

## Chapter 10

# Costs: the (uncertain) break-even point

*How much does a distance learning course cost?  
More or less than a classroom-based course?  
And how much does it cost preparing it with NICTs?  
More or less than preparing it with other technologies?*

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The answers to these questions depend on so many variables that in the end there is not a unique answer. This chapter intends to help you making an estimation of the costs of a course or programme bearing in mind important issues that are usually forgotten and its subsequent problems: things that can not be done because money was not set aside for that purpose, quality affected by such lack of foresight, costs that are higher than it was expected... directors, teachers and students angry at “those who had the great idea of involving us in this...”

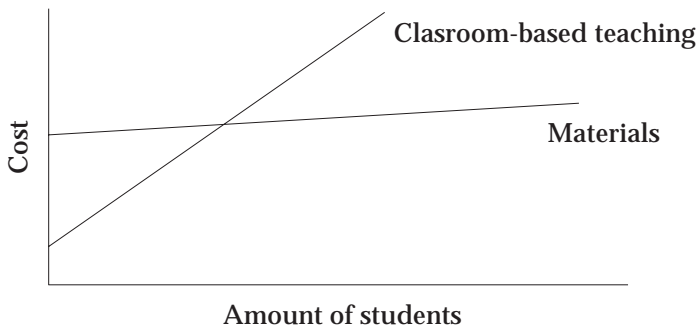
But I have already said this at the beginning, working at a distance or working with NICTs is usually not cheaper. It can even be more expensive, at least at the beginning. But this can be seen as contradictory to the general opinion that has led to several mistakes. Here you will see why.

### **Fixed and variable costs: economies of scale**

As in many other human activities, it is possible to recognise fixed and variable costs. Distance learning courses have *fixed costs* that can be reduced with respect to face-to face courses such as those derived from premises and furniture... except when classrooms with computers are offered to students, in which case costs can be higher.

There are additional significant fixed costs regarding classroom-based courses in the area of production of materials. That is a fixed cost for any course because it does not depend on the amount of students. The cost of the materials will differ depending on whether they are textbooks, videos, multimedia, etc. I will come back to this issue later on. In all cases, as I have already said, preparing the materials for a distance learning lesson takes much more time than that usually devoted by a teacher when preparing a classroom-based lesson. The difference is that the material can be used by a greater amount of students. Furthermore, it can be used more than once and during several years (although it will probably have to be updated and adjusted). The *economies of scale* could therefore compensate for that higher fixed cost.

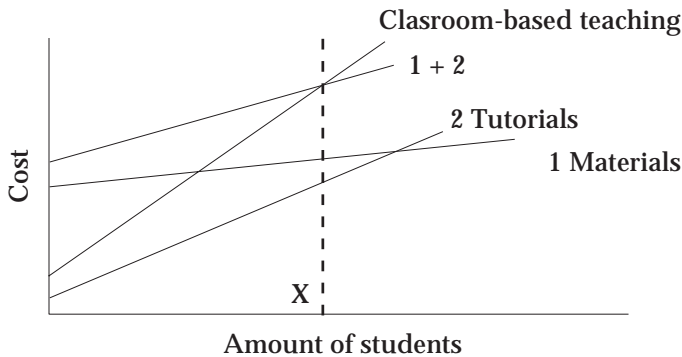
As Bates suggests (2002:162),<sup>1</sup> one could think the situation is as follows:



However, this situation does not consider tutorials. There are few cases in good DL in which the materials are useful on their own, without interaction between teachers and students. The cost of tutorials is *variable* because it depends on the amount of students. In general, a distance tutor teacher can satisfactorily handle the same amount of students a classroom teacher can: between 25 and 50 students depending on the type of course. Nevertheless, some people believe less or more students can be tutored (10 per tutor or up to 100 students per tutor) (cfr. Rumble, 2001; Bates, 2001). Some say the time devoted to a group is shorter than that in the classroom because students spend more time working on their own with the material and the tutor only clears up doubts. Others state tutorials may be more time demanding because the amount of queries is usually higher and they are

<sup>1</sup> This cost-student graph and the following one follow what Bates considers (2001:160-165), although not literally, adapting some of his suggestions to this book.

usually more difficult to answer (Rumble, 2001:81-82). Let us suppose that, finally, the cost of teaching is a little lower. Then the situation would be:



What is the amount (x) of students in which a distance course with NICTs is cheaper than a classroom-based course? As Bates states (2001:164): “no one knows for sure”. But he does mention a figure for a given case: 100 students per year during four years (400 students in total). That amount may be significantly reduced if less sophisticated materials are used.

As it can be seen, the key to the possible economies is in the scale and the “life span” of the course (which also affects the scale). However, it is neither always possible nor convenient to increase the scale for the *same* course. Increasing the scale means increasing the amount of students and/or repeating the same course many times. That may lead to an outdated course or to a course that does not adequately adapt to the different groups. Updates and adaptations increase costs. As I have already mentioned, the supposition that tutorials demand less time than classroom-based teaching is a widely challenged idea.

It is worth analysing the fixed cost of the production of materials. Said cost shall significantly vary depending on the material produced. As an example, see the chart of average costs above for a three-unit course (expressed in US dollars):<sup>2</sup>

<sup>2</sup> Values taken from *Arizona Learning Systems* (1998) quoted by Rumble (2001: 80). Each unit is equivalent to about ten hours of the course.

Design of the course and activities	6,000
Textbook	12,000
Textbook with reference material	18,000
Textbook with reference material and pictures	37,500
Audio and video	120,000
Simulation	250,000
Virtual reality	1,000,000

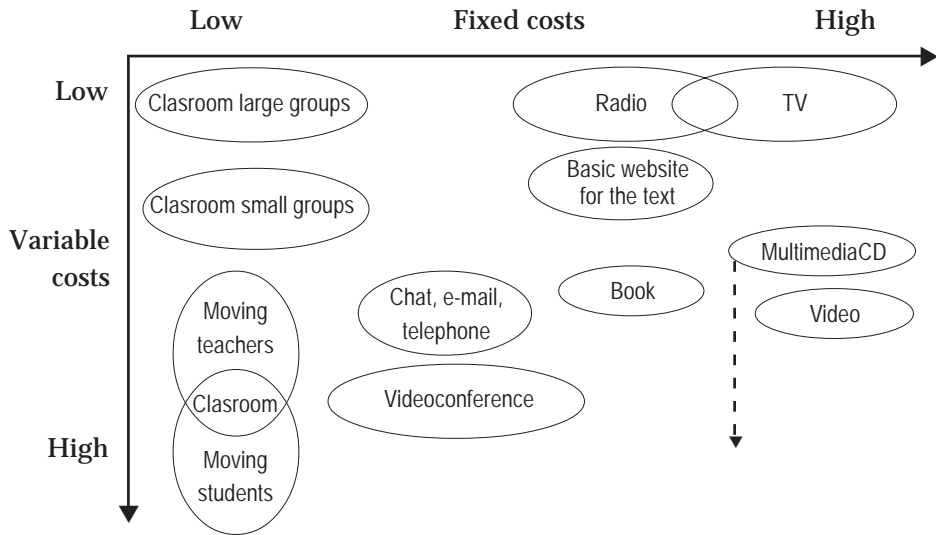
Please notice that, as an example, between producing a textbook with reference material and pictures (typical in many Web sites) and a video, costs increase by more than three times. These costs may be lower in absolute terms in developing countries but the proportion is probably the same.

It is worth mentioning that when a book is used as the basis, depending on the kind of activities proposed and the use of graphs and pictures, the usual estimation is that each hour of study (equivalent to one classroom hour) requires preparing between 3 and 5 pages. That is to say a 30-hour course requires between 90 and 150 pages. Besides, this does not include reading the reference bibliography. (cfr. Auñón, 2000).

The structure of fixed and variable costs is different for every technology. Producing a television programme has high fixed costs but once on air there is no difference whether it is seen by one thousand people or by one hundred thousand people. In all cases, the cost will increase if another hundred thousand people sees it in another city broadcasted by another channel, but the increase will be small. That is why the production of television programmes requires very big audiences to justify the costs.

It is important pointing out that in all the cases, the bigger fixed costs do not mainly correspond to the technological *infrastructure* but to the *work*. Longer periods of time are necessary and, above all, larger groups of people.

We can also make the estimate more precise for face-to-face teaching. As an example, if the problem is addressing those who are far away, we could ask ourselves if it is convenient to take the teachers to the place or bring the students to us instead of implementing solutions at a distance. Then, charts such as this one can be built (Fernández, 2001):



This chart compares isolated technologies but not integral technological models, as I suggested in the previous chapter. The only integral “technological” models (technologies and working method) that appear here are those corresponding to classroom-based teaching. If we take technological models, many variable costs may increase mainly due to tutorials. For instance, a course that uses mainly multimedia CDs, will move downwards, as the dotted line indicates, if the variable costs due to tutorials increase.

***Do you think the videoconference is correctly placed in the chart?***

There exists some consensus on the fact that models that entail predominantly *asynchronous* work are more expensive than those that mainly entail *synchronous* work (Rumble, 2001:80). As an example, “e-learning +” or “no distance learning” would be more expensive than the courses based on videoconference because the fixed costs are higher.

Some hope arouse over the fact that new technologies would make distance courses cheaper with respect to the old technologies; for example, distance courses based on printed texts or the Internet. Apparently this has not been confirmed. On the contrary, if costs *per student* are compared (which is finally the important

estimate and the one that summarises all estimates), there appear results such as the ones that follow: in the case of a 30-hour course for 200 students the cost is around 100 US dollars per student with the printed version and 150 US dollars with the online version (Inglis, 1999 apud. Rumble, 2001:85) although the difference between both of them was lower in smaller scales, where the printed version has relatively higher fixed costs.

As an example, the case of a 30-hour “e-learning +” course is presented here with texts and illustrations, tutorials, working in small groups and two real meetings with the tutor. Variations are estimated every 50 students mainly because it implies adding a tutor and physical space for meetings. The places where the small groups meet, as well as the computing equipment and the connection is paid by the students or through agreements with institutions which do not charge for the service. Then, the costs in the chart (expressed in US dollars), are only those that affect the budget of the institution.<sup>3</sup>

Students	50	100	150	200	250	300	350	400	450	500
Fixed costs	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Variable costs	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Total	16,000	17,000	18,000	19,000	20,000	21,000	22,000	23,000	24,000	25,000
Cost per student	320	170	120	95	80	70	63	57	53	50

### Costs of programmes, transfer of costs and opportunity costs

It is also possible to speak of fixed and variable costs in the case of a programme that prepares a set of courses. Fixed costs refer to infrastructure and human resources. As an example, the infrastructure for computing or videoconference can be used in a better way if it is shared by many courses and not by few courses. If they were very few, it may even be better to consider hiring all or part of the infrastructure instead of buying it. Furthermore it is important to bear in mind that with respect to NICTs, the equipment requires important maintenance and has a short life span which is estimated in three to five years (Rumble, 2001:91). This leads the fixed costs of a programme to increase largely.

| 3 The example takes, schematically, the data of a course in which I worked (cfr. Motz, 2001).

There are also variable costs regarding equipment. For example, one course can work with a small server but more equipment will be necessary in the case of many courses. More equipment and offices may also be necessary for the people producing materials.

Regarding human resources, there are also directing teams and technicians of various areas (camerapersons, graphic designers, computer specialists, etc.) that can work more profitably in a programme with various courses than in one with few courses. Again service contracts or outsourcing may be convenient to perform some of these tasks for few courses. In sum, there are also economies of scale in this case. The cost of adding courses to a programme is increasingly lower. That is why these programmes may be more expensive at the beginning, while they are being tested and people are learning about them and few courses are launched.

It is also true that huge programmes may turn into a difficult thing to manage and may give rise to hidden costs due to inefficiencies. The scale, up to a certain extent, may turn to be a flaw, and not a virtue. That explains why sometimes very big programmes prefer important levels of decentralisation.<sup>4</sup>

Some costs exert a direct influence on the institution and others do not because they are transferred to teachers or students (or to other institutions). But they should still be considered. For example, rooms and equipment for tutors and students can be set up, or these costs can be avoided if they work with their own equipment from their houses (or from cybercafes...). In this case these costs will not affect our budget but it will have an impact on the estimate students make in order to register or not for the course or on the one made by the tutor when deciding to accept the job or not. Therefore, tutors working under this methodology are usually rewarded in some way if they use their own equipment (the same as the delivery boy that uses his own motorbike). That leads to the fact that if one wants to include low-income students, it may be necessary to pay for hours at cybercafes or to enter into agreements with public communication centres or other institutions.<sup>5</sup> In such case, although costs may be lower, they will affect the budget once again...

4 For example, the virtual courses of SENA (Colombia) are produced by regional teams depending on the resources and the experiences each team has although later the courses are offered throughout the country.

5 It is one of the strategies quite intensely developed by SENA in Colombia.

Students will also estimate their *opportunity cost*. Perhaps if it were a classroom-based course students could simply not take it because it would imply travelling long distances, leaving their families or resigning to some hours of work. Those items will affect the estimate. And it is in this scenario where DL or blended learning methods win –or lose– many battles: in showing its advantages in terms of opportunity cost.

***Do you remember any battles lost or won by distance learning courses?  
Do you remember having decided between one possibility and the other?  
How much did the opportunity cost weigh?***

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### **Production of materials**

As we can see, in order to be able to afford a course or programme, many elements should be taken into consideration. A way to order them is to separate them in three big areas: production of materials, course running, and management and infrastructure costs. Below you will find a list of elements that should be considered for producing Internet-based courses.<sup>6</sup>

Regarding the **production of materials** the following items should be taken into account:

- *Kind of material.* If the materials are only texts, the costs will be much lower than if pictures, videos or simulations are also used. The kind of topics to be presented may also exert an influence on a greater or lower degree of complexity.
- *Amount of users (and life span of the course).* The higher these items are, the smaller the costs per year and per student will be. Some materials will only be used in one course and others will be useful for many (for example, the introduction to the use of the computer and the platform). If physical materials are produced as well as “virtual” materials, the costs of preparing copies and packaging should be considered. Generally those are proportionally lower when the amount increases.
- *Possibility of using already existing materials, owned or not by the institution.* In this last case, if students have to buy them, they will not mean a cost to the

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6 Here I mainly follow Rumble’s suggestions (2001). See also Bates (2001).

institution but they will result in an increase of the students' cost. It may also be necessary to pay for the use of someone else's materials.

- *Production, tests and reviews.* The three items above should be taken into consideration. Apart from the production itself, it may be necessary to pay for testers, assessments and adjustments as well as for revisions of the subsequent versions of a course (which are usually done once a year; such is the case of changes in assessments).
- *Qualified staff.* Verify if there is in-house qualified staff for producing the materials or if it will be necessary to hire people from outside the institution or spend money in training. Costs may increase because the internal staff may have to be exempted from performing other tasks or receive extra payment for the production of the materials. The external staff may be cheaper or more expensive than the internal staff depending on how specialised its work is and the market conditions.
- *Equipment and expenses.* This issue analyses whether the institution will provide the computing equipment or if it will belong to those working in the production, in which case the institution will make up for said contribution in some way. The same will happen regarding supplies, expenses arising from the Internet connection, etc. If the equipment is provided its recouping time should be estimated (3 to 5 years).

### **Running the course**

- *Advertising and marketing.* These may be part of a general policy for all the courses of the institution (see the next item) or require special financing due to the characteristics of the course: massive audience, problems in attracting people to the course, etc. The costs of this item may range between 10 and 20 per cent of the total costs.
- *Administrative costs.* For enrolments, services of the students' administrative office, collections, etc. It can usually be estimated in around 10 per cent of the total cost of the course.
- *Distribution of materials.* Traditional mail (for example for CDs) or e-mail, servers for the materials in the Internet, etc. The costs for those receiving the material must also be taken into account. It will have to be decided if it will

be paid by the institution in some way or by the students (in this case it does not affect the institution's budget but the cost for students).

- *Tutorials.* Payment of tutors by the hour, with a fixed salary, etc. The amount of students a tutor can manage and how much time each student demands is under discussion. An average range is possibly between 30 and 50 students per tutor working from 8 to 10 hours a week for a course of 2 or 3 hours a week. There is also a discussion on whether it is convenient or not to resort to cheaper teachers (younger people, advanced students, etc.). Other possible positions such as monitors or tutorial coordinators must be taken into consideration.
- *Equipment and connection expenses for tutors and students.* Computer rooms, software, printers, etc. Maintenance and recouping of the equipment (3-5 years) must be estimated. In case the equipment belongs to tutors or students, it is important to decide whether they will be compensated for it. Expenses due to the Internet connection and telephone should also be considered. Toll free lines for students may be made available with a resulting cost for the institution. *Classrooms* or meeting rooms must be accounted for, if necessary. They can be shared by many courses; its cost could be distributed (see infrastructure and management).
- *Opportunity cost.* It does not affect the budget of the institution but that of the student. Students can continue to work while they study, save money on transportation and time, etc. Students can estimate how much they would lose if they took the course with a face-to-face methodology. (But be careful: working at a distance does also take time and demands a discipline that is not always easy to keep. A high dropout level is one of the problems DL has been traditionally fighting with).

## **Management and infrastructure**

- *Programme management.* The team may be large or small depending on the importance of the programme for the institution. It involves salaries and expenses (communications, trips, etc.).
- *Training.* The production of materials, tutorials and the management of the programme itself usually require important initial training. Periodical up-

dates and continuing training are necessary as well. Remember new staff. Initially a high cost can be estimated for it to be recouped in 5 years. Then an estimate for an annual fixed cost for this item can be estimated as well. It can be done through in-house staff, external hired personnel or combining both.

- *Assessment and quality.* Staff and expenses for the quality control, external assessments, consultancies, etc.
- *Web sites.* Development and maintenance costs. It can be developed internally or outsourced. The initial cost must be estimated on an annual basis, for example, considering its life span is 5 years. It involves work and equipment which must be recouped (servers usually last 5 to 6 years). Although the site may be shared by the entire institution, these programmes usually change sites a lot and part of the costs should be undertaken by them.
- *Platform (LMS or LCMS).* Initial licence cost and payments for updates. Both may be free but they will probably have to be adapted, installed and maintained. They also need servers.
- *Office, furniture and fittings, and equipment.* Premises are usually recouped in 50 years; furniture and fittings and the equipment in general in 5 to 10 years. Another possibility is considering the cost of renting. Taxes, insurance and maintenance expenses should also be taken into account. In case only a part of the existing premises is used, the corresponding proportion should be considered as well as the expenses derived from stationery and supplies. The same estimates of costs used per job position can be used for other programmes (although these job positions may be more expensive due to the equipment).
- *The Intranet.* The Intranet may be an already existing part of the infrastructure of the institution and will be estimated on a pro rata basis or may have to be installed for this programme which will undoubtedly need it. Its recouping is estimated to take 5 to 6 years.
- *Classrooms.* The proportion of attendance time to courses should be estimated as well as the corresponding spatial needs. A usual problem is that, in the case of working students, classroom needs are usually clustered at night. It may be necessary to rent rooms. Agreements can be made with enterprises, especially with regard to corporate training.
- *Documents and information.* Library, subscriptions to publications, information and documentation services, etc.

- *Advertising and marketing.* A general plan for this area usually reduces the costs if compared to advertising a single course.
- *Administrative costs.* Everything that was said regarding course running applies here.

These management costs explain, to a great extent, why very small programmes with few courses can be fairly more expensive than large ones. It is because these costs are not absolutely proportional: there is a minimum management cost that is necessary and after a certain amount of courses, the increase due to the addition of a course is very low. This also explains why outsourcing a part of the tasks may be convenient in small programmes.

For the case of programmes the higher cost is also derived from human work. Although the initial investments on equipment may frighten you, the higher expenses will always lie on paying those who produce materials, teacher tutors, programme directors, support technicians, etc. On the other hand, IT investments have a barely short life span and high maintenance costs. If these two facts are not taken into consideration, an investment on equipment for DL with NICTs may become, in a while, a technological cemetery of equipment that can not be used or nobody wants to use.

The list of the following page summarises the aspects to be taken into account. They have been classified in general factors, staff, investments and expenses. Repeating items that will have to be included in each course or in the programme in general, or that will not appear in the budget of the institution but may have an impact on students or on other institutions, will be found between brackets.

***Did you find any aspect that was not taken into account while analysing the budget of a course or programme with this list?***

***What consequences did that have?***

***Were there other aspects that did not appear in the list?***

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	General	Staff	Investments	Expenses
<b>Production of materials</b>	x			
1. Kind of material	x			
2. Amount of users	x			
3. Use of existing materials	x			(x)
4. Production, tests, and reviews		x		
5. Qualified staff		x		(x)
6. Equipment and expenses			x	x
<b>Running the course</b>				
(Advertising and marketing)		(x)		(x)
(Administrative costs)		(x)		x
7. Distribution of materials				x
8. Tutorials		x		
9. Equipment, connection (and classrooms)			x	x
(Opportunity cost)	x			
<b>Management and infrastructure</b>				
10. Programme management		x		
11. Training		x		(x)
12. Assessment and quality		x		
13. Web sites		x	x	x
14. Platform (LCMS)		x	x	x
15. Offices, furniture and fittings, and equipment		x	x	x
16. The Intranet		x	x	x
17. Classrooms			x	
18. Documents and information		x	x	x
19. Advertising and marketing		x		x
20. Administrative costs		x		x

