100	48 400 €	25 300 €	390		33 389 €			33 779 €	40 311 €	121%
Course E	100	48 400 €	25 300 €		390		10 714 €		11 104 €	62 986 €	588%
TOTAL	**500**	**242 000 €**	**126 500 €**	**920**	**890**	**78 765 €**	**26 783 €**	**18 235 €**	**125 593 €**	**244 717 €**	

Figure 28, Resource allocation 100 students, final model

8.6 Conclusions

It is important that the EP find the right pricing strategy for how to sell their e-learning. There are many possible solutions, and picking the right strategy can be the difference between profit and loss. If the EP is operating in different markets and towards different target groups they should consider offering the courses with different pricing strategy to the different target groups. The e-learning offering should then to some degree appear to be different, so that the EP will not risk having customers who fell that they have been paying more then other customers to get the same product.

The EP must adjust to the market situation when they are setting the price and are calculating the costs. It is important to be aware of the way on can improve the income/cost ratio by adjusting the variable and fixed cost involved in e-learning.

Before running a course and allocating resources to it, some kind of simple economic model should be used. This will make it possible to compare the economy in different courses and the different ways they can be organized. In the future, earlier economic results from the model can be compared with the situation of today to see if we are becoming more effective.

It is a good idea to have a payment model for the development and offering of e-learning where the different activities are separated. In this way the EP will be better able to control the cost and allocate the resources. A model like this will also make it easier to motivate people involved with e-learning activities, showing them that they are getting paid for the job they are doing. With a good model that also involves the income per student one can find the number of students needed in a course to “brake even”.

In general we can say that all cost involved in all the e-learning activities should be monitored, trying to find new way to reduce the cost while maintaining or increasing the income. It can also be a good idea to increase the cost if this will lead to a proportionate higher increase of income.

Added references

We like to add one article in the subject:

Bartley, S. J., & Golek, J. H. (2004). Evaluating the Cost Effectiveness of Online and Face-to-Face Instruction. Educational Technology & Society, 7 (4), 167-175.

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The activities in the QUIS project will be directed towards QUality in e-learning, Interoperability and reusability of e-learning material and development of Standards. The project will also look at cost beffectiveness in e-learning.

Quality in e-learning is important to be able to exchange both learning materials and learning practices across HEI's in Europe. To establish joint study programs it is essential that cooperating institutions accept each others Quality Assurance Systems (QAS).

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