

# Resources File

The readings for this handbook appear in the following order below:

- 1 Rumble, G. 2001 'Analysing costs/benefits for distance education programmes' in *Knowledge Series* Vancouver: Commonwealth of Learning. A colour version can be downloaded from [http://www.col.org/Knowledge/pdf/ks\\_costs.pdf](http://www.col.org/Knowledge/pdf/ks_costs.pdf)
- 2 Dodds, T. 1983 *Administration of distance teaching institutions: a manual*, Cambridge: International Extension College (extract Unit 6, pp 129-154)
- 3 Annualisation Factors

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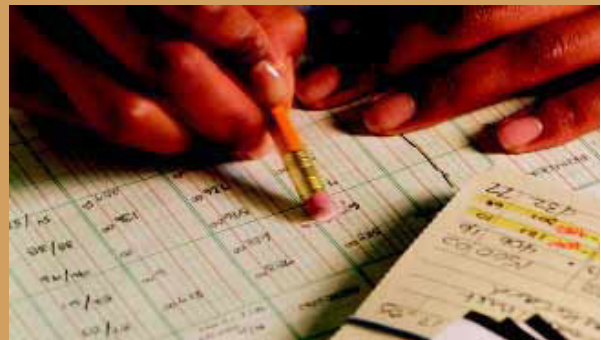
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# THE COMMONWEALTH OF LEARNING



## Analysing Costs/Benefits for Distance Education Programmes

KNOWLEDGE SERIES

A TOPICAL, START-UP GUIDE TO DISTANCE EDUCATION PRACTICE AND DELIVERY

## Costing is important if policy makers and managers are to make the right decisions

Through cost analysis you can find out how much something actually costs, set a budget, determine a price and compare the costs of different options.



Distance education systems are generally thought to be more cost efficient than traditional face-to-face education. Costs can be spread over large numbers, lowering the cost per student. Yet the cost per student in the Mexican Telescondaria, relative to traditional secondary schools in Mexico, rose between 1975 and 1981 even though student numbers had increased from 33,840 to 170,000. The institution was extending its operations into more communities and the average class size was decreasing, causing costs to rise. Costing is important if policy makers and managers are to make the right decisions.

Analysts need to understand how particular systems are structured and work before analysing costs.

### TYPES OF RESOURCES USED

- *Human resources*: staff salaries and wages, the *on-costs* of employing staff (e.g. employment taxes, insurance payments, staff benefits)
- *Premises and accommodation*:
  - a) Purchase of land, construction of new buildings and their infrastructure
  - b) Buying existing premises and adapting/renovating it
  - c) Renting accommodation
  - d) Running costs of buildings and grounds (e.g. utilities, repairs and maintenance)
- *Equipment and furniture*: note, small durable items such as staplers and hole-punches are consumables
- *Stocks, supplies, consumables and expenses*:
  - a) Stocks (inventory) are holdings of raw materials, components and goods, including work-in-progress and finished goods (paper, audiocassettes, texts)
  - b) Supplies are materials for which it is impossible, or not worth the trouble, determining a cost per unit of production (e.g. lubricants for machinery)
  - c) Consumables are materials used by the organisation but not incorporated into its products (e.g. office stationery)
  - d) Expenses are the cost of something other than stocks, supplies, and consumables (travel, postage, fees to non-payroll consultants).

Cost analysis places a money value on the resources used. It may be difficult however to relate the cost of activities to either the *budget* (a statement of expected expenditure over a period, normally a year), or the *accounts* (a statement of what has been spent over a period, normally a year). Generally it is better to use information from the accounts, since these reflect what has actually been spent. Bear in mind:

- The structure of budgets and accounts may have little to do with how activities are structured
- Budgets and accounts may reflect traditional organisational structures, rather than the products and services arising from expenditure
- Activities may run over the budget or accounting financial years

## INTRODUCTION

Through cost analysis you can find out how much something actually costs, set a budget, determine a price and compare the costs of different options. In distance education, the main areas are:

- Correspondence systems based around text (print-based)
- Educational/instructional television and radio systems, possibly supported by audio and video cassette programmes or involving radio, telephone and e-mail feedback loops
- Multi media systems (text, audio, video, and computer-based materials)
- E-education systems, delivering computer-based multi media materials and communications synchronously and asynchronously.

## COSTING DISTANCE EDUCATION

Cost analysis has its basis in cost accounting, with rules and recommended practice. The analyst must identify:

- The activities to be costed
- The resources used, and how they behave
- Where necessary, overhead costs
- Where necessary, joint product costs
- Where appropriate, annualise capital costs
- The factors that drive costs (cost drivers).

### ACTIVITIES IN DISTANCE EDUCATION SYSTEMS

- Creating or acquiring, producing and delivering learning materials
- Providing administrative and pedagogic student support services
- Providing institutional management to support the above.



- It can be difficult to estimate how much time staff worked on a project
- Some data – for example, personal salary details – may not be available to analysts. They may need to use standard costs
- Accommodation costs may be unclear. Analysts may have to work out a standard accommodation cost per square metre/foot, and apply this to the floor area occupied by the work group. Alternatively, use commercial rental rates per square metre/foot of office accommodation
- Any assumptions must be clearly described.

### DIRECT VERSUS OVERHEAD COSTS

Developing, producing and delivering a product or service involves *direct costs*, which result directly from offering the product or service. The cost of a course involves the salaries, expenses, and accommodation of staff involved in its development; the distribution of course materials involves the cost of packaging and postage/delivery.

However, many activities (management, finance, personnel, estate management) are not directly related to offering a product or service. These are true *overhead costs*, sometimes called *non-value-added activities*.

Some activities, such as basic student administrative processes (enrollment, advising, examinations), are effectively overhead costs because they have not been linked as a direct cost to a product or service.

### JOINT PRODUCT COSTS

Products and services in a distance education system are usually solely for its own benefit. The main exceptions are:

- Instructional television and radio systems that broadcast (or record) traditional classroom lectures for distance education use
- On-campus flexible learning approaches that use materials developed for distance education to support independent study by on-campus students.

The intermediate products (lectures, materials) are a *joint product cost*, supporting both courses offered on-campus and at a distance. How much of the cost of the intermediate products should be allocated to each?

- Give one of the end products a "free-ride"
- Share the costs equally
- Apportion the costs, usually according to the number of students per programme.

### RECURRENT VERSUS NON-RECURRENT COSTS

Recurrent costs occur yearly; non-recurrent costs are incurred for a fixed period only. Permanent, salaried staff is a recurrent cost; short-term consultants are a non-recurrent cost.

### CAPITAL COSTS

Many expenditures are consumed as they are paid for (monthly salary bill, expenses), or are treated as if they will be consumed (consumables, supplies). These are *revenue costs*. Expenditures such as equipment, furniture and buildings have an ongoing value, collectively referred to as *capital expenditure*.

Because capital items last for several years, it arguably gives a fairer picture of the financial situation to spread costs over their lifetime:

- Permanent *buildings*: usually over 50 years (Temporary buildings are spread over their expected life)

FIGURE 1: EFFECT OF CHANGES IN VOLUME OF ACTIVITIES ON FIXED AND VARIABLE COSTS

|                 |          | ACTIVITY INCREASES | ACTIVITY DECREASES |
|-----------------|----------|--------------------|--------------------|
| FIXED COSTS:    | IN TOTAL | Unchanged          | Unchanged          |
|                 | PER UNIT | Decrease           | Increase           |
| VARIABLE COSTS: | IN TOTAL | Increase           | Decrease           |
|                 | PER UNIT | Unchanged          | Unchanged          |

- *Furniture*: usually over 10 years
- *Equipment*: vehicles are usually over eight to 10 years, computers over three to five years (five being the common, but in my view, excessively long, period), central servers over three to four years, network electronics over five to six years
- *Distance education courseware*: over the expected lifetime of a course
- *Systems development* (for example, the cost of developing a new suite of computerised student administrative support systems): over its expected lifetime.

A fair comparison between traditional and distance forms of education, or between different kinds of distance education, requires measuring the *opportunity cost* of capital. The assumption is that, had the money not been spent on capital items, it could have been lent at the prevailing interest rate to generate income.

Economists annualise the capital costs to find their "true" cost. There is a formula for doing this (see Rumble, 1997: 45-6). There are also annualisation tables for given capital lifetimes and interest rates.

### COST DRIVERS, FIXED COSTS AND VARIABLE COSTS

*Cost drivers* are factors that influence the total level of costs – for example, the number of courses, the volume of materials used and services offered.

Unchanging costs are *fixed costs*; for example, an institution needs only one Chief Executive Officer. Costs that fluctuate directly with the level of activity that drives them are *variable costs*; for example, every extra applicant generates additional paperwork.

*Semi-variable costs* are fixed within a *relevant range*, but an increase in expenditure is triggered when activity levels pass a threshold. The triggering mechanism may be automatic, or subject to some latitude. For example, the institutional norm may be one tutor for every 20 students. An additional tutor may not be appointed if there are 21 students, but will be as student numbers move towards 40.

One of the tenets of activity costing is accurate identification of factors driving costs. Crude models emphasising just a few variables (e.g. registered students, courses in development and courses in presentation) are all right for "back-of-the-envelope" costing, but can seriously distort resource allocation and cost analysis. They do not allow managers to identify likely costs in sufficient detail, to manage budgets or analyse costs usefully.

The concepts of fixed and variable costs are central to budgeting and cost analysis, in particular to understanding the behaviour of average costs and to cost/volume/profit analysis. When teaching small numbers of students, face-to-face teaching almost invariably has a lower average cost per student. At high activity levels, distance education tends to have the lower average cost (see Figure 1). The Basic Cost Function and the Average Cost Function (see Rumble, 1997: 35), capture this relationship.

COST ANALYSIS

Analysts – and those who commission them – need to consider:

- The scope of the study, establishing its boundaries and what questions it is designed to answer
- The report's basic format, ensuring that the format and work plan will meet the commissioning agency's needs. These questions must be addressed:

costs

34, U40, 40, 3, 5, 7, U, 3, U, 4, 5, 11  
2.65£0%584.24\$30.24%98

TABLE 1: WEIGHTED AVERAGE EFFECTIVENESS RATIO (EXAMPLE)

|             |                    | Subject matter  | Skills (theory) | Skills (practice) | Attitudes | Overall score |
|-------------|--------------------|-----------------|-----------------|-------------------|-----------|---------------|
| DISTANCE    | Exit score (maths) | 0.44            | 0.66            | 0.79              | 0.63      |               |
|             | Weighting          | 3               | 1               | 2                 | 1         | 7             |
|             | Total              | 1.32            | 0.66            | 1.58              | 0.63      | 4.19          |
|             | Weighted average   | 4.19 ÷ 7 = 0.60 |                 |                   |           |               |
| TRADITIONAL | Exit score (maths) | 0.49            | 0.68            | 0.67              | 0.65      |               |
|             | Weighting          | 3               | 1               | 2                 | 1         | 7             |
|             | Total              | 1.47            | 0.68            | 1.34              | 0.65      | 1.14          |
|             | Weighted average   | 4.14 ÷ 7 = 0.59 |                 |                   |           |               |

- Are you analysing part of a system (e.g. a course, assignment handling), a major subsystem (student services), or the whole institution?
  - Are you looking only at costs to the institution, (costs carried on its budget), or are you taking account of the costs of other stakeholders (employers, students, the government) in a wider analysis?
  - How about areas that are subsidised – say, access at no cost to a national transmission network, or highly subsidised access to study-centres in schools? Should you cost them as the need arises, or use commercial prices as a “shadow cost”? This might be fairer if you are comparing costs with an unsubsidised venture, or trying to work out how much it might cost to replicate a system elsewhere.
  - Should you disregard certain costs for a more fair comparison? For example, one institution may have heavy financial commitments (such as major research projects) that the other does not.
  - Are you comparing costs at a common price level (adjusted for inflation or deflation)?
  - When comparing the costs of institutions in different jurisdictions, does converting local currencies to a common standard (such as the US dollar) make sense? Exchange rate fluctuations do not accurately reflect actual changes to the comparative cost, although it can sometimes be necessary to convert to a common international currency (e.g. when requesting international aid).
  - Are you looking only at costs, or for possible savings from switching to distance education/changing the technology of distance education?
- Decide how the data and information will be collected, and whether it will meet the analyst’s/agency’s needs
  - Identify any assumptions made in handling the data or coming to conclusions
  - Decide how the data and information will be presented, and at what level of detail.

## COMPARING SYSTEM COSTS

### WHAT COMPARISONS ARE MADE

The commonest comparison is the costs of a distance education system with a traditional classroom-based system. Many of these macro-level studies assume a particular mix of media and technologies, without questioning whether a different mix might result in a lower costing system. Factors affecting the cost of face-to-face education include whether small tutorials, seminars, lectures, or independent and resource-based learning strategies are adopted.

Each technology used also has a different cost structure. Take audio. The cost of delivering a radio programme is totally independent of the number of students that listen to it, mainly involving a fixed cost and no institutionally carried variable costs (unless you have to provide listeners with radios). With audiocassettes, there is an immediate variable cost per student (or learning group) to cover the costs

of the cassette, its packaging and postage. There may also be a reception cost – the cost of audiocassette players, assuming you provide these. Analysing the break-even point (in number of users) will help establish the number of students at which audiocassette delivery becomes more expensive than radio transmission.

Most of these comparisons focus only on the relative *cost-efficiency* of systems, institutions or technologies. A system is more cost-efficient than another if the unit cost of its output is lower than the unit cost of the system with which it is being compared.

Most cost-efficiency studies assume that the quality of the output is constant, and that it is just efficiency that varies. However, as there are usually differences in output quality, you should also measure effectiveness and relate this to cost.

### MEASURING COST-EFFICIENCY

The cost-efficiency of two or more educational systems is usually measured by comparing:

- Average cost per student*, by dividing the total annual cost of the institution by the number of registered students in that year. This assumes that within an institution, the teaching-learning experience of all students is similar. However:
  - The cost of educating someone in a laboratory subject may be much higher than the cost of educating someone in the social sciences
  - Some students are full-time, others part-time. The cost per student may need to be adjusted to a standard, usually the cost per *full-time equivalent (FTE) student*, equated to a notional course load (credit points/course hours per year).
- Average cost per graduate*. Consider:
  - Variances in the cost of different subjects will affect the costs per graduate
  - The length of a course (in years) may vary. Medical training takes longer to complete than an arts degree. Also, there are jurisdictional differences – a Bachelor’s degree takes three years in Wales, but four years in Scotland.

It is not enough to multiply the cost per student by the number of years that it takes to graduate; not all students graduate. The dropout cost needs to be considered, by taking account of the regulations governing student progress in particular cases (see Rumble, 1997: 125 for an example).

- Cost per Student Learning Hour (SLH)*. Hülsmann (2000) provides a useful framework for looking at the relative costs of media. To establish the number of SLHs studied by students, you take the number of SLHs course developers believe are required (this approach is usually related to credit hours). The drawback is that the resulting *cost per SLH (course) measure* is unrelated to the costs of materials developed to support the course. To deal with this, Hülsmann uses the *cost per SLH*

# benefits



(media) to analyse the development/production, delivery/ reception and costs of courses by media, with different measures for each (print, video, etc.). The total cost for each media is then divided by the number of SLHs that the media gives rise to.

**MEASURING COST-EFFECTIVENESS**

*Measurement against a standard:* the ratio of the actual to the possible or ideal outcome. If the ideal is that 100% of students pass, and the effectiveness of the programme is 82%, then out of every 100 candidates, 82 have passed.

*Measurement of relative effectiveness:* compares the effectiveness of distance education against traditional education by comparing graduation rates within a period.

*Measurement of learning gain* looks at the improvement in students' performance over the period of their studies. This compares their qualifications on entry (or by a pre-test) with their final examination results. This can be difficult when students enter with a variety of qualifications, or because of the diverse units of measurement used to measure teaching and learning effectiveness. Comparisons between institutions are also more difficult if the standard of the end qualification (say, a degree) varies from one institution to another. Cowan (1985) suggests working with components of the process of education, rather than with the whole course.

*Measuring overall effectiveness across a number of variables.* Nielsen and Tatto (1993: 121) report on the effectiveness of the Universitas Terbuka, Indonesia's teacher training programme in terms of student scores on exit tests, compared with comparable face-to-face programmes. They measured student performance in four areas, applying weighting to each score to derive an overall score (Table 1).

*Attaching a cost to learning gain.* In Wagner (1982: 43-4), University X spends UK£5,000 on teaching 25 students economics (Table 2).

The learning gain is 25% (the difference between an average entry test score of 30% and an average exit score of 55%). University Z spends £10,000 teaching 60 students economics, with a learning gain of 15%. University Z is the most expensive in total cost, but its average cost per student is less than University X (i.e. it is more *cost-efficient*). However, University X is more *cost effective*. It has an average learning gain of 25% against University Z's 15%, and if we divide

the average cost per student by the average percentage point learning gain in each university, we find that University X spends £8.00 per learning point gain against £11.13 at University Z.

**benefits  
MEASURING THE BENEFITS  
OF DISTANCE EDUCATION**

*Quantitative access:* Distance education can increase enrolment at all levels of formal education, in non-formal settings, and for training. Measure its contribution by establishing a proportion of total national places provided through distance means at an institution.

*Equal access:* Distance education can meet the needs of remote communities, those whose jobs prevent them from attending regular classes, or those who are tied to the home. Survey students and potential learners to find out how many cannot study by traditional means.

*Quality of the educational experience:* Distance education students may have access to teaching materials and lecturers not otherwise available, and student support services can provide high quality advice and support. The major drawback is the lack of opportunity for teacher-student or student-to-student dialogue, but electronic conferencing systems (email, computer conferencing and computer-based video conferencing) make e-education increasingly attractive. Distance education learning materials may seem limited without access to a library, but e-libraries can help with this.

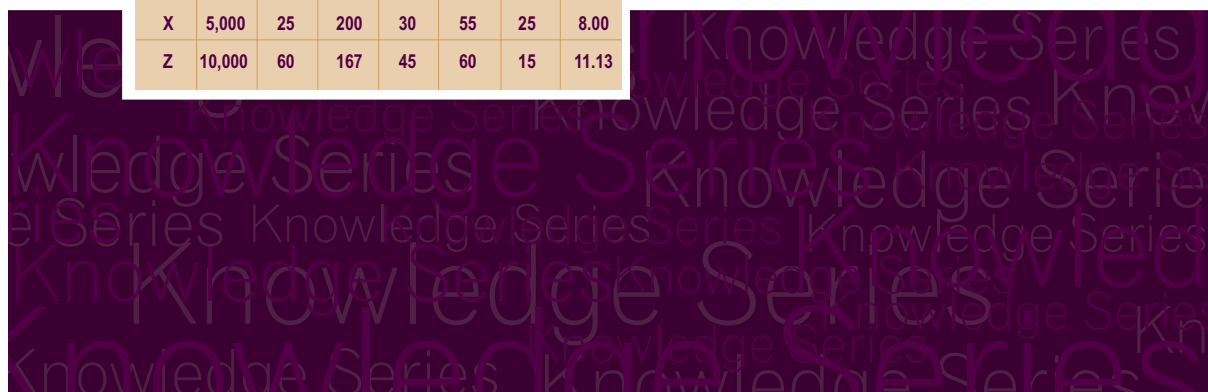
*Cost-efficiency:* Distance education may have a lower cost per student/ per graduate than traditional approaches (Rumble, 1997: 134-160), but as dropout rates tend to be higher in distance education, the average cost per graduate tends to be higher than the average cost per student. However, e-education approaches have different economies of scale from other forms of distance education (see Rumble, 2001).

*Economies of scale and scope:* Distance education provides economies of scale at the early stages of programme expansion, as fixed costs are spread across more and more students. Thereafter, economies tend to come from economies of scope.

*Benefits to students:* A little researched area. Are the lifetime earnings of distance students the same, more, or less than their counterparts from traditional institutions? Distance education students can earn as they study but may start their education later in life, when they have fewer years to earn at a higher level. The ability of distance education institutions to garner higher paid jobs for their graduates has been questioned. What studies exist, however, suggest that distance students do benefit financially.

**TABLE 2: EFFICIENCY AND EFFECTIVENESS (EXAMPLE)**

| University | Total cost | Number of students | Average cost per student | Entry Test average score | Exit Test average score | Learning gain (% points) | Average cost per learning point gain |
|------------|------------|--------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------------------|
| X          | 5,000      | 25                 | 200                      | 30                       | 55                      | 25                       | 8.00                                 |
| Z          | 10,000     | 60                 | 167                      | 45                       | 60                      | 15                       | 11.13                                |



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## REFERENCES

- Bates, A. W. (1995) *Technology, Open Learning and Distance Education*, London, Routledge.
- Cowan, J. (1985) "Effectiveness and efficiency in higher education," *Higher Education*, 14, pp. 235-9.
- Eicher, J.C., Hawkrigde, D., McAnany, E., Mariet, F. and Orivel, F. (1982) *The Economics of New Educational Media, Volume 3: Cost and Effectiveness Overview and Synthesis*, Paris, The UNESCO Press.
- Hülsmann, T. (2000) *The Costs of Open Learning: a Handbook*, Oldenburg, Bibliotheks- und Informationssystem der Universität Oldenburg, Carl von Ossietzky Universität Oldenburg.
- Jamison, D., Klees, S. J., and Wells, S.J. (1976) *The Costs of Educational Media. Guidelines for Planning and Evaluation*, Washington, D.C., US Agency for International Development.
- Jamison, D., Klees, S. J., and Wells, S.J. (1978) *The Costs of Educational Media. Guidelines for Planning and Evaluation*, Beverly Hills, Sage Publications.
- Neilsen, H. D. and Tatto, M. T. (1993) "Teacher upgrading in Sri Lanka and Indonesia," in Perraton, H. (Ed.) (1993) *Distance Teaching for Teacher Training*, London, Routledge.
- Rumble, G. (1997) *The Costs and Economics of Open and Distance Learning*, London, Kogan Page.
- Rumble, G. (2001) "The Costs and Costing of Networked Learning," *Journal of Asynchronous Learning Networks*, 5 (2), October 2001, pp.75-96. [www.aln.org/alnweb](http://www.aln.org/alnweb)
- Scott, P. (1997) "The postmodern university?," in Smith, A. and Webster, F. (Eds.) (1997) *The Postmodern University? Contested visions of higher education in society*, Buckingham, Open University Press.
- UNESCO (1977) *The Economics of New Educational Media*, Paris, The UNESCO Press.
- UNESCO (1980) *The Economics of New Educational Media, Volume 2: Cost and Effectiveness*, Paris, The UNESCO Press.
- Wagner, L. (1982) *The Economics of Educational Media*, London, The Macmillan Press.

## ANALYSING COSTS/BENEFITS FOR DISTANCE EDUCATION PROGRAMMES

Researched and written by Greville Rumble,  
Professor of Distance Education Management, The Open University, U.K.

The Knowledge Series is a topical, start-up guide to distance education practice and delivery. New titles are published each year.

Series editor: Grace Chin

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The Commonwealth of Learning

Suite 600 - 1285 West Broadway, Vancouver, BC V6H 3X8 CANADA

PH: +1.604.775.8200 | FAX: +1.604.775.8210 | E-MAIL: [info@col.org](mailto:info@col.org) | WEB: [www.col.org](http://www.col.org)

## Unit 8: Costs and budget

As managers we often have to make financial decisions. And we need to make administrative decisions which are affected by finance. The aim of this unit is to help with such decisions. To do so we need to be able to answer the following questions:

How do we decide on financial priorities?

How do we find out how each department and each course of our organisation costs?

How do we find out how much it would cost to run a new course?

If a course looks too expensive, what can we do about it?

How do we work out a budget for future expenditure?

We are therefore looking at ways of analysing costs and of using that information for budgeting, for financial management and management more generally. The unit will show how we can make such an analysis and give us practice in doing the calculations involved.

We have five specific objectives:

1. (for everyone) to be able to analyse the costs of an institution and so see how much particular activities cost;
2. (for everyone) to be able to use this information in budgeting for a distance-teaching institution or department;
3. (for everyone) to be able to see from an analysis of the costs how changes in a course or a project will affect its costs;
4. (for everyone) given a standard method, to be able to work out the costs of a particular course;
5. (for enthusiasts) to be able to improve the method.

### How do we decide on financial priorities?

We're likely to ask four key questions about costs.

Is distance teaching cheaper than conventional education?

Does it make financial sense to run a particular course or to use a particular teaching method?

How much does it cost to run any one department in our institution?

How do we forecast the costs of the whole institution for a given period of time?

The first of these is often answered before our own institution exists and is reflected in the decision to set up a distance-teaching unit. It must also be asked in relation to particular new projects in order to decide who runs them and how. It can only be answered, of course, if we can work out the real costs of that project by distance teaching and the real costs of it by conventional methods. Such information often does not exist or if it does it is very difficult to make the comparisons. We don't look at this question in any detail here. If you want to explore it further see our Broadsheet, [The cost of distance education](#).

The second and third questions require us to break down the costs of our work. We will examine how to do this in the next part of this unit, pages 132 to 144. These sections concern how we choose to spend money on one part of our work rather than another. Thus they are about priorities. And, as educational priorities may be determined by financial ones, we cannot happily dodge financial issues. Thus it is necessary to analyse our costs if our budget is to be used most wisely; it is necessary if we are to allocate resources wisely to one project rather than another. And it is necessary if we are to compete for funds against other agencies and want to show that we can make good use of resources. On the other hand there are arguments against controlling finance too strictly: the unexpected, the speculative, the imaginative need to play a part in education, and tight financial controls may stifle them all. In practice everyone wants some leeway in his budget and many people will manipulate their budgets to provide this, even if reluctant to admit to the fact.

The fourth question relates to the administrator's most regular financial job, namely to prepare an estimate of how much money is needed by the institution for the next year. There is nothing peculiar about this: the techniques of budgeting for distance teaching are largely the same as they are for any other sort of public enterprise. There are usually three stages in working out a budget. First, we need to break down the proposed activities under headings. Next, we can calculate, with some precision, future expenditure and income for that part of our work for which costs and receipts are fixed in advance. Third, there are some figures which we have to guess; for example, for new activities or for programmes which are likely to expand.

Much of the rest of this unit shows us how to work out the costs of distance teaching. This sort of calculation is the starting point for measuring all four kinds of question.

#### EXERCISE A

List in column (a) the headings which appear in the budget of your own institution (e.g. staff, printing, rent, office equipment). Do you think these headings tell you enough about the costs and income of your institution to be able to make financial decisions about what courses you should run, expand, cut down or abandon and to be able to draw up an accurate budget? If not, make another list, in column (b), of the kind of additional information about costs you think you would need in order to make such decisions. (If you do not know the headings which actually appear in a budget of a distance-teaching institution, just complete column (b) with a list showing the information you think necessary for an institution or proposed institution which is familiar to you.

|                            |  |
|----------------------------|--|
| (a) <u>Actual headings</u> | (b) <u>Proposed additional information</u> |
|----------------------------|--|

COMMENT

Different countries and different institutions require different budget formats, so we cannot say exactly what budget headings your institution has. It is likely, however, that they may include:

|                        |  |
|------------------------|--|
| <u>Income</u>          | <u>Expenditure</u>                           |
| Government grant       | Salaries and fees                            |
| Student fees           | Printing and stationery                      |
| Special projects grant | Books, instructional materials and equipment |
|                        | Rent, rates, office costs and services       |
|                        | Transport and travel                         |
|                        | Equipment                                    |

In order to be able to work out the actual figures for the expenditure headings and to make decisions about how to spend the money you have we think you also need to know:

the total cost of your institution's central administration;

the total cost of course production, divided into:

the cost of formal courses;

the cost of nonformal courses;

the total cost of radio production;

the total cost of evaluation;

the total cost of publicity.

In order to establish these total departmental costs you will also need to know how they are made up, which involves analysing:

salaries and fees for each department/section (including regional or field officers);

salaries and fees for each category of part-time or temporary staff (e.g. writers, tutors);

printing costs per volume of stated size and for different lengths of print run;

number of volumes, students, etc., per course;

proportions of rent/office space required for each function or department;

amount of travelling and transport costs per department and per course;

equipment costs per department, per course, per medium.

These all involve breaking down the costs in different ways. There may well be other details you will need which we have not thought of, but we think these are the most obvious items. And they illustrate the need for a more profound analysis of costs and the ability to break them down.

#### How do we find out how much each department and each course costs?

We shall try to answer the questions about costs first for the People's Education Centre (PEC), and then ask you to work out the costs for your own institution, or for another existing institution for which information on costs is available. Here are the basic facts about PEC.

#### People's Education Centre

As we saw in Unit 6, the People's Education Centre is a distance-teaching institution which uses both correspondence and radio. It also runs an experimental project in rural education and has a research unit of its own. It works in People's \$\$, whose value lies between the US \$ and the £ sterling. It is financed partly by student fees, partly by government grant, and partly by a special grant for its rural project.

PEC's courses are mainly but not entirely written by outside authors, and it employs part-time tutors who are paid fees for marking its students' work. As a semi-government institution it does not have to pay postage. It prints its own courses.

In 1979 - the year for which we have accounts - it had 10 000 enrolments; offered 7 radio series, for which the national broadcasting service met production and transmission costs; printed 45 250 volumes of correspondence texts; and ran its own vehicles, which travelled 18 027 km in total.

A substantial number of PEC students drop out of their courses. In two-volume courses, only three-quarters of the students go on to volume 2. In three-volume courses, three-quarters go on to volume 2, but only three-fifths go on to volume 3.

To make any sound financial plans, or to use financial control as a way of managing the Centre effectively, we need to break down the costs. We have to see, for example, how the Centre is spending its money before we can calculate the cost of a single course. Later on, we shall see how PEC can make financial decisions about a new, proposed course. But we start by analysing its total budget.

In 1978, PEC's administrator worked out its budget for 1980, using the approved government headings. This budget gave a forecast of what it would receive and spend in 1980. PEC's agreed budget for 1980 was:

| <u>Income</u>                          | P\$            |
|--|----------------|
| Government grant                       | 52 000         |
| From student fees                      | 141 000        |
| Experimental project grant             | <u>60 000</u>  |
| Total                                  | <u>253 000</u> |
| <br><u>Expenditure</u>                 |                |
| Salaries and fees                      | 96 662         |
| Instructional materials and services   | 70 175         |
| Rent, rates, office costs and services | 14 109         |
| Transport                              | 6 613          |
| Maintenance of equipment               | 4 942          |
| Purchase of equipment                  | 10 800         |
| Direct experimental costs              | <u>49 160</u>  |
| Total                                  | <u>252 461</u> |

By remarkably good management, PEC's actual expenditure turned out the same as this budget. This is unusual, but makes our job easier: often we get different results if we look at budgets - what people plan to spend - and actual expenditure - what they in fact spend.

To satisfy the government auditors PEC need only keep records of expenditure under the seven headings above. But this does not give the administrator of PEC enough information. She needs to know, for example, how much it costs PEC to print each course. And she needs to know whether the grant for the experimental project is in practice covering all the costs for the project. And so on. So what does she do? She wants to get the information that will help her planning, but without creating additional work.

The bookkeeper already keeps details of expenditure in rather more detail. His summary accounts for the year are in Table 1.

Table 1 Summary accounts for PEC (P\$)

|  |                |                |
|--|----------------|----------------|
| Salaries and fees                      |                |                |
| wages and salaries                     | 63 932         |                |
| tutors' fees                           | 21 433         |                |
| course writing fees                    | 8 370          |                |
| pension scheme                         | 2 927          | 96 662         |
| Instructional materials and services   |                |                |
| course printing materials              | 34 811         |                |
| residential courses                    | 4 140          |                |
| books, tapes, kits                     | 5 234          |                |
| general printing, stationery           | 9 092          |                |
| student handbook, guide, magazine      | 14 959         |                |
| sundry instructional services          | 1 939          | 70 175         |
| Rent, rates, office costs and services |                |                |
| rent, rates, insurance                 | 7 094          |                |
| heat, light, cleaning                  | 1 864          |                |
| telephone                              | 3 498          |                |
| bank charges and other fees            | 1 653          | 14 109         |
| Transport                              | 6 613          | 6 613          |
| Maintenance of equipment               |                |                |
| hire and maintenance                   | 1 574          |                |
| depreciation                           | 3 368          | 4 942          |
| Purchase of equipment                  | 10 800         | 10 800         |
| Experimental project                   | 49 160         | 49 160         |
| <u>Total</u>                           | <u>252 461</u> | <u>252 461</u> |

This gives the administrator a bit more information, and enables the bookkeeper to see that he does not overspend on any heading. But it still does not tell us how much each department spends. To find this out, she asks the bookkeeper to break down the expenditure a bit more. PEC is organised in six sections: central administration; course printing and production; student services; radio; research; and projects. She starts by looking at the wages or salaries for each person in the centre. It is then easy to see what the salary bill is for each department. It is broken down like this.

(P\$)

|                    | Admin  | Course<br>production | Student<br>services | Radio | Research | Project |       |
|--------------------|--------|----------------------|---------------------|-------|----------|---------|-------|
| Wages and salaries | 63 932 | 15 982               | 21 310              | 5 328 | 7 992    | 5 328   | 7 992 |

We can now see how much of that total wage bill of nearly P\$64 000 is spent in each department. It is fairly easy to go on and allocate some other costs to particular departments. The student service department, for example, is responsible for the teaching activities of the Centre. It looks after tutors and ensures that students' work is marked. So it is clear that tutors' fees are part of the expenditure of that department. Course writing fees and course printing materials are both required to produce new courses, so these costs belong to the course production department. Residential courses are run by the student services department. With this sort of knowledge we can continue to break down the expenditure under the same headings. The breakdown now begins to look like this.

|                           |        | Admin  | Course<br>production | Student<br>services | Radio | Research | Project |
|---------------------------|--------|--------|----------------------|---------------------|-------|----------|---------|
| Wages and salaries        | 63 932 | 15 982 | 21 310               | 5 328               | 7 992 | 5 328    | 7 992   |
| Tutors fees               | 21 433 |        |                      | 21 433              |       |          |         |
| Course writing fees       | 8 370  |        | 8 370                |                     |       |          |         |
| Pension scheme            | 2 927  | 2 927  |                      |                     |       |          |         |
| Course printing materials | 34 811 |        | 34 811               |                     |       |          |         |
| Residential courses       | 4 140  |        |                      | 4 140               |       |          |         |

If we go on like this, we get an analysis of costs as in Table 2. This already tells us a lot more than we had when the costs were only broken down as in Table 1. For the most part we can very quickly see that all the costs for a particular item belong under one heading. In other cases we can tell from the books that an item can be split between two headings or departments. The account books show, for example, that P\$3 200 of the expenditure on books, tapes and kits was for tapes used by the radio section, so that item can be split as it is in Table 2. But we are left with a great many costs under general administration, because we don't know where to put them. We can find where to put some of them without much difficulty. If we take transport as an example, we know that most of PEC's transport costs are the costs of running its own vehicles. Each vehicle has a log book and the log book shows which department has used the vehicle for a journey and how long the journey was. Once we know the total cost for travelling for a year (P\$6 613) it is very easy to calculate a rate per kilometre and see how the transport costs should be shared between departments.

Table 2 First breakdown of PEC's costs (P\$)

|  | Sub totals     | Administration | Course production | Student services | Radio         | Research     | Project       |
|--|----------------|----------------|-------------------|------------------|---------------|--------------|---------------|
| Salaries and fees                      | 96 662         |                |                   |                  | 7 992         | 5 328        | 7 992         |
| wages and salaries                     | 63 932         | 15 982         | 21 310            | 5 328            |               |              |               |
| tutors' fees                           | 21 433         |                |                   | 21 433           |               |              |               |
| course writing fees                    | 8 370          |                | 8 370             |                  |               |              |               |
| pension scheme                         | 2 927          | 2 927          |                   |                  |               |              |               |
| Instructional materials and services   | 70 175         |                |                   |                  |               |              |               |
| course printing materials              | 34 811         |                | 34 811            |                  |               |              |               |
| residential courses                    | 4 140          |                |                   | 4 140            |               |              |               |
| books, tapes, kits                     | 5 234          |                |                   | 2 034            | 3 200         |              |               |
| general printing, stationery           | 9 092          | 9 092          |                   |                  |               |              |               |
| student handbook, guide, magazine      | 14 959         |                |                   | 14 959           |               |              |               |
| sundry instructional services          | 1 939          |                |                   | 1 939            |               |              |               |
| Rent, rates, office costs and services | 14 109         |                |                   |                  |               |              |               |
| rent, rates, insurance                 | 7 094          | 7 094          |                   |                  |               |              |               |
| heat, light, cleaning                  | 1 864          | 1 864          |                   |                  |               |              |               |
| telephone                              | 3 498          | 3 498          |                   |                  |               |              |               |
| bank charges and other fees            | 1 653          | 1 653          |                   |                  |               |              |               |
| Transport                              | 6 613          | 6 613          |                   |                  |               |              |               |
| Maintenance of equipment               | 4 942          |                |                   |                  |               | 500          |               |
| hire and maintenance                   | 1 574          | 1 074          |                   |                  |               |              |               |
| depreciation                           | 3 368          | 3 368          |                   |                  |               |              |               |
| Purchase of equipment                  | 10 800         | 10 800         |                   |                  |               |              |               |
| Experimental project                   | 49 160         |                |                   |                  |               |              | 49 160        |
| <b>Total</b>                           | <b>252 461</b> | <b>63 965</b>  | <b>64 491</b>     | <b>49 833</b>    | <b>11 692</b> | <b>5 328</b> | <b>57 152</b> |

This is how it is done. The account books show that of the total expenditure on transport of P\$6 613, the sum of P\$484 was for public transport and the balance of P\$6 129 for using PEC's own vehicles. The log books show that they travelled in total 18 027 km in the year. We can see that the cost per km was therefore (6 129/18 027) or P\$0.34.

Next the administrator arranges for the log books to be analysed. They show the distance travelled for each department, thus:

|                   |        |
|-------------------|--------|
|                   | km     |
| Administration    | 3 695  |
| Course production | 432    |
| Student services  | 5 211  |
| Radio             | 900    |
| Research          | 4 027  |
| Project           | 3 762  |
|                   | 18 027 |

If we multiply these figures by P\$0.34, we then get a transport cost for each department:

|                   |        |             |       |
|-------------------|--------|-------------|-------|
|                   | km     |             | P\$   |
| Administration    | 3 695  | x P\$0.34 = | 1 256 |
| Course production | 432    |             | 147   |
| Student services  | 5 211  |             | 1 772 |
| Radio             | 900    |             | 306   |
| Research          | 4 027  |             | 1 369 |
| Project           | 3 762  |             | 1 279 |
|                   | 18 027 |             | 6 129 |

This sort of calculation enables us to improve the breakdown of costs in Table 2. We could change it, so that instead of showing the total transport costs under administration, we showed under administration just the \$1 256 calculated above, and the \$484 for public transport. (The public transport figure is so low that it is probably not worth the extra work involved in splitting it between departments.) This would, of course, also alter the totals. We would then substitute the amounts in Table 3 for the transport costs and total costs in Table 2.

Table 3 Changes to Table 2

|           | Admin   | Course<br>production | Student<br>services | Radio  | Research | Project |
|-----------|---------|----------------------|---------------------|--------|----------|---------|
| Transport | 6 613   | 1 740                | 147                 | 1 772  | 306      | 1 369   |
| Total     | 252 461 | 59 092               | 64 638              | 51 605 | 11 998   | 6 697   |

The administrator does a somewhat similar calculation to discover how much it costs PEC to print a standard, 100-page, A4 volume. She knows that the total course production costs were P\$21 310 for wages and salaries plus P\$34 811 for course printing materials, making a total of P\$56 121. The records kept by the production department show that during the year they printed 45 250 volumes. This gives her a cost per volume of (56 121/45 250) or P\$1.24. Similarly, by

looking at the number of volumes the editors deal with in a year, she can produce an average editing cost per volume - a figure we will need when looking at the cost for a proposed course.

Now you must do some calculations. If you have the accounts of your own institution, you can work out the cost of teaching a student, and the cost of producing a volume of a course from those figures. Or something similar. But if you have not, then work from the sums in Table 4. This is a summary of the National Extension College's expenditure in 1978.

Table 4 National Extension College expenditure 1978 (£)

|                           |                |
|---------------------------|----------------|
| Salaries, wages, pensions | 78 500         |
| Tutors' fees              | 25 900         |
| Course production         | 74 100         |
| Books, tapes, kits        | 5 600          |
| General printing          | 9 900          |
| Advertising               | 22 000         |
| Postage and telephone     | 34 400         |
| Rent, rates, office costs | 10 900         |
| Travel                    | 3 300          |
| Maintenance, depreciation | 7 400          |
| Interest                  | 3 400          |
| Project expenditure       | 66 300         |
|                           | <u>341 700</u> |

In that year the College had 8 500 enrolments on correspondence courses. Your job is to find out: (a) what it cost to teach each student (leaving aside the cost of administering the college, publicising it, producing courses and running its separate project) and (b) what it cost to produce each volume. You can assume it produced 12 000 volumes.

To work these out, divide NEC's expenditure between 5 sections: administration; publicity/advertising; course production; teaching; project. You can assume that salaries, wages and pensions, and postage and telephone costs were divided between departments, and that one third of course production costs were for the separate projects, like this:

|                   | (£)            |           |                   |          |         |
|-------------------|----------------|-----------|-------------------|----------|---------|
|                   | Administration | Publicity | Course production | Teaching | Project |
| Salaries          | 30 000         | 12 000    | 15 000            | 14 000   | 7 500   |
| Course production | -              | -         | 49 400            | -        | 24 700  |
| Post/telephone    | 7 000          | 12 000    | -                 | 15 400   | -       |

| <b>EXERCISE B</b>  |                |           |                   |       |
|--|----------------|-----------|-------------------|-------|
| Draw up a table for NEC or your own institution like the one we used for PEC in Table 2. From this you can work out the teaching costs and production costs. Don't forget to make it clear what currency you are using |                |           |                   |       |
|  | Administration | Publicity | Course production | Total |
| Salaries and fees  |                |           |                   |       |
| wages and salaries   |                |           |                   |       |
| tutors' fees   |                |           |                   |       |
| course writing fees  |                |           |                   |       |
| Instructional materials  |                |           |                   |       |
| course production  |                |           |                   |       |
| books, tapes, kits   |                |           |                   |       |
| general printing   |                |           |                   |       |
| Office costs and services  |                |           |                   |       |
| rent, rates, etc.  |                |           |                   |       |
| bank charges, interest   |                |           |                   |       |
| post, telephone  |                |           |                   |       |
| Transport  |                |           |                   |       |
| Maintenance, depreciation  |                |           |                   |       |
| Project expenditure  |                |           |                   |       |
| Total  |                |           |                   |       |

COMMENT

These exercises are quite useful. They tell managers something about their costs. They help us decide between alternative courses of action. They keep the pocket calculator industry in business. Your analysis of NEC's costs is the starting point for further work later in this unit.

But they only tell part of the story. Look back at Table 2: we are still left with P\$63 965 out of a total of P\$252 461, or 25% of the total expenditure, under the vague heading 'administration'. Even when we reallocated the costs of transport in Table 3, we were still left with P\$59 092 (23% of expenditure) under administration. Often we want to know more precisely what this money was spent on. But we cannot divide up the administrator's time, or the cost of heating and lighting the building or paying rent, as easily as we could keep track of expenditure on vehicles. We therefore need to make some arbitrary decisions about sharing the administrative costs between departments. If we want, for example, to know how much our radio section costs, we need to take into account not only the costs of its own staff and its tapes, which are easily discovered, but also its share of the rent and of senior staff time. This is important if we are planning the future use of more radio and want to know the effect of it on our budget. Similarly, if we have a separate project fund, we need to be sure that it covers not only the project's direct cost but also the costs of the time other staff spend on it. And so we need to share out the administrative or overhead costs between departments.

We can do this in various ways. They are all based on guesses, and it is probably not worth spending a lot of time in subtle calculations. We can see how much each department spends, and then allocate the administrative costs between them in the same proportion. Or we can see how much floor space each department uses, and allocate the overhead costs in the same proportion. Or we can get staff together and get them to make the best possible guess as to how much of the organisation's energies go on one part of its work or another. This is what the administrator of PEC has done. The staff meeting decided that the energies of the Centre were divided in the following proportions between the five sections of the Centre other than the administrative section:

|                   |     |
|-------------------|-----|
| Course production | 35% |
| Student services  | 35% |
| Radio             | 10% |
| Research          | 5%  |
| Project           | 15% |

She can now see that the total cost of running each section is the total shown in Tables 2 and 3, together with the appropriate proportion of administrative costs. Thus, for example, she needs to add 35% of the administrative costs to the costs of the course production section in order to see the total cost of course production. Table 5, which summarises PEC's expenditure, shows the results of this redistribution.

Table 5 Revised breakdown of PEC s costs (P\$)

|   | Sub totals     | Administration | Course production | Student services | Radio         | Research     | Project       |
|---|----------------|----------------|-------------------|------------------|---------------|--------------|---------------|
| Salaries and fees                                   | 96 662         | 18 909         | 29 680            | 26 761           | 7 992         | 5 328        | 7 992         |
| Instructional materials and services                | 70 175         | 9 092          | 34 811            | 23 072           | 3 200         |              |               |
| Rent, rates, office costs and services              | 14 109         | 14 109         |                   |                  |               |              |               |
| Transport   | 6 613          | 1 740          | 147               | 1 772            | 306           | 1 369        | 1 279         |
| Maintenance of equipment                            | 4 942          | 4 442          |                   |                  | 500           |              |               |
| Purchase of equipment                               | 10 800         | 10 800         |                   |                  |               |              |               |
| Experimental project                                | 49 160         |                |                   |                  |               |              | 49 160        |
| Total   | <u>252 461</u> | <u>59 092</u>  | <u>64 638</u>     | <u>51 605</u>    | <u>11 998</u> | <u>6 697</u> | <u>58 431</u> |
| Redistribution of administrative and overhead costs |                | –              | 20 682 (35%)      | 20 682 (35%)     | 5 909 (10%)   | 2 955 (5%)   | 8 864 (15%)   |
| New total   | <u>252 461</u> | –              | <u>85 320</u>     | <u>72 287</u>    | <u>17 907</u> | <u>9 652</u> | <u>67 295</u> |

This is a very crude calculation. It does not for example, separate capital expenditure on equipment from recurrent expenditure. But crude calculations have their merits. These ones tell us a number of things which the administrator wanted to know and which help her in managing PEC. Here are three examples.

We know that PEC prints 45 250 volumes a year and we had previously assumed that these cost P\$1.24 per volume to produce. Now this figure may be all right for some of PEC's internal calculations. But when PEC is going to produce volumes for an outside organisation it is important for it to charge enough. It must recover a proportion of its overheads for this work. And the calculations in Table 5 show that the full cost per volume is more like  $85\,320/45\,250$  or P\$1.89.

PEC receives a grant from the government which is meant to cover the cost of its student services. That grant is for P\$52 000. But the department demands a lot of management time, and a fair amount of office space, which were not allowed for in the original grant calculations. We can now see that the grant is not covering the full student service costs. As a renewal of the grant is being negotiated, the PEC administrator is in a stronger position to argue for it to be increased.

Now look again at your analysis of NEC's costs for 1978. You probably have totals like this:

|        |           |                      |          |         | (£)     |
|--------|-----------|----------------------|----------|---------|---------|
| Admin  | Publicity | Course<br>production | Teaching | Project | Total   |
| 71 900 | 46 000    | 64 400               | 60 900   | 98 500  | 341 700 |

A group of NEC advisers recently reconsidered its expenditure for 1978 and decided that the administrative and overhead costs could be allocated like this:

|                   |     |
|-------------------|-----|
| Publicity         | 15% |
| Course production | 40% |
| Teaching          | 30% |
| Project           | 15% |

They also agreed that 90% of the publicity costs should be allocated to teaching and 10% to the project.

**EXERCISE C**

Now reallocate NEC's costs or the costs of your own institution and calculate the revised cost of teaching a student and the revised cost of producing a course. This exercise is slightly more complicated than the one we did to produce Table 5. You will need to reallocate the costs in two stages. First, reallocate the administrative costs to all the other headings. Then, as a second stage, reallocate the publicity costs

|                           | Administration | Publicity | Course production | Teaching | Project | Total |
|---------------------------|----------------|-----------|-------------------|----------|---------|-------|
| Salaries and fees         |                |           |                   |          |         |       |
| wages and salaries        |                |           |                   |          |         |       |
| tutors' fees              |                |           |                   |          |         |       |
| course writing fees       |                |           |                   |          |         |       |
| Instructional materials   |                |           |                   |          |         |       |
| course production         |                |           |                   |          |         |       |
| books, tapes, kits        |                |           |                   |          |         |       |
| general printing          |                |           |                   |          |         |       |
| Office costs and services |                |           |                   |          |         |       |
| rent, rates, etc.         |                |           |                   |          |         |       |
| bank charges, interest    |                |           |                   |          |         |       |
| post, telephone           |                |           |                   |          |         |       |
| Transport                 |                |           |                   |          |         |       |
| Maintenance, depreciation |                |           |                   |          |         |       |
| Project expenditure       |                |           |                   |          |         |       |
| Total                     |                |           |                   |          |         |       |

COMMENT

You can now see the dramatic effect of bringing in all the costs: an effect much greater than you would find in orthodox education, where staffing costs alone amount to between 65% and 80% of the total in many schools. If you did the NEC exercise, for example, you will see that this change more than doubles the cost of teaching a student, leaving aside the cost of producing courses. As the production department makes more modest calls on the rest of the organisation and does not require publicity its costs rise less dramatically.

How do we find out how much it would cost to run a new course?

The calculations we have done enable PEC to work out how much it will cost to run a proposed course. We look now at the way PEC does this. We are concentrating on a correspondence course by way of example, but similar methods could be used for the use of radio, or for a different style of course.

PEC wants to decide whether to offer a new course. It will be on revolutionary literature. There is a demand for the course and it would fill a gap in PEC's list of courses. But it is not PEC's highest priority. So the PEC administrator works out how much the course will cost. This is how she does it.

First, she gets the best possible answers from her colleagues to the following questions:

How long a course will it be?

How many assignments (for marking) will it have?

How much will tutors be paid to mark each assignment?

How long will the course be used before it is changed?

How many students a year will enrol?

What will they be charged?

How many of them will drop out before completing the course?

(If PEC had to pay for postage, she would also need to ask how much it would cost to post lessons to students.)

Some of the answers she gets are guesses but they are the best we can do. They are based on PEC's experience of similar courses.

Next she works out how much it will cost to pay the author. Here she can get a more accurate figure: the course is to be written by an outside author and the proposed fee is based on what PEC usually pays. Then she needs to calculate the cost of editing, designing and setting the course. She knows how much it costs to edit a volume of a particular length, and how much it costs to design it and set it in type. She also knows how much paper costs. So she can work out these production costs. This is the kind of calculation made on p.137 above.

After these calculations she can work out the annual cost. Revolutionary literature is to be used

for four years. She can therefore see that the annual cost of running the course is made up of four elements:

- a quarter of the author's fee;
- the cost of printing one year's supply of the course;
- payment to tutors for marking one year's work by students;
- overheads.

The first three of these are quite straightforward. As for the fourth, there are, as we saw, various ways of calculating overheads. PEC has adopted a very simple approach for costing courses. It has argued that correspondence students should generate enough income to pay half the administrative costs together with half the costs of the student services section. From Table 5 we can see that these costs are:

|                      |         |
|----------------------|---------|
|                      | (P\$)   |
| Administrative costs | 59 092  |
| Student services     | 51 605  |
|                      | 110 697 |

The cost of tutors' fees has to be deducted from this figure, as we can calculate more accurately how much tutors will cost for a particular course. This then gives us the following total figure to be allowed for overheads:

|                                    |         |
|------------------------------------|---------|
|                                    | (P\$)   |
| Admin and services<br>(from above) | 110 697 |
| less tutors' fees                  | 21 433  |
|                                    | 89 264  |

2 = 44 632

(In the light of the discussion on pages 137 - 140 above, we could work out a better way of calculating overheads. But this crude approach has given PEC an accurate enough idea for the calculations.) PEC expects to have 10 000 subject enrolments a year. The overheads have to be shared between these 10 000. Thus the administrator wants to recover \$44 632/10 000 or \$4.46 from each subject enrolment for her overheads.

Now look at Figure I on pages 146 and 147. On the left is PEC's standard costing form, completed for the proposed course in revolutionary literature. On the right, we explain how PEC's administrator has worked out the costs for the course. The notes are numbered to correspond with the numbers in the right hand margin of the form. Work through both pages carefully, so that you can see how she reaches the annual cost and the annual income.

If a course looks too expensive, what can we do about it?

If the course is produced as planned, PEC will lose an estimated P\$392 a year on it. The estimate may be wrong, but it is the best we can do. It faces PEC with the following choices:

- it can go ahead with the course, in effect subsidising it from other funds;

FIGURE I - Course costing

|   | <u>Notes</u> |
|---|--------------|
| Title <u>Revolutionary Literature</u> Length <u>300 pp. A4</u> .....                            | 1,2          |
| Assignments (a) <u>16</u> ..... Marking fee (f) <u>0.75</u> .....                               | 3,4          |
| Life (y) <u>4</u> .....years Annual enrolment (e) <u>250</u> ...                                | 5,6          |
| Proposed fee (p) <u>18</u> ..... Overheads per student (h) <u>4.46</u> .....                    | 7,8          |
| Annual text usage volume 1 (e) .....  | 9            |
| volume 2 (3/4 e) .....  | 10           |
| volume 3 (3/5 e) .....  | 11           |
| Total (u) .....   | 12           |
| <u>Production costs</u>   |              |
| Author's fee .....  | 13           |
| Edit, design, set .....   | 14           |
| Total generation costs (g) .....  | 15           |
| Printing (y × u × print cost per volume) (r) .....  | 16           |
| (4 × 590 × 1.24)  |              |
| <u>Annual costs</u>   |              |
| Generation cost (g/y) .....   | 17           |
| Print cost (r/y) .....  | 18           |
| Tutors' fees (0.6 × a × f × e) (0.6 × 16 × 0.75 × 250) .....                                    | 19           |
| Overheads (e × h) (250 × 4.46) .....  | 20           |
| Extra costs (e.g. radio) .....  | 21           |
| <u>TOTAL ANNUAL COST</u> <span style="border: 1px solid black; padding: 2px 10px;">3 992</span> |              |
| Annual fee income (0.8 × e × p) .....   | 22           |

Notes to Figure I

1. PEC education staff give the title of the course.
2. They determine its length: at 300 pp it will have 3 volumes.
3. They say how many assignments it needs.
4. Tutors on comparable courses are paid \$0.75 for each assignment.
5. The course may get out of date in 4 years.
6. Similar courses attract about 250 students a year.
7. They usually cost about \$18.
8. Overheads are calculated as discussed on pp. 143-144.
9. All students will get volume 1 so 250 copies are needed.
10. But dropouts mean that only 3/4 will go on to volume 2.
11. 3/5 will go on to volume 3.
12. This is therefore the total number of volumes to be printed.
13. Authors of similar courses are paid \$420.
14. Analysis of PEC costs shows that it will cost this to edit the text, design it and set it in type.
15. The total costs for generating the course, to the point where it is ready for printing, are the total of these two costs.
16. It costs PEC \$1.24 to print a 100-page volume, including paper costs. The total print costs are 1.24 multiplied by the annual number of volumes and by the 4-year life of the course.
17. The annual costs include 1/4 of the generation cost (as it is to run for 4 years).
18. They also include 1/4 of the print cost.
19. Tutors' fees: from past experience PEC knows that students do not do all the assignments. They usually do 60% of them. So the tutors' fees are 60% of the total number of assignments multiplied by the marking fee and by the number of enrolments.
20. Overheads - the rate per head multiplied by the number of enrolments.
21. Sometimes there will be extra costs - if there is any extra expenditure which arises just because of this course. There are none for Revolutionary literature.
22. Some students do not pay all their fees, and some get refunds. From experience PEC knows that the actual fee income is therefore likely to be only 80% of the proposed fee multiplied by the annual enrolment.

it can abandon the plans for the course;

it can make changes to the outline plan for the course in order to produce a different financial result.

The PEC administrator looked at four different ways of producing a better financial result. She considered:

1. Increasing the student's fee by P\$2. From previous experience this would result in a 5% reduction in enrolment. Thus, for this option, the student's fee would be P\$20 and the enrolment 237.
2. Making the course shorter so that it had only 2 volumes and 12 assignments. This would reduce the printing costs, the marking fees and the cost for editing, designing and setting. PEC authors argue that it would cost as much to write as a longer course and the treasurer thinks that he can still charge P\$18 for the course. (In calculating the number of copies to be printed, the administrator assumes that three-quarters of the students will still go on from volume 1 to volume 2.)
3. Making modest changes by prolonging the life of the course from 4 to 6 years, cutting the number of assignments from 16 to 15 and the marking fee from \$0.75 to \$0.65.
4. Running a publicity drive for the course which would cost an additional \$500 but double the enrolment from 250 to 500 students.

#### EXERCISE D

Using the same format as Figure I, you can now calculate the effects of all these changes if you want to, using the form on p.149. Which would you choose? You may decide, when you have done the calculations, that your choice between alternatives has now to be on educational rather than financial grounds.

COURSE COSTING

|                     |                             |
|---------------------|-----------------------------|
| Title               | Length                      |
| Assignments (a) ..  | Marking fee (f)             |
| Life (y) years      | Annual enrolment (e) ....   |
| Proposed fee (p) .. | Overheads per student (h) . |
| Annual text usage   | volume 1 (e) ..             |
|                     | volume 2 (3/4 e)            |
|                     | volume 3 (3/5 e)            |
|                     | Total (u)                   |

Production costs

|   |    |
|---|----|
| Author's fee ..   |    |
| Edit, design, set .                                       |    |
| Total generation costs (g)                                | .  |
| Printing ( $y \times u \times$ print cost per volume) (r) | .. |

Annual costs

|   |  |
|---|--|
| Generation cost (g/y) ..                          |  |
| Print cost (r/y) .                                |  |
| Tutors' fees ( $0.6 \times a \times f \times e$ ) |  |
| Overheads (e x h)                                 |  |
| Extra costs (e.g. radio) .                        |  |

TOTAL ANNUAL COST

Annual fee income ( $0.8 \times e \times p$ )

Next, the administrator looked at a more radical proposal: to add a radio component to the course. In PEC's discussions on this it was argued:

1. Providing a radio component would cost PEC P\$1 670. This is the figure omitting overheads; we are using that figure because the administrator has already decided to recover the overheads by including the figure of P\$4.46 discussed on p.145. This represents one seventh of the annual expenditure on radio, or one seventh of the \$11 692 shown in Table 2, as PEC normally produces seven radio series a year. Of course there are far greater costs in making radio programmes, but the other costs are met by the radio station and not by PEC.
2. A course linked with radio would attract 1 250 students. 250 of these would be students who would have enrolled with PEC anyhow, and who might have enrolled for a different course if Revolutionary literature had not been available. Thus adding a radio course of this kind would increase PEC's total number of students from 10 000 to 11 000. PEC could look after this many students without increasing staff or office accommodation. As a result the overheads of P\$44 632 which were previously shared between 10 000 students are now shared between 11 000. The figures for overheads per student enrolment thus fall from P\$4.46 to P\$4.06.
3. A more popular radio course should be shorter, with 2 volumes and 12 assignments.
4. PEC would like to reduce the enrolment fee to P\$16.50.

#### EXERCISE E

Now work out the financial effects of doing the course with a radio component. Use Figure II (p.151) to help you. We have started to complete it. You must finish it.

#### COMMENT

The purposes of Exercises D and E is to show how costing can help the manager. PEC's costing form is not, of course, the only way of working out the costs of a course. But we think you will need some sort of form like this to help you make choices about your budget.

#### EXERCISE F

You can now, if you want, draw up a better costing form for your institution on a separate sheet of paper. You may want, for example, to treat overheads differently. Or you may want to bring into the form the costs of any face-to-face teaching you offer. Or you may be able to change it so that you can more easily see the effects of increasing or reducing fees, or the length of the course, or changing some other variable.



COMMENT ON EXERCISES E AND F

We'd draw two general conclusions from these exercises. First, you can see that many of the costs in a distance-teaching institution are fixed, in the sense they do not go up or down with a larger or smaller number of students. The generation costs and the overhead costs form a significant proportion of the costs in all the alternatives considered above.

Second, having done the calculations, we are often forced back to making decisions on educational, social, or political criteria, not on financial ones. If we look at different ways of doing a course and find that their financial results are very similar, we cannot decide which way to choose on financial grounds. Small differences are meaningless, as we are working from estimates. In the case of Revolutionary literature, for example, we can get the following results:

| Course   | No. of students | Financial results |
|--|-----------------|-------------------|
| Original plan but fee of P\$20                               | 237             | loss P\$7         |
| Lower tutors' fees, 2 volumes with 12 assignments, fee P\$18 | 250             | gain P\$325       |
| Course with radio, but with course fee dropped to P\$16.50   | 1 250           | loss P\$27        |

These are all so similar that it would be absurd to choose between them solely on financial grounds. We have, instead, to consider the educational arguments about educating fewer people, at a higher fee, or more people on a shorter course, or very many more people on a shorter course and with radio thus stopping us using radio for something else.

All that we have done so far has been in an attempt to help managers decide. The point of the calculations is to help make better decisions, within a distance - teaching institution.

How do we work out a budget for future income and expenditure?

So we come back to where we started. The most regular and perhaps the most important financial job for an administrator is to work out the institution's annual budget: how much money will it need for its various activities and departments and where can it hope to get that money? We said earlier, on page 130, and we stress it again, that most of the techniques of budgeting for distance teaching are the same as for other kinds of institutions. We listed there the three stages in working out a budget. Let us look at them again in more detail.

1. We need to break down the costs of the proposed activities under headings: salaries, rent, office supplies, equipment, transport and so on. Often the headings will be determined by the administrative system within which the institution has had to work; they will be the headings laid down by our parent body, and will often be of the kind shown on pages 131

- 132; they remain the same from year to year, and are similar to those used by other similar institutions.
2. Next we need to calculate with as much precision as possible future expenditure and income for that part of our work for which we have clear and reliable guidelines. If we pay rent for our offices, for example, we can very easily see how much to include for next year. Similarly, if we have already negotiated a grant for part of next year's work, there is a definite, known, sum to include under income in our budget.
  3. Third, we have to make some informed guesses about those parts for which we do not have clear information or guidelines. In a new organisation or for a new project it is often difficult to forecast how rapidly things will grow. But it is usually possible to make reasonably reliable estimates. If, for example, we have to forecast transport costs for a new activity, we can guess at these in one of three ways. We can take the present transport costs and multiply them by what seems a reasonable factor to cover the expansion of our activities. Or we can work out approximately how many journeys of approximately what length we are likely to do and calculate the costs on that basis. Or we can find the costs for an organisation comparable to our own, adjust them to our own circumstances, and work from there.

#### CASE STUDIES

Now read Case Studies 28 and 29

In the next few paragraphs we shall not look at budgeting techniques which are common to most organisations. We shall concentrate on a few considerations which apply especially to distance-teaching institutions, drawing on the examples contained in these case studies.

You should be able to see from the case studies that the techniques of detailed cost calculations described in this unit are valuable techniques in budgeting. In the Sudan proposal, for example, these have been used to calculate the costs per student per course of the different kinds of activity. An important reason was to make it possible to apply to different agencies for support for different programmes and, in some cases, to apply for support for a given number of students. In Lesotho a similar approach is used when working out how much its various service agency activities cost and therefore how much it should charge. This also helps the agencies served by LDTC to budget for their distance-teaching projects. In most budgets it may not be necessary to give the detailed breakdown by department, by students, or by course. It is, however, usually necessary to have done the detailed costings first in order to arrive at figures for the general budget headings.

These examples also re-emphasise the need to have a method of calculating the overhead costs - general administration, rent, office services and so on - of individual projects. If we cannot do so we cannot include a reasonable proportion of these overhead costs in applications for financial support, or in working out the fees we should charge students for those courses we cannot or do not want to subsidise. It is also a useful guide to calculating the additional overhead costs, in cash, personnel and resources, of adding new courses or new projects to our programme.

A complication in budgeting for a distance-teaching project is to calculate the costs of part-time staff. These may include fees for part-time writers and for part-time tutors and counsellors. The first are comparatively straightforward if you know in advance the courses you intend to produce each year. You can then estimate the number of course units or sections and multiply that by an agreed and acceptable fee for each unit. It is more difficult to know in advance how many

students will be enrolling for each course, and how many assignments each will complete. Such an estimate determines the numbers of part-time tutors required and the fees they will need to be paid. You must remember two things: first, you must base your estimate on the maximum realistic number of enrolments; secondly you must assume that not all of them will keep up their studies, so you need to allow for an average rate of dropout. We saw how this was done for the PEC on page 147. The basis for both these calculations will be agreed fee rates per written unit or per marked assignment. These rates inevitably vary widely from country to country. Two guidelines, however, may be useful: the fee rates per hour for part-time evening class teachers which apply in the country and at the level concerned, and the rates per script paid by local examining councils. Part-time tutor and writer fees should be significantly higher than the latter, and about the same as the former. You must then estimate how long a tutor will take to mark and comment on each script or a writer to write a unit. In both cases it is advisable, if you can afford it, to make a generous estimate, so as to ensure that tutors give careful consideration to individual students' requirements, and that writers are prepared to rewrite or revise what they have written as advised by the editor.

In all such estimations it is extremely difficult to predict the amounts you will need. A crucial part of budgeting is therefore the art of approximation. This becomes easier each year, but even for a new institution, as we have suggested, guidance can be obtained from similar institutions at home or in nearby countries. It is important to allow for inflation and contingencies, so it is better to err on the side of overestimation, rather than to underestimate and then to have to cut back on a programme already launched. Because of the need to approximate, it is useful to ensure some flexibility so that money can be switched, within reason, from one item to another. For example, it is useful if money saved on part-time tutors can be available to cover unexpected writing costs, or the salary of an unfilled part-time subject post can be used to commission a course in the same subject from a part-time writer. This means that a distance-teaching institution will benefit if it can negotiate with its parent body the right to switch sums between budget headings. However, under some financial systems this will not be possible.

#### What have we learned?

1. Costing is not mysterious.
2. Intelligent guesswork is better than struggling in the dark and hoping the costs will come right.
3. It is possible to work out the probable expenditure and income for a particular course, and for a particular department in a distance-teaching institution.
4. To do that we need some wider analysis of a distance-teaching organisation's costs.
5. Such an analysis can be made fairly easily, without creating additional work, on the basis of records necessarily kept by the institution.
6. It always raises questions about how to deal with overheads.
7. Now we have looked at them we see that there is often a danger under-estimating costs.
8. Costing enables us to draw up a reasonably accurate budget for a distance-teaching institution, or for specific distance-teaching projects.

***Annualisation factors***

| <b>Life of capital<br/>equipment in<br/>years (n)</b> | <b>Interest rates (r)</b> |             |           |             |            |
|---|---------------------------|-------------|-----------|-------------|------------|
|   | <b>0%</b>                 | <b>2.5%</b> | <b>5%</b> | <b>7.5%</b> | <b>10%</b> |
| 1   | 1.000                     | 1.025       | 1.050     | 1.075       | 1.100      |
| 2   | 0.500                     | 0.519       | 0.538     | 0.557       | 0.576      |
| 3   | 0.333                     | 0.350       | 0.367     | 0.385       | 0.402      |
| 4   | 0.250                     | 0.266       | 0.282     | 0.299       | 0.315      |
| 5   | 0.200                     | 0.215       | 0.231     | 0.247       | 0.264      |
| 6   | 0.167                     | 0.182       | 0.197     | 0.213       | 0.230      |
| 7   | 0.143                     | 0.157       | 0.173     | 0.189       | 0.205      |
| 8   | 0.125                     | 0.139       | 0.155     | 0.171       | 0.187      |
| 9   | 0.111                     | 0.125       | 0.141     | 0.157       | 0.174      |
| 10  | 0.100                     | 0.114       | 0.130     | 0.146       | 0.163      |
| 15  | 0.067                     | 0.081       | 0.096     | 0.113       | 0.131      |
| 20  | 0.050                     | 0.064       | 0.080     | 0.098       | 0.117      |
| 25  | 0.040                     | 0.054       | 0.071     | 0.090       | 0.110      |
| 30  | 0.033                     | 0.048       | 0.065     | 0.085       | 0.106      |
| 40  | 0.025                     | 0.040       | 0.058     | 0.079       | 0.102      |
| 50  | 0.020                     | 0.035       | 0.055     | 0.077       | 0.101      |