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ECONOMICS OF DISTANCE EDUCATION RECONSIDERED

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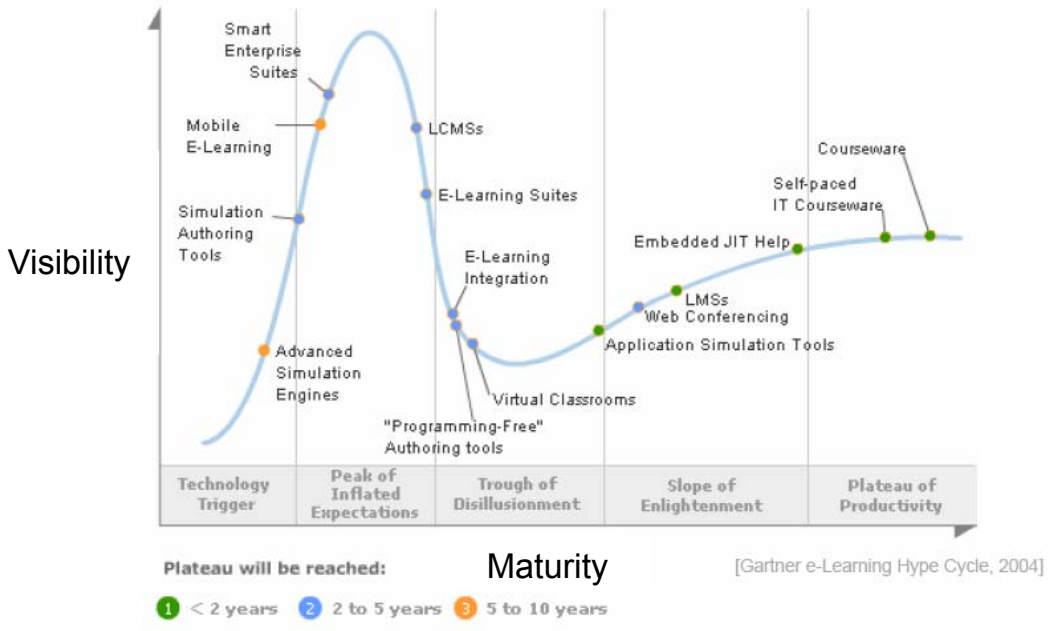
ABSTRACT

According to Gartner a certain hype of e-Learning was followed by a downturn but eLearning will continue to be an important factor in learning scenarios. However the economic viability of e-learning projects will be questioned with more scrutiny than in earlier periods. Therefore it seems to be a good opportunity to see what can be learned from past experience in costing distance learning projects and what aspects are added by current attempts to measure economic efficiency. After reviewing early research about costing distance learning some more recent approaches will be discussed, such as eLearning ROI-calculators and the concept of total cost of ownership. Furthermore some microeconomic effects referring to localization of distance learning courses are outlined. Finally several unsolved issues in costing distance education are summarized.

Keywords: **Distance Education, Cost, eLearning, Network Economics**

WHY COST EFFICIENCY IS IMPORTANT?

According to Gartner a certain hype of e-Learning was followed by a downturn but eLearning will continue to be an important factor in learning scenarios.



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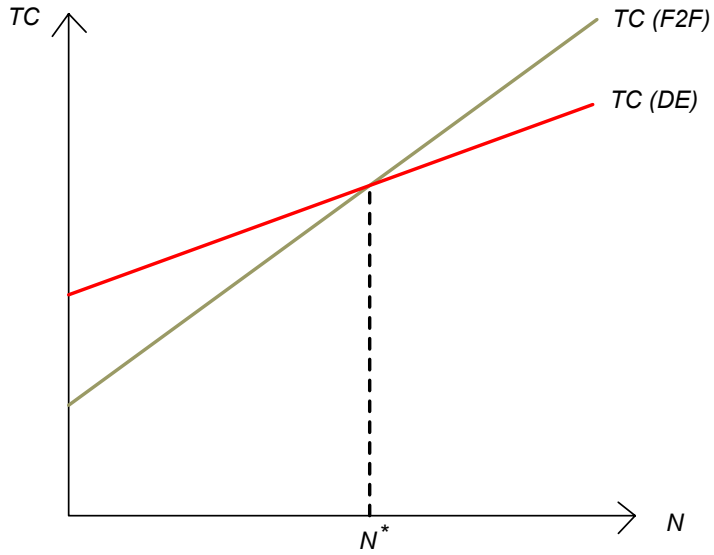
COSTING DISTANCE EDUCATION IN A HISTORICAL PERSPECTIVE

Historically one of the first important studies was carried out by Wagner analysing the cost of the British Open University compared to those of the conventional universities in 1976. The aim was to check whether distance education is a viable and cost efficient alternative to face to face teaching. Wagner's calculations (Wagner 1976) showed that the cost per student is about one third of the other universities. However this effect holds only for a high number of enrolled students.

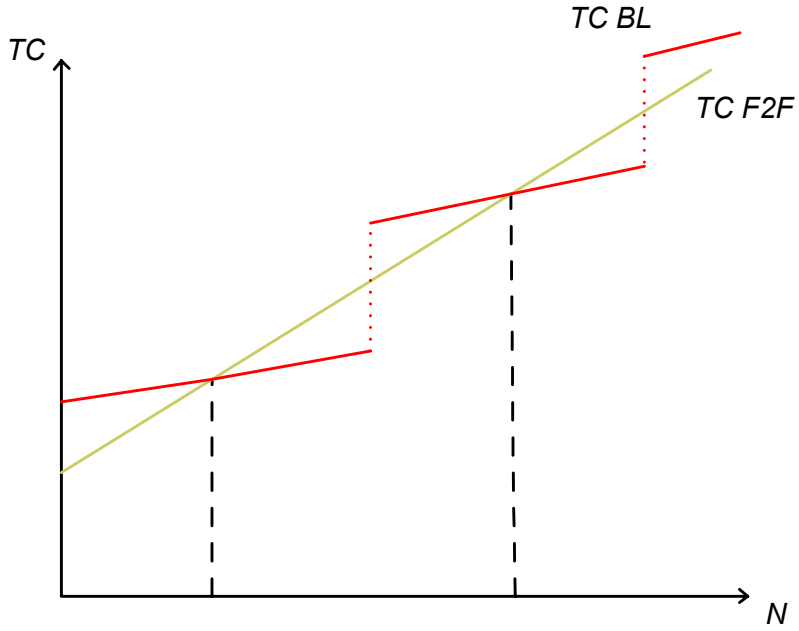


TC = Total Cost, F2F = Face to Face DE = Distance Education N = Number of Students

In later works these calculations have been refined by taking into consideration the drop-out ratio, the impact of courses for different subject areas, group size of tutorials and type of media used. Furthermore other distance teaching institutions were analyzed in studies with comparable findings (Yenbamrung 1994).

The economies of scale due to decreasing average cost per student might have been responsible for the emergence of the distance teaching Mega-Universities in Britain, Spain, Turkey and India. However today distance education systems do not have the monopoly anymore to deliver teaching by technical media. Therefore we can observe some tendencies also among traditional universities to share content production to reduce the high fixed costs and at the same time exploit the economies of scale by serving a bigger student population.

With upcoming blended learning scenarios (BL), i.e. a combination of sequences with eLearning and face to face meetings, the economies of scale of distance learning diminished and unique solutions for break even points may not exist any more.



Every type of simultaneous communication be it electronically or face to face is hampering full exploitation of economies of scale due to the limited capacity of teachers. However if we think of internet live recordings of tutorials that can be later viewed by an nearly unlimited number of students from a webpage then the old economies of scale might re-appear to a certain extent.

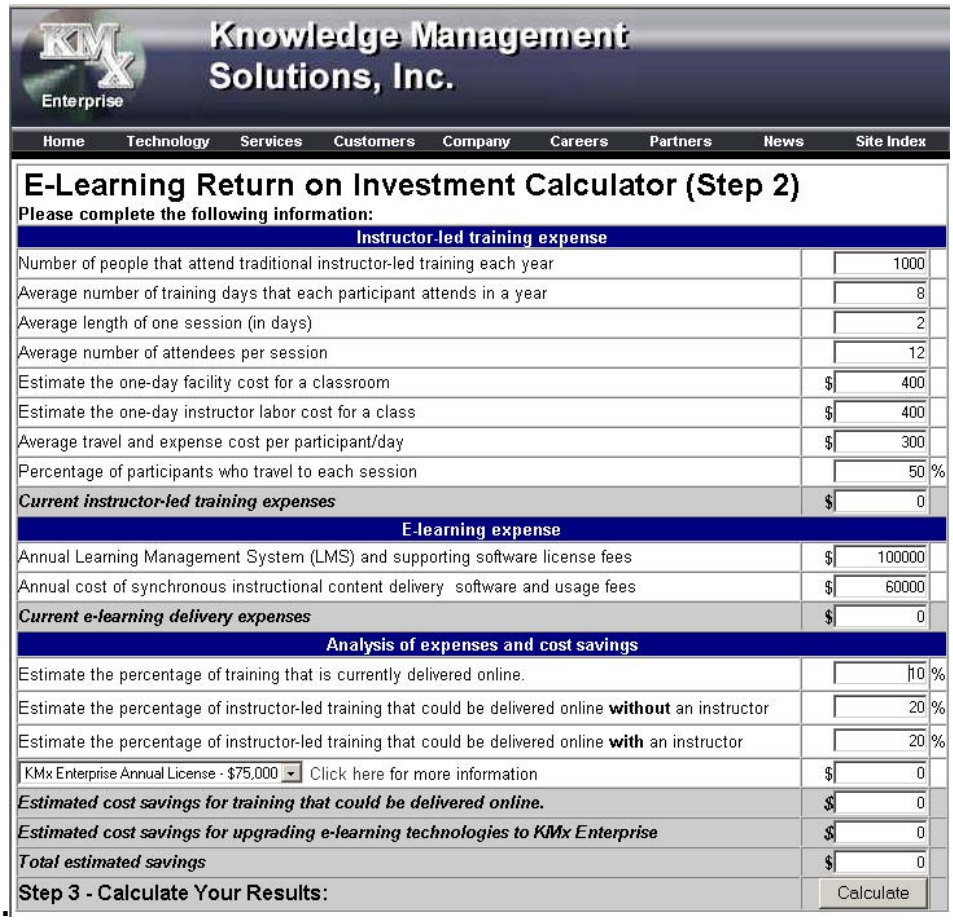
COST EFFICIENCY OF ELEARNING

In its initial phase e-learning cost calculations followed this more traditional pattern. One of the main objectives was once again to prove that e-learning offers can be cost effective compared to face to face settings. Below you find a commercial ROI (Return on Investment) calculator tool to calculate such comparative profitability of e-learning.

However it is obvious that the concept is static and does not take account of a time profile for earnings and expenditures. A study of Bayrak and Kesim (2005) uses therefore the inflation rate plus a risk free interest rate to discount future expenditures and revenues.

With e-learning becoming an accepted alternative some modifications entered into the debate. The focus switched from course development cost and success rates to the acquisition cost of content and learning management systems, e.g. the discussion about commercial or open source software. With educational software we find some similar characteristics as with distance education in general. Development cost of software is high but distribution cost is minimal.

This effect is reinforced by the fact that even content related developmental costs are sharply decreasing with scale due to copying and pasting or reengineering e.g. using existing templates.



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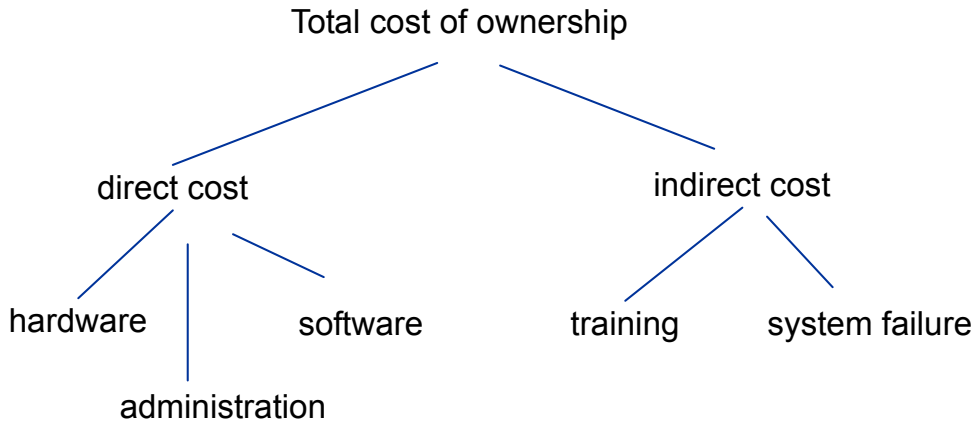
E-Learning Return on Investment Calculator (Step 2)

Please complete the following information:

Instructor-led training expense	
Number of people that attend traditional instructor-led training each year	1000
Average number of training days that each participant attends in a year	8
Average length of one session (in days)	2
Average number of attendees per session	12
Estimate the one-day facility cost for a classroom	$ 400
Estimate the one-day instructor labor cost for a class	$ 400
Average travel and expense cost per participant/day	$ 300
Percentage of participants who travel to each session	50 %
Current instructor-led training expenses	$ 0
E-learning expense	
Annual Learning Management System (LMS) and supporting software license fees	$ 100000
Annual cost of synchronous instructional content delivery software and usage fees	$ 60000
Current e-learning delivery expenses	$ 0
Analysis of expenses and cost savings	
Estimate the percentage of training that is currently delivered online.	10 %
Estimate the percentage of instructor-led training that could be delivered online **without** an instructor	20 %
Estimate the percentage of instructor-led training that could be delivered online **with** an instructor	20 %
KMx Enterprise Annual License - $75,000 Click here for more information	$ 0
Estimated cost savings for training that could be delivered online.	$ 0
Estimated cost savings for upgrading e-learning technologies to KMx Enterprise	$ 0
Total estimated savings	$ 0
Step 3 - Calculate Your Results:	Calculate

Source (http://www.kmsi.us/)

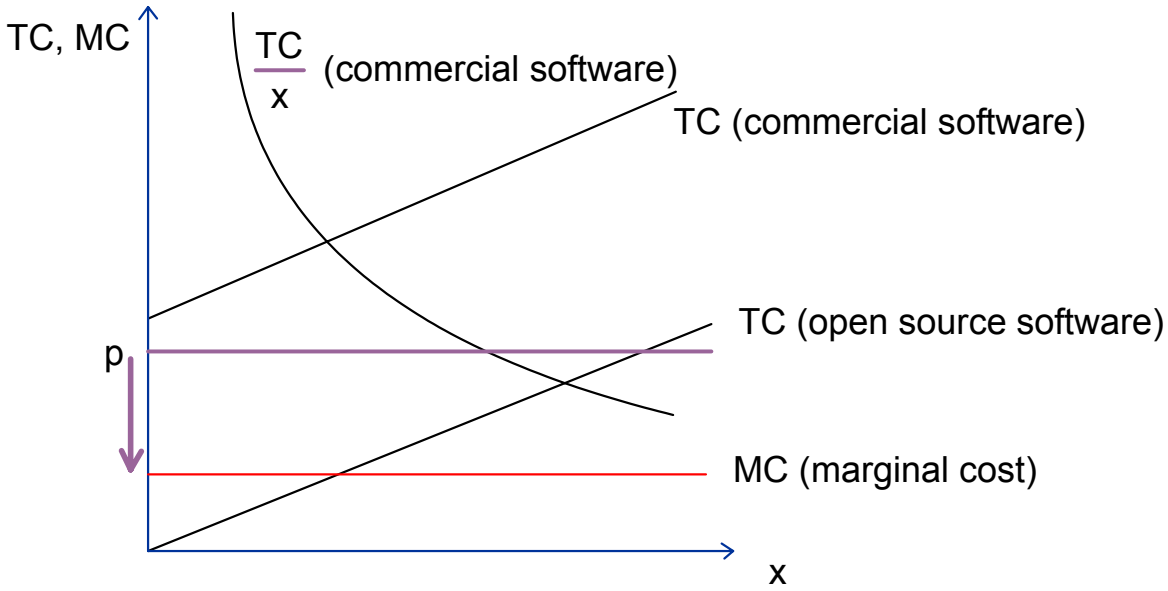
As costs of learning platforms became lower, other cost components have been analyzed in more detail. It was acknowledged that a lot of additional cost is involved with the implementation of e-learning and have to be considered as well, e.g. hardware, training cost, maintenance, upgrading of software. The cost of the learning platform itself therefore is considered only as a minor cost item.



PRICING EFFECTS

Service quality and stability of further development seem to be bound to the size of the vendor measured by the number of user licenses. This explains partially the merger of learning management systems such as WebCt and Blackboard. However the low distribution cost and the decreasing average cost per user have also important consequences for pricing the educational services.

The higher the number of users the lower are the average cost of the product. With nearly zero licensing cost by acquisition of open source it becomes obvious that pricing of the delivery of educational content itself is difficult to achieve. Instead grades or tutorial support have to be priced.



TC = Total Cost, MC = marginal cost x = Output (Users, Licenses) p = Price

Fig. 5

Also the size of the community of developers and the number of users enter into buying decisions. The here mentioned effects are called network effects and are usually not considered in concepts like the "Total Cost of Ownership" (Bensberg 2006).

Another aspect usually not considered in simple ROI-models of eLearning projects are compatibility issues. As learning platforms initially were developed in isolation from prevailing administrative IT-systems now the cost of integrating learning platforms with campus management systems is a major issue for investment decisions.

It turned out that instead of a single product or outcome an entire value chain has to be taken into consideration and specific cost drivers have to be identified. Also cost should be seen differently from the perspective of different actors or stakeholders.

The cost for the student differs from the cost of the institution (university, business enterprise) or e.g. an educational ministry. A student has to consider travel cost, loss of salary, a business enterprise may calculate loss of working hours to be balanced against later productivity gains, a ministry might estimate change in life time earnings or check improved quality of life through higher education measured by some consumer satisfaction index.

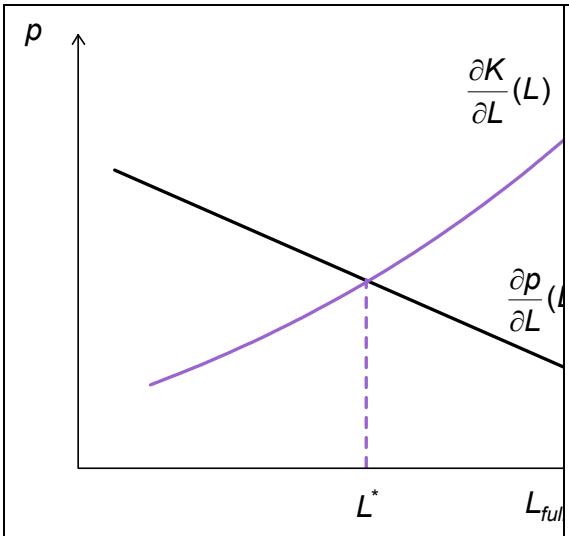
Universities today start to apply complex management systems that monitor workflows including the costing of services according to different service levels. The aim is to assess costs of business processes and match services and costs. So the focus is more on permanent controlling rather than on investment decisions. Finally the data collected and stored in data banks can be combined with management decision systems. However until university management decisions are really based on such systems is still a way to go. What is needed from economic theory is to explain the decisions of the stakeholders by applying microeconomic models e.g. using utility functions, budget constraints and prices to value the different educational alternatives. Unfortunately this type of research seems to be largely absent.

INTERNATIONALIZATION

In a global educational market export of distance education programs becomes increasingly important. Though the breakthrough by sweeping the global market with customized learning objects from huge repositories so far did not materialize expectations remain high and are repeated by educationalists as well as voices of the IT companies. However to sell the programs in another cultural context is not a mere translation issue into English language. Significance of images, language style, colors and layout patterns are only a few of the known cultural markers (Klusemann 2003).

Source: D. Klusemann (2003)

A complete localization to a foreign context may end up in a complete redesign approaching the cost of the initial program. However increased localization will drive up sales figures. So a provider has to balance the cost of additional localization against the revenue form increased sales. In economic modeling a profit maximizing firm therefore will choose the degree of localization were the marginal cost of localization (L) will balance the net value of the marginal output increase (Laaser, Kharalashvili 2003).



$$G(x,L) = p(x,L)x - K(x,L)$$

$G(x,L) =$ **Profit**

$L =$ **Degree of localization**

$x =$ **Output**

$p =$ **Market Price**

$K(x,L) =$ **fixed development cost**

Profits will be maximized if

$$\frac{\partial G(x)}{\partial x} = \frac{\partial p}{\partial x}(x,L)x + p(x,L) - \frac{\partial K}{\partial x}(x,L$$

and

$$\frac{\partial G(L)}{\partial L} = \frac{\partial p}{\partial L}(x,L)x + p(x,L) - \frac{\partial K}{\partial L}(x,L)$$

UNSOLVED ISSUES

Even though the data basis may be much more refined in the future than that applied in the early days of distance education some basic problems still remain unsolved. One of these problems is the assessment of the benefits of a given learning and teaching system. If training packages are sold in the market the benefits for the offering institution may be measured by the sales results. However this doesn't hold for the enterprise that is buying the service. Productivity or income increases are difficult to relate exclusively to prior training.

Even though you might have some income from selling courses an old debate dating from cost-benefit analysis enters into the reasoning. What kind of interest rate should be applied to discount future earnings?

The situation is even more difficult to assess for public institutions that do not charge full cost or make no profit. If the student's perspective is applied foregone earnings during study time and potential increases in future earnings are difficult to estimate. Methods such as to estimate willingness to pay for educational services are not applied and in any case may not be a very safe guide. A more fundamental problem is that economic efficiency considerations so far are not based on theoretical concepts about decisions of consumers or educational institutions. Here some interesting attempts are made by network economics (Shy 2001) e.g. to explain the introduction of new technology in the framework of game theory and utility functions, however the prevailing models are on a rather general level and not empirically tested.

Therefore the contribution of economics to assess efficiency of e-learning projects, to forecast reactions of stakeholders to changing economic parameters and to investigate conditions of network creation, standards and network dynamics are still tasks waiting for more research.

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