



## FUNDING E-LEARNING: A REVIEW OF PAST STUDIES

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### **Abstract:**

Although it may be a cause of regret for some, modern education providers seem poised to continue and extend the use of technology in the provision of education. The precise details of how this use of technology unravels over time will be revealed gradually, but important decisions about how to fund distance learning provided electronically and what the expected outcomes will be, need to be made on the ground. However, even though the technologies now available are rather new, distance learning does have a recognised history to which we can and should refer. The purpose of this paper is to shortly present past studies with ideas and models of funding e-learning university programmes from both institutions' and students' point of view.

**Keywords:** e-learning, funding, review, past studies, university, students

### **1. Introduction**

New and emerging technologies have changed forever the way in which education, and particularly distance education, are provided. These technologies continue to change at a pace so rapid that data collected in January of any given year are no longer valid by the end of that same year. The cost of acquiring and maintaining these technologies also changes, and this is only one of the barriers to performing an adequate cost assessment.

We can also point to difficulties in determining outcome. In general, however, it should be noted that while set-up costs are often extremely high, as are initial costs in providing training and support to teaching and administrative staff and even students, these costs decrease with time, especially if the institution uses "off the shelf" program providers rather than having "special" software designed in-house or privately. In other words, the cost-effectiveness of these technologies in the provision of education should be calculated over time.

## **2. A short history of distance learning and funding decisions**

The last 40 years have seen a shift towards government funded provision of distance education worldwide—prior to 1970, most were privately sponsored, apart from in France, Australia and New Zealand (Keegan, 2000, p.84). Australian universities pioneered state sponsored distance learning. In 1910, the University of Queensland in Australia was founded and other states followed to cater for a scattered farming community. New Zealand and Canada also followed suit. In France in 1939 the Centre National d'Enseignement par Correspondence (CNEC) was set up. The foundation of the Open University in Britain in the late 1960s was a major turning point in the worldwide proliferation of government sponsored distance education schemes. In all cases, the benefit of enhancing human capital in areas and social classes removed from the university campus was weighed against the cost of doing so, and found favourable.

## **3. How funding was used in previous years**

Despite these historic case studies, however, there was still considerable doubt about how funding should be allocated, and what the best use of funds was. The questions universities had to pose were: do they use resources in generating conventional education, distance education or virtual education and in what proportion? Which answer will provide the best return, the most high quality human capital for the lowest cost?

Funding distance education involves spending twice, when a distance program is offered by a traditional university also providing onsite education. First, conventional colleges and universities must be funded. Then, distance learning programmes must be funded from these same colleges. In other words, there must be a conviction that the output, human capital, will represent good value in return for financial investment.

The Distance Training Industry Market (Keegan, 2000) calculated that the average fee paid in a distance learning course in an EU country was in the region of €350-450. As the volume of students enrolled in the EU is calculated as being more than 3,000,000, it was thus calculated that the annual recurring market volume in 2000 was over €1 billion.

Keegan's report claims that a reason for the growth of distance training provision is its cost-effectiveness in comparison to both conventional provision and to other forms of open, flexible or technology driven provision. Care must be taken in the selection of the media by which distance education is delivered for it to be truly cost-effective:

*"...expenditure on technology by distance systems, whether on the web or not, must not be excessive. The choice of a high-cost medium, like television production, introduces permanent cost-inducing variables into the system".*

(Keegan, 2000, p.89)

Some general observations on the cost-effectiveness of distance training were:

- In conventional training, the teaching cost is a recurrent cost variable with students in the system.
- In distance training, cost of developing materials can be seen as a fixed cost and can be written off over the life of the course. The more students using the materials, the lower the average cost per student of the materials. This means that at some point the distance system should become cheaper. In the 1970s it was shown that the average recurrent cost for a fulltime undergraduate in the Open University was less than third that of a campus university and the cost of a graduate less than half. If cost-inducing variables are controlled, student numbers can be increased without proportionate increases in costs.
- Distance systems can increase numbers without structural changes.
- Initial investment in distance learning programmes can be costly, so it must be observed that cost effectiveness can only be judged over time.
- If there is a lot of face to face support required, i.e. regular tutorials and mentoring sessions in a programme, it undermines the general cost-effectiveness of distance learning.
- It is crucial that there is not a high dropout rate, as this would represent high cost, with no outcome.

## **4. Public and Private Sector Models of Funding E-learning**

### **4.1. Deciding funding**

Cost calculations to underpin academic e-learning have been funded by the Canadian Federal Government and developed in Canadian university consortia since the mid-1990s (Bartolic-Zlomislic, Bates, 2000). The following is a summary of the ACTIONS model proposed by Dr. Tony Bates of the University of British Columbia to assess the strengths and weaknesses of learning technologies using the following criteria:

**A:** Access – to technologies for a particular target group

**C:** Costs – structure of different technologies, including unit cost per learner

**T:** Teaching and learning – kinds of learning, instructional approaches, best supporting technologies

**I:** Interactivity and user-friendliness – kind of interaction, ease of use

**O:** Organisational issues – changes required to overcome barriers to new mode of delivery

**N:** Novelty – of technology

**S:** Speed – for mounting and updating courses

According to types of cost:

**Capital** – expenses associated with purchase of equipment and materials

**Recurrent** – (operating) costs that occur on a regular basis to run a programme

**Production** – programme development costs, typically high initially but subsequently low

**Delivery** – programme delivery costs, often similar each year

**Fixed** - costs that remain the same regardless of output

**Variable** – (or marginal) costs that change with output (e.g. number of students)

And benefit:

**Performance driven** – including learning outcomes, student/instructor satisfaction, return on investment

**Value driven** – increased accessibility, flexibility, ease of use

**Societal or 'value added'** – reduced travel/time/pollution, unemployment, potential for new markets.

This method of cost analysis is useful to calculate the likely break-even point for revenue from student numbers to yield satisfactory returns on course development and delivery. Fixed costs would be likely to include subject experts, Internet and design specialists, new administration and marketing procedures, server costs, departmental overheads, library input, copyright clearances and international tutors. Variable costs include those that accrue incrementally with volumes of learners and are linked to tutoring, delivery and internal charging mechanisms. Total costs were subdivided into average costs per year and balanced against average revenue per learner, where break-even point is calculated at average cost per year divided by average revenue per learner. (Marchmont Observatory Study, 2000, p.3)

Decision-making focuses on balancing the effectiveness of technology combined with learning in the classroom by establishing the appropriateness of various technologies for different situations. The variables addressed are instructional, technological and resource-based and are filtered by content, learners, delivery formats, resources and cost. The delivery formats examined were divided into two-way (classroom, audio-video conferencing, Internet) and one-way (computer and print based training, video broadcast). The decision support model proposes fixed and variable costs as well as stepped incremental costs for extra communications capacity. It is based on the rule that technology-based learning is expensive to develop but cheaper to deliver; the break-even point being calculated at incremental fixed costs of the

selected technology divided by the delivery cost savings per student. The total cost is: fixed costs plus variable costs (multiplied by number of students), with stepped costs being added where appropriate to delivery circumstances.

## **5. The Institution's Viewpoint**

There are obvious economic advantages to the university of offering distance learning courses of any kind. Enrolment and therefore revenue is increased, making available greater funds for research, development of the institution, and profit; there is no need to build and maintain extra campuses or buildings, and the image of the institution is raised in that it appears to be technologically advanced and forward thinking. However, the initial outlays for distance education can be very substantial, and in most cases, the long-term cost effectiveness of distant learning may not be readily apparent. Investments in computers, virtual libraries, central servers and data networks, on-going technical support, program development costs, and marketing can be a heavy drain on already stretched university resources. The technological infrastructure must be strong and reliable to support these systems, which, once established, need continuous maintenance and upgrading, all of which needs to be provided by highly trained technical staff that represent a further drain on university resources.

There is also a high cost involved in developing suitable educational materials for the new educational medium. Isolated students have particular learning problems, which must be addressed by a wide range of activities. There is the added cost of training of academic staff in the use of technology, and some studies have maintained that it is more labour intensive to teach a class online than in an ordinary classroom setting. There is also the danger that because of the high cost to the institution, the courses must become more expensive than traditional, onsite courses to recoup the costs involved in creating the programme. Finally, there may be restrictions on financial aid availability for distance learners (Selingo, 1998), because of a failure of government policy and funding to adapt rapidly enough to the new realities on the ground, thus making education through e-learning less, rather than more, accessible to the student and ultimately keeping student numbers low, a fact which will also result in less revenue in fees to the institution.

However, educational institutions should bear in mind that distance/ e- learning has the capacity to vastly increase the number of students served by the organisation, without substantially increasing the physical size of the organization (buildings, campus, etc.). It has been noted that increasing the number of students served by an establishment and decreasing the overall number of educational establishments (i.e. by merging) has a generally positive effect. In particular, Ash and Bacsish (2000) have

noted what they refer to as “hidden costs” in instigating a course of study, which they consider to encompass costs that are “both fundamentally unrecorded (such as academic staff overtime) and more generally absorbed into larger budgets (and are therefore unable to be attributed to an individual activity or even genre of activity), observing that these “hidden costs” are difficult to determine and rarely, if ever, considered as part of the wider picture.

## **6. The Student’s Viewpoint**

From the point of view of the individual student, there are many potential advantages to pursuing a course of education remotely. Let’s take a look at the usual inputs that must come from the student in following a traditional educational course. Even if the country in which he or she lives subsidises university education in great part or in full, the student will have to pay for books and learning materials. He or she may have to move from their home to a centre providing the education they seek, and thus have to pay additional expenses of rent, living costs, transport, etc. Then, one must also bear in mind that the student, in investing time and money in education, is not available to work during the years dedicated to their education. All of this results in substantial input. (Ioakimidis, 2007).

In the case of the disabled student, input is further increased by factors such as the costs involved in finding or equipping suitable accommodation, in the provision of specially adapted didactic materials, and possibly the need for specially adapted means of transport. Students who are also parents or otherwise involved in an unpaid capacity as carers will also have to deal with the expense of childcare, and so forth. In many cases, able-bodied and disabled students alike may perform their own analysis of the cost-effectiveness of following a traditional course of education, and decide that the increase in personal human capital will not be justified. While these individual decisions may be based on sound economic arguments, the outcome of many such decisions is considerable: persons from provincial areas become less likely to invest time and money in education as do disabled persons, parents and the inhabitants of developing countries. All of this results in a concentration of human capital in large urban areas of wealthy countries, with a corresponding lack of human capital in provincial areas, developing countries and among the disabled and parents (especially single mothers) who have had their families early in life. The economic implications on a wider scale are considerable. Furthermore, as Beller and Or (1998) pointed out, there are increasingly numbers of older students, and the sum of all of this has given rise to the need for a new way of pursuing a higher education:

*“The studying population has not only grown larger; it is becoming older, on average, and has additional obligations-mainly work and family. As a result, there is an increasing demand for a flexible learning framework, one that does not tie the learner down to a specific time or place. Differences between individuals also require an adaptable pace and mode of study, suited to personal abilities and distinct learning styles. The adult learning market is becoming increasingly competitive and full of opportunities, both for existing institutions and for new entrants.”*

## **7. Distance/ e- Learning-Where and Why**

Distance/e- learning has the potential to enable would-be graduates in developing countries and in the peripheral (geographically and/or sociologically) areas of the developed world to attend and complete courses of study that would otherwise be unavailable to them, simply because the opportunity cost would be excessive, due to the economic and infrastructural situation in their country. Kirillova (2002, p.175-82) provides a study of the validity of information technology in education, citing the case of Kazakhstan. Kazakhstan is a former Soviet Republic, now an independent state. If it is to develop economically, it is crucial that workers and graduates be equipped with the skills and education necessary to perform well. Recognising the crucial role that technology must play, the Kazakhstan Institute of Management, Economics and Strategic Research was founded in 1992. Concentrating on computer and information systems-based education, this institute has become one of the primary establishments offering higher education in the region. It has managed to do so despite initial levels of computer literacy that were extremely low in comparison to those in developed countries and despite serious flaws in connectivity and infrastructure in the country in general. Apart from technical issues, among the many problems which had to be contended with, was serious resistance on the part of educators, who feared new technologies and were concerned that they would be liable to lose their jobs. Currently, the institution successfully produces graduates and provides an excellent example of how e-learning can be made to work *“even in a country with limited infrastructural resources”*:

*“...institutional cooperation on an international level, proper goal setting, careful analysis, implementation of good practice, together with managerial support, leads to rapid development of an institution’s IT infrastructure”.*

Kirillova (2002, p.180)

But how does the introduction of e-learning as an input change all of the above? Quite simply, it eliminates many of the inputs that students have to make to attend a traditional course of studies, especially those which we might term “secondary inputs”: transport, housing, specialised equipment and, to a degree, didactic materials. (Ioakimidis, 2007). Furthermore, in allowing a higher degree of flexibility in terms of when the student follows the educational material, it may be possible for him or her to continue to work part-time and generate some income, thus reducing the opportunity cost of the program to a degree. Despite these changes in input, the output of the course of students is the same as that of a traditional course: the university graduate.

## 8. Conclusions

Instigating a program of distance learning using new and emerging Internet and other technologies represents a realm of possibility for students who would otherwise be unlikely to pursue a course of higher education. Doing so clearly has significant repercussions for their own private incomes (rate of return), but it also has major effects for the wider economy. Just some of these include the fact that distance learning can facilitate disabled students to acquire a high standard of education, thus preparing them for employment and removing the need for a state pension, and can allow individuals who are located at the periphery of the economy either for reasons of geographic or sociological status to acquire a high standard of education and increase their value in “human capital” while contributing to both personal and general economic growth. However, funding distance /e- learning programs with the technologies available, involves considerable start-up costs, and on-going costs that can be substantial, especially in the early years of the enterprise. A short-term cost analysis is unlikely to be useful in these cases.

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