COSTING TEACHER EDUCATION:

perceptions and practice

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Neil Burton BSc, PGCE, ACE, MA (education)

Educational Management Development Unit

University of Leicester

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ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Abstract

Neil Burton

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This study results from a perceived need for Higher Education providers of primary undergraduate initial teacher training (ITT) to be more accountable, within their institutions and externally to their funding body, for costs incurred. A survey of all undergraduate primary ITT courses within England and Wales revealed that very few course leaders had access to the necessary raw data or to any resultant financial information. Most courses generated sufficiently detailed costings to demonstrate course viability but not to assist with detailed course planning and management of resources. Using data obtained from a case study institution, 'back-flush' costing was employed to identify component costs in a form which allowed the development of a formulaic costing system. The viability of such approaches to costing is analysed and recommendations are made for changes to course, institutional and state funding body procedures to ensure that there can be rigorous accountability for the use of public funds.

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Chapter 1 INTRODUCTION

Preamble

The external view of Higher Education (HE) has changed considerably in the past 20 years. As has been the case with other parts of the public sector, education has been made to face up to stark financial realities. The current 'transparency review' of the use of funding within English universities has highlighted the inadequacies of current practices. This led Goddard (1999) to report that, due to the lack of adequate financial information, both the Department of Trade and Industry and the universities were able to claim that cross subsidisation of research and teaching was taking place. The universities were claiming that income from teaching was being used to subsidise research and the DTI was claiming the exact reverse.

The initial teacher training (ITT) of school teachers, which takes place within HE, has to accommodate both the changes from within that sector and those within the sector for which the students are being trained. External change leads to internal change and change is a potentially expensive activity. Not only do changes to courses have to be costed, but also the cost of making that change. Amongst all of educational, professional and practical factors driving the need for change, cost remains the ultimate constraint, in times of reducing incomes and increasing quality criteria.

For these reasons, the focal points of this thesis will be to explore the extent to which ITT courses are costed across the sector; examine costing systems, where they exist; and to offer approaches by which ITT courses might be costed more accurately and effectively. Approaches to costing from the HE sector, education as a whole and beyond will be reviewed and their applicability examined in the context of ITT. As the public sector increasingly adopts financial management strategies used in the private sector it becomes ever important to examine the lessons it has to offer on costing in the market place.

Funding the Public Sector

This study can be seen as a microcosm of the current politico-economic thinking; applying 'private-sector' approaches to a 'public-sector' activity. As far as the public sector is concerned it needs to be viewed in the context of the Government's approach to the financial management of the public sector. This applies particularly to the movement of the NHS and local government towards an itemised costing of services and activities in order to make their operations more accountable and financially transparent and offers a potential vision of the future for educational establishments.

Over the past twenty years, Britain has seen significant changes in the way the country organises and runs public services and utilities. Many of the industries that were once state managed (nationalised) have been returned to the private sector or 'denationalised'. These 'sell offs' have had a significant impact for the whole of the public sector. Some nationalised industries such as coal mining and car manufacture, which had been nationalised to secure employment, were returned to the private sector as purely commercial ventures. Once state monopolies such as the gas, water, electricity and telecommunications utilities required the introduction of state organised regulatory bodies to ensure that standards were maintained and that any monopoly position that the industry found itself in was not abused. Other state run services proved more difficult to place in the private sector, health and education among them.

Although this country has an element of private provision for both health and education services, state provision continues. While the main reasons for this continuation may be political, there is an underlying element of sound economics. Generally available figures will suggest that in both per capita terms and as a percentage of gross domestic product (GDP), Britain spends less on health care, than many comparable nations, for a similar level of service. This suggests that public provision might, in certain cases, be more efficient than the open market. It is likely that a health system based on private insurance has a much higher level of profit taking than one based on state provision. Alternatively, it should also be noted that there has been a degree of 'creeping privatisation' within the National Health Service (NHS) for many years (means tested prescriptions for example) with incentives for those wishing to make private provision through insurance schemes.

The health sector has gone further down the path towards a private sector approach to financial management than education has so far achieved. The NHS could been seen as a future model for the education sector to aspire to. As far as the NHS is concerned, the key element has been the introduction of an 'internal market'. In this system funding was attached to patients though general

practitioner units (the surgery they were registered with) and this was used to 'buy in' medical services as required. In education, 'nursery vouchers' were a similar, short-lived concept.

Inequalities began to appear when costly patients (those with medical conditions that were long term or expensive to treat) were finding themselves 'de-registered' from surgeries that could no longer afford to care for them. On the positive side it did make those who made decisions about provision more aware of the cost of their actions and the implications for their ability to provide the breadth of service required. It also made the public aware that some 'life and death' decisions were being made on financial as much as medical grounds - as had always been the case, only now it was much more open to external scrutiny.

The main problems that arose when placing the NHS on a more financially aware footing was the large degree of inconsistency in provision; area to area and patient to patient. Not all regional health authorities had the same level of resources and expertise to call upon, and not all patients had the same needs. By running pilot studies to prove that this approach would be successful when operated nationally, the government over resourced these 'fund holding' practices relative to non-fund holding surgeries, leading directly to inequalities in provision. Because a relatively greater proportion of the available fund were going to fund holding practices the government set up resource expectations for those surgeries wishing to opt in to the system that simply could not have been met without increasing the aggregate funding for the NHS. Though much of the 'buy back' and internal accounting systems remain, the current government has pulled back from the full implementation of a 'private sector' approach.

Funding Educational Provision

To a large extent, many parallels can be drawn between the changes in the health service and state provision of education. The Education Reform Act of 1988 (ERA) took away many of the powers traditionally held by Local Education Authorities (LEAs) and either assumed central responsibility for them or devolved them to schools. Central government has introduced prescribed National Curricula, for all children in state schools between the ages of 5 and 16, accompanied by regular national testing of children and inspection of schools. Schools have either been allowed to opt out of LEA control entirely or have had significant financial responsibilities devolved to them with the option to buy back services as required.

Many of the problems inherent in the NHS system also become apparent in the changes to the state education provision. Financial incentives were given to schools that 'opted out' (of LEA control) to attain Grant Maintained (now 'foundation') status. If all schools had taken that option when it was initially offered, there would have been a need for significant extra funds to be directed towards education to match the pledges of the politicians. Subsequently these incentives were reduced. Not all of the incumbent managers (headteachers) within schools had sufficient financial skills to assume their new responsibilities successfully. But one key factor that is still being addressed ten years later is that each LEA received a different level of funding (per pupil) and that this inequality, from area to area, has been maintained since the ERA. Children are not identical so their educational needs, and the resources required to support them, do vary. These different requirements have proved difficult to cost and account for - various cost drivers, such as the number of children receiving state subsidised meals and the age of school buildings, have been tried. School exclusion levels have risen significantly since then and the extra cost of providing for children who perform or behave outside the norm can be regarded as contributing to this exclusion rate.

Education vouchers, which could be used to 'pay', either fully or in part, for a school place for a child in either a state or private school was considered in depth for some time. Eventually a short term, limited scale experiment was trialed with nursery provision (four year-old children) which ended with a change of government. Politically, vouchers were seen more as a means of subsidising private schooling rather than a means of improving educational provision as a whole, a factor which probably prevented further pilots in other phases within education.

Higher Education Funding

In the HE sector there have been substantial changes to both the organisation and the funding. In order to help all institutions in the sector attract overseas students, most of the institutions operating in the sector (polytechnics and colleges or institutes of higher education), subject to meeting certain requirements, were allowed to assume the designation of 'university' status from 1992, most of the others have subsequently become 'university colleges'. The funding of these institutions, except for courses concerned with teacher education and medicine, was unified under the HE Funding Council (HEFC).

Until quite recently, the funding of students rather than the costing of the courses that they attend, has been the main focus of attention - price rather than cost. Previously, to ensure that students from less affluent backgrounds gained access to HE, means tested maintenance grants, with a guaranteed minimum sum were available to all students for a minimum of four years, so as not to discriminate against courses which went beyond the three year standard length. The system also allowed students to collect further financial benefits from the state during vacations, should they not be able to find employment. In addition to this, the state also paid all course fees. Given that, on graduation, those benefiting from HE were frequently able to command the more highly paid positions in society, moves have been made to ensure that graduates pay more towards the cost of their HE. Firstly this has resulted in the staged withdrawal of the maintenance grant (by 2000/01) in favour of student loans, which are repaid at preferential rates of interest when certain salary levels are reached. Additionally, students are now required to pay up to £1100 (1999/2000, means tested) per year towards their course fees, for which a further loan entitlement is available.

Now that students are being made much more aware of the costs of their higher education, providers are being made to ensure that they offer 'value for money' and that all costs are justified. In particular the issue of identifying the costs and other non-teaching activities within universities has been of particular interest to the Higher Education Funding Council England (HEFCE) (1997). This has led to the establishment of the Joint Costing and Pricing Steering Group (JCPSG) which, published a strategy to support universities in adopting good practice in costing (JCPSG, 1998).

The funding and regulation of Initial Teacher Training (ITT)

The government department with responsibility for education, the Department for Education and Employment (DFEE), which was formerly known as the Department for Education (DFE) and previously the Department of Education and Science (DES), lays down regulations as to the structure, length and, to an increasing extent (DFEE 1997,1998), content, of primary ITT courses. Four-year courses, under the 1987 regulations (DES), have almost been phased out in favour of three and four-year courses, designed under the regulations from Circular 14/93 (DFE, 1993), which are themselves being altered to comply with Circulars 10/97 (DFEE 1997) and 4/98 (DFEE, 1998).

There are several major differences in course design as a result of Circular 14/93 (DFE):

- a reduction in the modal length of course from four to three years (resulting in an identical qualification); more time spent in school;
- a narrower range of subject expertise;
- an expectation that schools, with a suitable transfer of funding from HE, will play a greater part in the professional aspects of the courses.

As the significant task of supervising and assessing the school experience of students is transferred to schools, the HE institution (HEI), as the validating body, needs to ensure that quality is maintained. This transfer of the responsibility for professional assessment, from HEIs to schools, necessitates the training of teachers, to ensure that they are sufficiently knowledgeable about the course requirements and have the skills to be able to successfully provide appropriate support. There is a considerable implication for training and associated costs built into this transfer. Some of these costs were covered by discretionary 'transitional funding' grants made to institutions, but it soon became apparent that these costs would become a regular, annual burden on institutions. This was a due to a constant need to train teachers new to supervising students and to update existing ones as regulations and, therefore courses, changed. Transitional funding finally ceased in 1997/8 leaving HE either to resource any training out of existing funding or to transfer the cost to schools.

The funding body for ITT in higher education, the Teacher Training Agency (TTA), is moving towards a 'price tariff' approach (TTA, 1996), whereby, following a transitional period, all providers of ITT will receive the same funding per student by 2000/01. A differential rate of student fees for each institution is the legacy inherited from the period when LEAs had the responsibility to fund and regulate ITT courses. The 'price' of a primary undergraduate ITT student (as an example for 1996/97) is set at £2609 (arrived at by calculating the average funding per undergraduate ITT student in the previous year), regardless of the different needs of the students and actual costs of the course. The per capita fee had risen to £2650 by 1998/99 - an annual rate of increase of 0.5% at a time when inflation is running at between 2.5 and 3.5% and wage increases, the biggest single cost, at 2.5-3% p.a..

It should be noted that under the present set of regulations for ITT courses the duration of full undergraduate courses, with equivalent qualifications and admissions requirements, will be either three or four years. The different courses will receive either 3 or 4 times the price tariff for

'producing' an equivalent 'output' from very similar 'inputs'. The TTA claim that the 3-year courses are much more attractive to potential students, particularly in the context of students being expected to take out loans to pay for maintenance and course fees during their studies. The incentive identified by the TTA for institutions is that they are more likely to fill their allocation of places. But given that undergraduate and postgraduate places for ITT, at least for primary trainees, are heavily over subscribed, this argument is not as commanding as it might be with unrestricted recruitment allocations.

In subsequent developments, the regulations contained in Circulars 10/97 and 4/98 (DFEE 1997, 1998) have resulted in many institutions that currently offer both 3 and 4 year undergraduate routes to qualified teacher status (QTS), significantly scaling down their 3-year option in favour of the 4-year course and several HEIs that only offer 3-year courses inquiring about the possibility of reverting to four-year routes. Some institutions maintain that they are unable to deliver the course requirements within three years, others that they are unable to bring their costs below the fee income, which would be only 75% of the fees received for a 4-year course. Given that the qualifications from 3 and 4-year courses are identical, and that regulations indicating course content and the number of taught hours for the duration of the course are also identical, then the only significant cost difference is that a three-year course has a school based element of at least 120 days, and the four-year course 160.

Across the HE sector funding per student has been falling in both real and absolute terms for a number of years. As Jandhyala (1993:9) notes, "the cost of higher education revolves around the cost of academic staff" , consequently most institutions have absorbed these financial cuts by introducing 'productivity improvements' - in effect, allowing the student:staff ratio (SSR) to worsen. At a time of increasing student numbers this has been relatively easy to achieve, within the existing staffing and accommodation institutions have at their disposal. Institutional funding has been maintained but only by accepting increased student numbers. On the TTA funded courses, where student numbers are set, this option has not been possible.

It was the stated intention of the TTA (1996) to 'reward' high quality providers by allowing those institutions to bid for extra students, not by allowing them to charge a premium price. Since professional placements for students in schools will be restricted in the vicinity of the institution, student numbers will be self-limiting - unless the institution sets up satellite courses in other geographical locations, or removes the need for students to attend campus based courses. During a

meeting of the Standing Conference of Partnership Administrators (SCoPA) in 1998, the chief executive of the TTA acknowledged that in many cases the 'reward' of extra student numbers would not be an appropriate signal of appreciation towards the best providers and that other means might be considered (SCoPA, unpublished conference notes).

The TTA are becoming increasingly aware of the financial implications of the imposition of their course regulations. Anecdotal evidence from discussion groups at SCoPA conferences (with representatives from the majority of HE ITT providers) suggests that there is increasing frustration that the funding provided by the TTA to HEIs for ITT courses is not reaching the courses that it is designated for. As a result, the TTA have undertaken research to uncover good practice in this area, which has been disseminated through a TTA publication "The Use of Resources in Partnership" (1999). Whilst focusing on the funding of the school based elements, there are also significant implications for HEIs in terms of the degree of financial accountability and the extent of financial information and planning that should be available. This aspect of costing is under consideration by HEFCE with strategies currently being developed and disseminated by JCPSG (2000, online).

Aims and purpose

The broad aim of this thesis is to develop a costing system, based on a review of approaches to costing, which will produce information to facilitate effective management and to support the audit and assessment processes of an undergraduate ITT course. This can be broken down into a series of objectives, each focussing on a different aspect of the overall aim.

In order to examine the costing of courses in higher education, or more specifically the costing of initial teacher training, the practice and background to it will need to be explored on several different levels. Through a description of the micro economic context in which education operates, a basis can be established for further discussion of general costing systems and recent research in the field of costing educational activity within HE.

One key area which this thesis intends to examine will be the aims of the Government with regard to the funding of HE based ITT courses as enacted by the funding and regulatory body, the Teacher Training Agency (TTA), and the inspection arm, the Office for Standards in Education (Ofsted).

Together, these bodies attempt to ensure that the funding directed to HE for ITT is used efficiently and effectively to produce high quality teaching professionals and 'value for money'.

The general funding situation of the university sector, as part of the increased need for institutions to be 'cost conscious' will be examined. As funding impinges on the financial viability of courses and institutions, leading to a new 'financial reality', the constraints on academic staff, accommodation, open recruitment, students and other related issues will need to be taken into account.

This study is being carried out at a time of increasing constraints on the providers of Initial Teacher Training (ITT). The financial constraints are similar to those affecting all institutions involved in higher education within England; income from fees is being squeezed. Additionally, there is legislation regulating the content and nature of ITT courses, and to this are applied rigorous quality assurance and inspection procedures, all of which have significant financial implications. Beyond the demands placed on institutions by the funding and regulatory bodies, the demands and expectations of the teaching profession also have to be considered and met. An objective of this study is to produce a viable costing system which would provide evidence of an 'effective use of funds' to satisfy any national inspection procedure.

The external expectations placed upon ITT providers have to be balanced alongside the internal demands of the institutions themselves. HE institutions also have their own quality and financial thresholds to meet, often linked to national indicators concerned with teaching, research and other academic activities. In addition to meeting external demands, ITT providers within institutions are also expected to contribute to institution wide targets, with all the financial resources that will require. It is, therefore, important that this study recognises both the external and internal pressures. Although data will be presented from a wide sample of the institutions that provide undergraduate primary ITT courses, there will be a strong 'case study' element requiring a clear description of the context in which ITT is being provided. Consequently, a further objective will be for any costing system to be compatible with internal approaches to budgetary control and financial management.

The review of literature will demonstrate the limited availability of published research in this area leading to the development of a research tool for this study. From subsequent literature searches it was apparent that research was being conducted concurrent to this study, mainly under the auspices of the JCPSG, but was unavailable at the time. Due to this lack of comparative work at the

developmental stage, specifically within ITT, it has been necessary for this thesis to take a wider view of the current state of research in the area and a more exploratory approach to the investigation of current practice. Since costing in HE, particularly within the UK, is a relatively new phenomenon, especially at the level of course management, there is also the added problem of identifying individuals who carry out such duties as there are seldom established 'post holders' to be found. Indeed, as institutions begin to tackle these issues in isolation from each other, even the terminology that is developing is not fully understood or shared by all.

Given this lack of published research, it will be an objective of this thesis to gain evidence from other institutions, offering undergraduate ITT, of their use of costing systems to inform management decisions. It is necessary to establish the extent to which ITT course management teams are taking account of financial conditions in the design and operation of their courses in a formal and systematic way. In situations where a structured approach is being applied, further details will be requested. The key survey questions will be concerned with the decisions made by those who design, manage and work on ITT courses -

- to what extent are ITT courses costed by HEIs?
- how are ITT courses costed?
- to what extent is costing information used by the course management?
- can a suitable, generic, costing system be developed?;

The case-study institution

The main campus site of the case-study institution began life in the 1970's as a 'teacher training college', primarily to provide trained teachers for local schools. As it developed it began to offer a wider range of courses and qualifications, finally merging with other complementary institutions in the area to form a twin campus College of Higher Education. Operating within the HE sector it has recently changed its designation from 'College of Higher Education' to 'University College', having not been given the opportunity to achieve full 'University' status in 1992, when many comparable institutions did so. As it has only recently gained first degree awarding powers, and is still in the process of seeking research degree awarding powers as a prerequisite to obtaining full university status, it is very aware of the need to perform effectively and be responsive to directives

from governmental bodies. It is attempting to work closely with local leaders of commerce and the community, as well as the local members of parliament, to achieve this much sought after status.

Both undergraduate and postgraduate ITT courses are offered at the institution and have been in a state of continual change and adaptation in response to TTA directives over the past five years. By the intake of 1999/2000 the four-year undergraduate ITT course will have been phased out to be replaced by a three-year BA(QTS) course, sub-divided into two distinct cohorts representing the main division in primary education in schools in the country, Key Stage 1 (4-7, later redefined as 5-8) and Key Stage 2 (7-11), further redefined (as a direct consequence of 10/97 and 4/98 (DFEE)) as a single 5-11 course with a key stage preference. In effect, due to changes in course regulations, the three cohorts on the BA(QTS) course during 1998/99 will actually be on three distinctly different courses.

The philosophical issues of the organisation and educational direction of the (then) proposed replacement for the BEd were discussed by the course team during the development period of 1995 to 1996. The costs of the provision of such a course were not on the agenda of the development teams. Their prime consideration, alongside that of ensuring that the course would be of high academic and professional quality, was to meet the DFE (1993) course requirements ('West Anglia College', 1994).

The basic design was for there to be two courses, determined by age-phase specialism, which would have a shared core of subject specialist courses, hence the dual documentation (West Anglia 1996 a&b) where many of the sections, organisationally, are identical in both documents. An equal number of students for each age phase was envisaged, with each student choosing a subject specialism from: English, mathematics, science, geography, history, art, or physical education - there was an expectation that there would be twice as many students wishing to take English as any other subject. Periods of school experience, totalling 120 days, were to be evenly shared between the three years, with teachers assuming the responsibility for student supervision in school.

The main effects of the imposition of the requirements of Circulars 10/97 and 4/98 (DFEE, 1997 & 1998) have been to:

- narrow the curriculum (with fewer existing members of teaching staff being asked to teach a greater proportion of the curriculum);

- increase the time spent in school (a course of 120 school days has changed to a requirement for students to attend school for no less than that period);
- change the age of the children that students can teach (4-7 becomes 3 or 5-8);
- for all students to have experience of teaching children across the primary age range (5-11) and;
- increase the range and levels of the assessment criteria the students are expected to reach in order to gain qualified teacher status (QTS).

In addition these changes have, in effect, been backdated so that all courses currently operating have to meet these criteria on completion, even if they have one of four years remaining and were designed to meet a previous set of requirements. These significant changes have cost implications, particularly the school based elements. It will be demonstrated later in this thesis that these are the most costly aspects of the course.

In addition to these external pressures for changes to the current course, internal ones have also become increasingly apparent. In an attempt to make degree programmes more flexible for students modularization is being introduced through a common academic framework (CAF). Even though the ITT courses 'stand alone'; for the sake of academic comparability it is envisaged that any subsequent major alterations to the undergraduate course will involve packaging the course according to CAF. If this does result in non-QTS students taking modules designed for QTS courses then accurate costing becomes even more imperative as non-QTS students are funded via a different body - the Higher Education Funding Council (HCFC). To avoid this complication some modules that were originally designed for QTS courses have been repackaged for non-QTS students so that they can be taught separately with the emphases within the modules tailored to meet the different specific needs of these students. The differential fees for TTA and HCFC funded students will be explored later in this thesis whilst examining the costing of the professional or school based elements of ITT courses (the main difference between QTS and non-QTS courses.

Due to the very stable and pre-planned nature of ITT course numbers the institution is able to rely on a certain level of funding. This is not true of many other courses (non-QTS) provided by the institution, where numbers may fluctuate quite dramatically on a year to year basis, making the staffing demands very volatile. In the institution as a whole, even though total student numbers may meet approved targets, the meeting of course targets may vary considerably, resulting in some academics being 'under utilised' in terms of their teaching duties, whereas other, more popular

courses are having to 'buy' extra staff in - leading to an inefficient allocation of resources. Superficially, this would appear to benefit the provision of ITT courses where staffing requirements could be confirmed well in advance of needs and personnel could be secured on long term contracts. Due to the 'peaks and troughs' experienced occasionally in other academic departments the opportunity of redirecting funding arises, whereas between HCFC funded courses this does not present a problem, between HCFC and TTA courses it can. The TTA is particularly keen on ensuring that TTA funding is directed towards TTA courses in HE (be they QTS or for the continuing professional development [CPD] of existing teachers) and this concern is currently at the forefront of discussions with ITT providers (TTA, 1999).

Although in the past the School of Education has always worked in collaboration with local schools, and a large proportion of graduating teachers find teaching posts locally, the regulations imposed by the TTA have significantly changed the nature of that partnership. At a time when schools are under increasing pressure to improve performance and educational provision for their pupils, student teachers are being required to do more in school and have a greater say in what they do and how they do it. Schools are being asked to be more flexible towards the needs of the students, rather than the students adapting to the needs of the schools. Coupled to this is the requirement that schools, in particular the individual teachers that students are placed with, should assume more responsibility for the supervision and assessment of the students' professional competence. The staged introduction of this form of professional partnership, starting with a close-knit group of schools working on the relatively small (75 entry) PGCE course, has helped to establish relative responsibilities and procedures, many of which have been incorporated into the approach used for the undergraduate course.

Summary

'Facing up to financial realities' has been a key driving force behind many of the changes imposed upon the public sector over the past few years. This thesis has evolved out of the particular demands placed upon ITT within HE, particularly those concerning the financial elements. The underlying assumption is that to be able to manage the financial aspects, an understanding of the costs of course provision is necessary. The framework of this study is dominated by the TTA ITT course regulations that define the context in which all other aspects of costing examined in this

thesis must be considered. If courses are to exist, then these are the base requirements that they must adhere to, even where they might come into conflict with those of the host HEI.

The existence of costing systems from other sectors of HE and beyond offer a starting point from which specific approaches designed for use in ITT might be developed. This leads to the necessity of examining the availability of financial information on which costing systems might be based both in the wider, national context and in the context of a detailed case study. Working with a case study provides the necessary opportunities to apply and compare different costing systems using the same base information.

Chapter 2 LITERATURE REVIEW

Introduction

In providing an academic background to this study, there have been three distinct bodies of literature to review. It has been necessary to set out a firm economic basis for this thesis and so the first section will examine the different purposes of and approaches to costing. As the research will focus upon the costing of courses, as opposed to the cost of educational institutions or education as a whole, there is a deliberate concentration on the costing of product lines within an educational setting. As a consequence, the choice of the form of educational output will be justified. Finally, significant and recent research in this field will be examined with a view to offering insights into the operational implications of developing a course costing system.

The review of the various costing methods that are described in the literature of educational management seeks to examine the practical applications derived from the theoretical perspective. Pyke (1998:80), working within public sector costing, identifies three distinct forms of costing: full, marginal and activity-based. Pyke also notes (p86) that the use of activity-based costing (ABC) has already been shown to make a positive contribution to the financial management of the National Health Service. Due to the nature of funding of higher education, it has been necessary to broaden the scope of this section to also encompass budgeting. The distinction between budgeting (the allocation of set resources), and costing (the resources required to provide a given output, or perform a given task,) is examined in detail and the focus on costing, for the purpose of this study, is developed.

Previously published research on this topic can then be presented and analysed. Much of the research that has been carried out has focused on educational funding - the allocation of funds between and within institutions; or the arguments for and against education vouchers. Although this study focuses on the unit costing of particular courses, much of the evidence base, especially from the UK HE context, has an emphasis on costing at an institutional level. These studies have been included in the review to demonstrate the development of costing approaches within HE.

Defining 'Cost'

Economic cost

In economic theory, the concept of cost is well established where cost is a prime motivator in the consumer decision-making process. In a comprehensive review of the theoretical perspectives of the concept of 'cost' based upon the work of such economists as Schultz, Sen, Lipsey and Atkinson, Thomas (1990) notes the subjective nature of cost, where it is determined through "anticipated satisfaction" or "derived utility" (p8). Where Pettifor (1974:63) asserts that "cost can be assessed in two distinct forms... 'opportunity cost'..and..actual outlay cost", it is the former upon which definitions of the concept are based . Opportunity cost is defined by Levin (1978:98) as the "set of social sacrifices associated with a particular choice among social-policy alternatives", and that "all costs represent the sacrifice of an opportunity that has been forgone" (1983:48). In these subjective terms, the (perceived) cost of any action or commodity will be unique to each individual decision maker. The cost will be expressed in terms of the alternatives that the decision maker would be willing to forego in order to achieve that act of consumption.

The determination of a 'next best alternative', in terms of perceived utility or satisfaction, as suggested above, is a subjective decision. It is clear that the value judgements of the decision maker must therefore be central to the costing process. But, as Bowman asks, "who bears the cost – that is, whose forgone alternatives are being examined?" (1966:423). Thomas (1990:6) notes that the student is frequently taken as being the 'decision maker' in economic studies of education. This is an appropriate assumption to make in cases where the question being asked concerns the decision to participate in educational activity or the choice between different courses or modes of study. As this study focuses on the alternative means of resourcing a particular provision, then the course leader is taken as the decision maker. This contradicts Buchanan's (1969 in Thomas 1990:13) concept of cost where it is postulated that "cost must be borne exclusively by the decision maker; it is not possible for cost to be shifted or imposed on others". The only way that it is possible to reconcile this statement with the notion of the course leader as the 'decision maker' is to expand educational costs into a multi-decision making web. The implication being that the cost implications of decisions made by the course leader will cause ripples as those affected by the changes will have to reassess decisions in the light of new cost information. The subjectivity of costs needs to take into account inertial influences: a change in costs which may have led to a student choosing an alternative course or a member of staff seeking alternative employment had the

information been available prior to the decision to commit, may not lead to the student withdrawing from the course or the member of staff resigning due to the perceived costs of change. The accuracy of the subjective cost may be insufficient for informed decisions to be made.

'Indifference theory offers an interesting development of opportunity cost. Thomas (1990:9) explains that:

> by a process of trial and error it would be possible to build up several bundles of commodities which give equal satisfaction, among which households are indifferent

This theory offers an approach to comparing alternative forms of course organisation. The course leader, at the basis of this study, will be charged with determining alternative means of achieving the stated educational and professional outcomes of the course working within the overall resource constraints. The aim being that those alternatives will offer equal levels of satisfaction – leading to the indifference – which would allow another decision maker, presumably with a different set of values, to make a decision on the most appropriate alternative. It is important to realise at this point that "market value cannot be regarded as an indication of the resource owner's cost" (Thomas 1990:12). In essence, the equal valuation placed upon alternatives by one decision maker may be perceived as a surplus or deficit of 'satisfaction' by an alternative decision maker. The decision maker may be led into a situation where the perceived 'utility surplus' of one group is used to subsidize the perceived utility deficit of another group. In this way, contrary to Buchanan (1969 in Thomas 1990), costs are imposed on others.

This approach to corporate utility leads in to the "Pareto criterion of social welfare" (Thomas, 1990:14). This criterion states "that social welfare increases if some individuals are made better off without any individual being made worse off" (Ng 1983, in Thomas, 1990:13). This implies that the decision maker takes into account the utility position of all who are affected by a change when determining the relative cost of that change. Arrow's Impossibility Theorem (Thomas 1990:14) suggests that the more complex the social grouping, the less likely a Pareto improvement can be found – someone will always claim to be 'worse off' as the result of a change. It is very unlikely that all of the implications of a change will be known and there is an inevitability that there will be some "outcomes which are not the same as those anticipated" (Thomas, 1990:16). Given this acceptance of the impossibility of ensuring that no individual will ever be moved to a worse utility position, there is an argument in favour of 'social maximisation' rather than individual self-interest. This would appear to be consistent with the view, according to Pettifor (1974, p39), that higher education is not a 'profit maximising sector', the main driving force behind neo-classical

economics. Its aims are more to do with 'sales maximisation' (after the work of JW Baumol) or 'satisficing'. Since in the ITT sector sales, or more accurately enrolment maximisation, is not an option, then satisficing would appear to be the main driving force; achieving the highest quality possible whilst working within given constraints; a "goal orientation where funding is an enabler" (Pettifor, 1974:35).

Thomas (1990:18), basing his thoughts on the work of economists such as Sen, Buchanan and Wiseman, among others, argues that moral values of the individual may lead to a rational choice to reduce personal welfare. It could be argued that decisions that superficially appear to reduce personal welfare, such as making a charitable donation, or "sacrificing a holiday to look after a sick relative" (Brittan, 1985 in Thomas, 1990:18) can also be rationalised in terms of opportunity cost decisions which lead to an improvement in social (and personal) welfare.

So far, costs have been examined from a subjective perspective, which mitigates against objective comparisons. Units of currency offer a normative means of valuing the decisions of different individuals. A more 'monetary orientated' definition being that opportunity cost is "concerned with the 'value' of the best alternative use to which the resources can be put" (Kedney and Davies, 1994:455), for example the income that might be realised by renting out teaching rooms. "It is this notion of opportunity cost that lies at the base of cost analysis" (Levin, 1983:48). This monetary means of measuring 'sacrifice' or 'value' is encompassed in the concept of cost which, according to Stone, (1992:1) is "about what is paid to secure or accomplish something of value". Actual outlay cost can therefore be seen to be equivalent to opportunity cost, only expressed in more monetary terms. "Prices" according to Thomas (1990:8) "provide an indicator of 'value in exchange' ... and opportunity cost is no more or less than an expression of value in exchange". There is a need to recognise that, as both Kedney and Palfreyman expressed independently, "costing does not equal pricing" (1991:4 & 1991:26). If the 'price' is fixed for all potential customers then there is a strong likelihood that some will regard the offer as 'a bargain', where individual welfare is in excess of cost.

Even though a 'price', representing cost, might be clearly established and widely communicated, the actual opportunity cost to the individual may be very different. In the context of ITT courses, the opportunity cost to a student with no dependents, entering direct from full time education may only be the price of the course and the earnings foregone which may (or may not) have been realised. The opportunity cost for a mature student who has dependents and an existing

employment may be considerably greater. It is probable that changes to costs will affect particular individuals disproportionately. Bowman (1966, cited in Thomas, 1990:22) indicates six factors that need to be clarified including 'who will bear the cost?', the potential to transfer costs between individuals and the institutional constraints. Having offered a definition of the nature of costs, it is now necessary to examine how costs can be categorised and collated.

Accounting for Costs

Costs can be categorised in different ways, dependent upon the perspective taken. If sensitivity to change over time is the main concern, then categories of 'fixed-cost' and 'variable-cost' (Lipsey 1992:184) would be most appropriate. The division between the two is not absolute but a product of sensitivity to change, either over time or as a result of changes to student numbers. In the 'very long run' (a time period which is very open to debate and dependent upon many factors which vary from industry to industry) all costs will be variable; in the 'very short run' a much greater proportion of the factors which affect costs will be 'fixed'. Where costs are related to the level of output, average and marginal costs become more appropriate measures. Average cost can be calculated by dividing the total (fixed plus variable) cost of a given output, by that output. The definition of marginal cost varies slightly from economist to economist, but to synthesise from the work of Lipsey (1992), Samuelson (1995) and Baumol (1994), marginal cost is the additional cost incurred of producing one more unit of output. Costing, related to the unit of output, is explored in greater detail below.

An alternative classification of costs is in terms of the relationship between the source of the cost and the level of activity. Cohn and Geske (1990) discuss the costs of education in terms of 'direct', 'indirect' and 'imputed' costs. Direct costs are those that can be directly attributed to the cost of the explicit (in this case) educational activity. Indirect costs are those that are less closely related to the activity but still need to be accounted for within the cost structure – otherwise known as 'overheads' or "joint costs" (Verry, 1987:405). These are clear links between the definitions for variable and direct costs and fixed and indirect. Imputed costs are a different consideration – these are costs that have a direct relationship with the activity but are frequently ignored by the costing process. "Earnings forgone by students" (Cohn and Geske 1990:76) is an example of a cost borne by students attending an educational establishment for full time study. The magnitude of such costs is frequently unknown but can have a significant effect on the overall economic viability of a course. The economic realities of different modes of course delivery upon the recipients of the course (full-time, part-time and distance learning) are ones which are increasingly being considered

(Bacsich et al, 1999) within course structures as costs are transferred elsewhere (usually to students). Mathematically, and also graphically, cost functions, according to Verry, are "a convenient way to represent the dependence of costs on output or scale" (1987:402).

In these terms the cost of course attendance can be determined not only by the fees paid to cover both direct and indirect cost of provision to the HEI, but also the costs to the student (book purchase, travel costs, loss of potential earnings,...). Sometimes these can hide costs within the system: a course might reduce costs by cutting library purchases, the lack of books will then require students to make increased purchases – a cost has been transferred from the course to the student.

Levin (1983), viewing costs from an accounting perspective, suggests "dividing ingredients into four or five main categories" (p54). These categories equate to the direct and indirect inputs plus imputed costs, which Levin calls 'client inputs'. Such categories allow the physical collation and aggregation of costs to take place, so that the total costs of a given activity or 'intervention' can be analysed. The division of costs, into pay and non-pay categories (JCPSG, 2000, online), may well be an accurate reflection of current practice, but not necessarily helpful to the unit-costing process. The aggregated cost categories are a means of ordering the responsiveness of those costs in respect to changes in the scale of activity. Unit costing provides a means of collecting and analysing comparative data.

Unit Costing

Full or total absorption costing is where all costs are apportioned or allocated between the services provided to allow a direct and accurate comparison. Marginal or variable costing focuses on the costs which can be directly associated to the provision, with fixed costs being "written-off in full against the aggregate contribution"(CIMA 1994:38 – cited in Pyke, 1998:82). Carr (1994:30) notes three stages to this process: the direct allocation, where sources are known, of costs to course (the unit of output); the apportionment of allied (support) costs to cost centres (academic departments which manage several courses); and the absorption (using formulaic means) of departmental costs by courses. This terminology is further defined by Lucey in the context of costing activities which are combined to produce an output. A 'cost centre' being an arbitrary gathering together of costs (in HE this will usually be a Department, School or Faculty); 'cost allocation', which is the action of charging costs to cost centres; and 'cost apportionment', the splitting of costs over several centres (such as landscaping and security) (Lucey, 1996b:111).

Carr identifies seven reasons for costing the outcomes of educational activities in terms of the unit of provision (student/course/module):

1. relating the unit of resource for a course/student to the cost of delivery
2. evaluating the alternative delivery methods
3. choosing to run, expand or drop courses
4. developing a case for additional funding
5. identifying the marginal costs of additional students for bidding purposes
6. developing output as opposed to input cost based budgets
7. setting targets and monitoring performance based on the cost of delivery (Carr, 1994:27)

The cost of pre-determined outputs are calculated in terms of the actual resource expenditure necessary. The approach focuses upon the allocation of identifiable monetary costs in normative terms, rather than a subjective view of economic welfare. In this way it offers a rational and accountable means of "informing and guiding management in resource utilisation and monitoring" (Carr, 1994:28).

One approach to output determination would be to produce up to the point where the extra cost of producing one more unit of output is minimised. Beyond that point subsequent units of output would begin to cost more to produce than previous ones but as long as revenue (the student fee) exceeded this cost, additional units of output would still make a positive contribution towards total costs.. Dunworthy and Bottomley (1973:29) in stating that "it is marginal cost, not average cost that is relevant to a decision to expand a level of activity", imply that, where it is possible to expand educational provision (enrolment), the optimal position will be where the marginal cost (MC) of an additional student is equal to the fee income received for that student. An assumption that must have been accepted for this to be the case is that marginal costs are rising – falling MC implies that at lower levels of output, costs have exceeded revenues leading to accumulated losses. This will only be an equilibrium point if, at this level of output, average cost (AC) is at a minimum (graphically this would be represented by the price line being tangential to the minimum point of the AC curve).

From a costing perspective, as opposed to a strictly economic one, Lucey (1996b:331) describes a means of marginal cost decision making in terms of break even or cost-volume-profit (CVP) analysis. This is the point where total sales revenue exceeds total costs plus any required

contribution to profits. Effectively this means that the desired output level is where average cost (plus the profit contribution) is equal to average revenue regardless of the marginal cost.

Step economics, or step costs, are according to Lucey (1996 b:332), "costs which remain constant over a range of activity". Whereas economies of scale intimate that the larger the output the lower the unit cost, step economies acknowledge the realities of cost curves being 'stepped' rather than smooth. It also acknowledges that the marginal cost of some units will be significantly in excess of the units both preceding and following it due to production capacities being exceeded. For example the cost of the fourteenth person going on a journey in a fourteen seat minibus will be relatively small if not almost zero, but a fifteenth person will require the use of an additional minibus - a considerable marginal cost. Subsequent additions to the passenger list will have a very small marginal cost until the 29th passenger comes along. In education the dividing line is not so absolute, but it is just as dramatic in terms of the implications for costs. There will come a point where the class size has reached a point where it will need to be divided into two separate classes, doubling room and teaching requirements. If there is unused capacity, a room and teacher being available, then although the costs for the course may be significant, within the institution there will be a more efficient use of resources. If both staff and space utilisation are at capacity, then the costs will be significant, either through room hire and part-time staff payments (a short-term approach) or by building and staff appointments (a long-term approach). In either terms the microeconomics will be the same and the same graphical representation will be possible, see Figure 2.1:

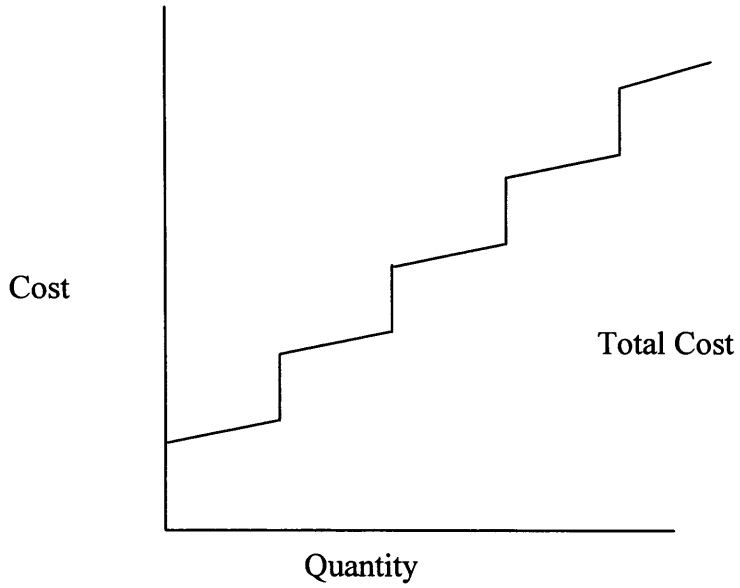


Figure 2.1
Stepped Total Cost (Lucey, 1996b:295; Pyke, 1998:79)

'Unit analysis' is clearly dependent on an appropriate choice of output unit. It is important that the unit (or units) chosen within an empirical study are consistently applicable to the basic "decision-making unit" (Verry, 1987:407). It is only by the judicious choice of output unit that an effective cost-effectiveness model for educational activity can be developed (Psacharopoulos, 1987:342).

Educational Output

Whereas cost has been adequately explored in terms of providing a common definition, output, particularly as it relates to education, has not. During the examination of past research into the cost of education it will be seen that different researchers have taken up different definitions of what educational 'output' actually is - some have compared the effects of valuing or measuring education by these different outputs (eg Rumble (1987), Verry & Davies (1976), Hiromitsu Muta & Takahiro Saito (1994), Laidlaw& Layard (1974) and Mace, J.(1993)). The three main ways in which output has been measured has been in terms of the numbers of students, number of degrees awarded and the number of 'study units' completed (see Carr, 1994:27, for example). These may be an appropriate indication of quantity, but as Verry (1987:402) points out "as a measure of output student numbers fail to capture the *quality* of the teaching output". Other researchers, including Al-Khatab & Sultan Torky (1990) and McKillop et al (1995), have employed measures of educational effectiveness as an indicator of output such as career prospects and salary. Given that there is significant variation within each of the more direct measures (not all students, degrees and study units are the same), it will be necessary to discuss the definitions of 'educational output' within the context of particular studies.

While there is considerable interest in the identification and management of costs (as detailed in the work of Pyke, 1998; DeHayes & Lovninic, 1994; Howson & Mitchell, 1995; Goddard & Ooi, 1998, for example), measures of output appear to be less likely to be discussed. Throsby suggests that there may have been a "loss of interest amongst applied economists" where "an ideal measure of output remains elusive" (1986:175). It is the comparability that appears to be the stumbling block. Even simply measures focusing on the number of graduates is fraught with potential "quality variations in the production of different types of award" (Throsby, 1986:176). Resorting to proxy measures based upon student enrolment weighted by the level of the potential award, length of study and various other logistical factors such as mode of study and full/part time attendance (Throsby, 1986:176-7) is the result of an attempt to resolve these difficulties. In the cost calculations performed by Lloyd et al (1988:16) a double weight is given to full time post-graduate

students in recognition of the extra value of these students over undergraduates. More recently the JCPSG have highlighted the link between the choice of cost object and the unit of output suggesting:

- a course or module
- a service
- a product
- a product
- an activity where unit cost = total cost/number of cost objects (JCPSG, 2000 online)

This is perhaps a confusion of the issues with the same terminology being used for both the element to be costed and the units of output of that element.

A measure of educational output is particularly necessary in order to make judgements concerning the effectiveness of provision. The formal process of external inspection of ITT provision is the responsibility of Ofsted (the Office for Standards in Education). The guideline that these inspections adhere to (Ofsted, 1998) measures output in terms of degree completions, degree classification and first appointments. Courses and HEI education departments also receive gradings as a result of direct inspection of the quality of provision on the basis of predefined standards. Beyond the bureaucratic requirements, there is also the need of the course manager to determine the effectiveness of the course in respect of the resources used and output achieved.

Cost Effectiveness

As Thomas notes:

> Policy-makers require assurances that resources are being used efficiently as well as effectively: the cost-effectiveness of educational provision has to be demonstrated. (1990:46)

For this to be achieved there needs to be a commonly agreed understanding of educational effectiveness - this is where notions of educational output are combined with the calculations of the cost of provision. Efficiency and effectiveness are alternative ways of viewing the same basic issue – the achievement of stated educational aims. Efficiency is a minimalist approach, focusing on the meeting of threshold standard at the lowest cost (price efficiency) or lowest combination of resources (technical efficiency) (Thomas, 1990:47). In effect, the "cheapest means of accomplishing a defined objective" Rumble (1987:72). It is important that in defining efficiency the notion of achieving basic output criteria is retained, otherwise it might be the case that "outputs

that are actually produced do not contribute to the programme objectives; that is it may be efficient at doing the wrong things" (Atkinson, cited in Thomas, 1990:50).

Effectiveness is concerned with maximising welfare or utility within the constraints of cost or resource availability. Thomas expands upon this by suggesting that:

> The most cost-effective will be the least costly of the alternatives compared, which is not necessarily the cheapest possible method of attaining the objective (1990:50).

This acknowledges that the decision is constrained by the limits of the knowledge that the decision maker is able to draw upon. In the view of Knight (1993:25) the aim of effectiveness is "the fullest possible attainment of the goals and objectives". Clearly the implication is that it is only possible to accurately compare the effectiveness of educational activities which have the same 'outputs'. This restriction on the use of cost-effective analysis is clarified by Levin:

> It is assumed that (1) only programs with similar or identical goods can be compared and (2) a common measure of effectiveness can be used to measure them. (1983:18)

Thomas offers three lines of argument to suggest that cost-utility and cost-analysis are essentially the same:

1. costs are assumed to have no subjective element and are therefore directly comparable;
2. the objective choice between alternatives relies upon the "doubtful assumption of a linear relationship between different coefficients of input and output"
3. the problem of defining and valuing the outputs. (Thomas, 1990:51-2)

The third of these points can be directly related to the Ofsted measures of course output. Once basic levels of acceptability have been achieved, is there some form of hierarchical preference between the maximisation of course completion, degree classifications or gaining first appointments? What is more effective – focusing resources on those who are best placed to achieve first class degrees, or ensuring that all graduates are suitably employed as teachers for the next academic year? Inevitably there will be a degree of subjectivity between the relative merits in a multi-outcome (or output) system.

It should also be acknowledged that the merits of a cost-benefit analysis will allow other benefits of tangible value to the consumer (student) to be brought into the equation. Verry and Davies (1976) and Verry (1974a) offer evidence of the effectiveness of distance learning modes of delivery in HE over more traditional approaches which recognise the financial benefits for students able to study concurrently with their careers. The 'hidden' benefits to students to be able to attend a conventional

university are much more subjective and less easy to measure. Cost-benefit analysis, as opposed to cost-effectiveness, has considerably closer links to notions of opportunity cost, and all the difficulties of subjectivity and comparability of measures that entails to value utility. Woodhall notes that a cost benefit-analysis will require "both the costs and the benefits ...*to be measured* ... in economic, or financial, terms" (1987:397). Whereas cost-effectiveness allows educational output to be measured in non-financial qualitative or quantitative terms (eg exam scores).

Cost-effectiveness analyses are still open to subjective interpretation. Particular policies regarding modes of educational delivery may be followed on the grounds of political expediency rather than cost-effectiveness. School centred ITT (SCITT) receives more funding per student than HEI-based ITT courses (TTA, 1996) but the political support for this mode of delivery excludes such discrepancies from measures of effectiveness, in the same way that there is no distinction between 3 and 4-year undergraduate ITT courses.

Woodhall (1987:397) notes that "there are two ways of applying cost-effectiveness analysis": to maximise output in respect of a target cost or to minimise cost in respect of a given output. Both can be seen as being either operational or strategic dependent upon the position of the decision maker. At the level of the course leader, Woodhall identifies five uses of cost-effectiveness analysis to support educational planning:

1. testing the economic feasibility of expansion plans or proposals;
2. projecting future educational costs;
3. estimating the cost of alternative actions;
4. comparing alternative means of achieving the same educational objectives;
5. improving the efficiency of resource utilisation. (from Woodhall, 1987:399)

These five purposes, along with the seven reasons for unit-costing suggested by Carr (1994:27), offer an appropriate basis on which to develop a model for managing costs. It is important, therefore, to examine potential model formats.

Modelling Costs

To bridge the gap between the economics of education and costing educational activity, there are a variety of different types of model to choose from. Costing models have been available to the managers of HE for some considerable time, particularly in the USA. Hopkins (1971) claimed that it would be too costly to design and operate a model that, given the projected enrolment, would

compute the level of resources required. If such a model were possible resource requirements for all levels of enrolment would be calculated so that the minimum unit cost position, should one exist, could be identified. Schroeder (1973) identified four distinct categories of cost-effectiveness analysis models focusing on cost minimisation being used: student planning, faculty staffing, optimisation and resource allocation. Bleau made an analysis of the models available and concluded that:

a) all models required the development of extensive data bases;

b) to be effective, there must be an institution wide commitment (preferably at board level);

c) the actual model type was not significant, and;

d) the inputs and outputs required simplification. (1981:67-8)

Lucey (1996a) provides a useful digest of the different forms and their potential applications. To begin with, there are two distinct categories of models; normative and descriptive. Normative models are "concerned with finding the best, optimum or ideal solution to a problem", whereas descriptive models "describe the behaviour of a system without attempting to find the best solution" (Lucey, 1996a:3). An example of a descriptive model is a simulation which "represents the behaviour of a real system" (op. cit. p2). It is envisaged that this study will lead to the production of a normative model. An optimum-seeking model that is mathematical, "one which tries to show the workings of the real world by means of mathematical symbols, equations and formulae" (op. cit. p1) and is based upon exacting heuristic principles which "use a set of intuitive rules which managers hope will produce at least a workable solution" (op. cit. p2).
Bascich et al (1999), in a review of costing models in preparation for costing networked learning, proposes a three stage model for costing the Course Life Cycle:

- planning and development
- production and delivery
- maintenance and delivery.

The suggestion being that if a costing model does not take into account all three elements it will provide an inadequate view of the true cost position of a course. The two costing models that meet this requirement (Hunt & Clark, 1997; and Moonen, 1997)) relate purely to a technology based mode of course provision.

Costing systems, according to Hans (1996:93), can be: "descriptive, telling administrators how much a given activity or process costs, and second they can be predictive, suggesting how

resources ought to be combined in the future for cost effective use". This definition, from higher education in the USA, demonstrates the importance that is currently placed on sound financial management is not restricted to Britain. But, as Lucey (1996b:6) states: "to be of use, costing information must be appropriate, relevant, timely, well presented and sufficiently accurate for the intended purpose." In summary, Coombs and Hallak (1972:253) note that "different combinations of data and analytical techniques are needed for different purposes". The decision maker not only has to respond to the output of such models, but also needs to determine which model is to be used. These three statements provide a focal point of reference on which to base a further examination of the literature.

A comparison of costing with more traditional budgetary approaches

The emphasis from the literature of educational management

Budgeting and costing are two different approaches to determining the necessary funds for educational activities. Budgeting focuses on the allocation of available funds; costing on the funds that are required to allow certain educational activities to take place. One of the results of the 1988 Education Reform Act (ERA) was to transfer the responsibility for the management of school finances from the Local Education Authorities (LEAs) to individual schools. In doing so there was no real attempt to cost the activities of the schools; there was, in simple terms, a sharing out of the funding allocated to education on the basis of what was spent in previous years. Any inefficiencies or anomalies were, in effect, incorporated into formula funding systems. If funding was to continue in subsequent years at, or above the current levels, it was necessary for schools to ensure that the funds were spent - an emphasis on funding driving costs rather than the other way round. Research and literature, as a consequence, has tended to concentrate on the funding issues that are more accessible.

A significant proportion of the available literature concerned with educational management emanating from Britain (cf. West-Burnham (1992), Brookbank & Anderson (1992), Silver (1983), Bush (1986,1989), Crawford et al, 1994) concentrates on the personnel management aspects rather than financial management. This may be understandable for, as Kedney (1991:1) explains "if provision is up and running, the quality is judged to be at least adequate, life is generally though to be reasonable and will stay that way, so why bother with costing?". By 1994, with changes to the

funding of HE in the UK, DeHayes and Lovrinic (1994:81) were able to observe trends and conclude that: "the importance of cost information increases as resources diminish".

Even when the controls of educational finances are considered, it is frequently in terms of the allocation of devolved funding to particular educational resources (Bush et al, 1994). The overwhelming bulk of the available literature concentrates on funding issues (cf. Williams, THES (both 1994); Mace, THES a&b (all 1995); and Booth, Tysome (both 1996)). Clearly the question being addressed is 'how do we allocate the funds we have?' rather than 'how much does it cost?'. This emphasis in the literature would appear to imply that budgeting rather than costing is the prevailing approach to educational financial management. For this reason it is important to examine budgetary approaches for comparative purposes.

The historical emphasis on budgeting educational activity

A budgetary approach, concentrating on available funds rather than the actual costs, tends to be encouraged by the funding bodies in British education, which rely, to a very large extent, on 'formula' methods to arrive at allocations for particular institutions. Levačić (1989) critiques the formula method used for funding schools, in that each Local Education Authority (LEA) has a different formula, which are based on historical costings, and these do not relate to educational activity in other than gross terms.

This 'top-down' model forces educational managers, given an ever decreasing resource allocation (in real terms), to attempt to make savings without any encouragement to discover the actual costs of the various aspects of the course programmes. This has led to short term cost reduction techniques being employed and a search for "acceptable ways of saving money" (Kedney and Davies, 1994,:443) with an emphasis on "cut it out now and put it back later" (op. cit. p 448). But, as Knight (1983:15) rationalises: "let no-one deride the word 'cheaper'. There is no advantage in education being more expensive than it has to be".

The formula, on which the funding allocation is based, is developed from an 'incremental budgeting' approach to costing, consequently this is the approach that institutions are implicitly encouraged to follow. As Levačić (1990) notes about incremental budgeting or historical funding: "it does not provide a coherent and integrated approach to management planning which links resource allocation to the achievement of institutional aims or purposes" (p32). In simple terms, the

resource or funding allocation of previous years dictates the allocation in subsequent years - a steady state or static approach that is rather at odds with the dynamic changes currently facing ITT. "The experiential base of managers has, therefore, been one of year on year marginal change and specific funding" (Kedney and Davies, 1994:447) which tends to militate against long term planning.

The move towards the accommodation of educational costs

Dynamic budgeting systems are available, most notably the PPBS (planning, programming, budgeting system). It is described as "objective budgeting" (Levačić, 1990:40), where the institution sets clear educational priorities and allocates resources accordingly and in so doing identifies what expenditure is being incurred for. It does have strong critics though. As far back as 1989 Sharma claimed that "at best (it) is only superficial, and could ... lead to very erroneous conclusions being drawn" (Sharma, 1989:87). By making the cost of alternative educational activities part of the decision making process, the ability to perform simple cost-effective analyses becomes a realistic option. Educational priorities can be emphasised and supported through the level of resource that they are allocated.

Brockman (1989:84-85) sets out the differences between program and incremental budgeting (PB and IB), emphasising the planned nature of the expenditure and implying the use of costing, through the use of zero-based budgeting (ZBB), as a basis for the resource allocation. (1989, p84-85)Through this process Brockman expects issues of finance to become a more understood aspect of the educational decision making process at all levels. There is encouragement to define the purpose of courses, to define clearly identifiable targets and to consider different ways of approaching problems.

In comparison with IB, ZBB emphasises taking a fresh look at costs incurred. Incrementalism tends to be based around a fixed core and "decisions are based upon last year's budget" (Davies, 1994:329), characterised as 'muddling through'. Area managers, according to Harkley (1989:90), will be required to justify resource allocations annually, rather than allow them to roll over. Alternatively Johnes (1993:91) argues that "ZBB is costly in terms of administration time" and "might also frustrate long term planning by introducing discontinuities", clearly suggesting that a compromise might be appropriate.

An attempt at a more dynamic and responsive system is made using a multi-year time horizon (MYTH). The key question it asks of managers is "how well have the resource allocation decisions enabled the institution to meet objectives in an effective and efficient way" (Davies, 1994:334). As a compromise, this approach does tend to favour the incremental approach by its cyclical nature. There is, perhaps, insufficient investigation of the nature of costs in this approach to be able to suggest significant moves towards a model of cost-effectiveness.

By gaining an understanding of the possible, mainly budgetary, approaches to financial management that are likely to be currently employed within the proposed survey population it will be possible to develop a greater appreciation of departmental positions in respect of costing. In a situation where there is an expectation to allocate resources rather than cost elements or activities, it is the language of budgets rather than costing that will be understood by potential respondents to the survey to be used within this study. Levin (1983:50-1) notes several inadequacies of budgets as a basis for a reliable approach to financial analysis, but mainly on the grounds that they do not contain adequate information, although there is a recognition that "these documents may still provide some data that is of use".

Towards an Approach to Costing Education

There is a line which can be drawn between budgeting and 'ingredient' forms of costing. The distinction being, according to Gray (1984:12, that budget costs are based on planned expenditure and ingredient approaches focus on actual expenditure. This still implies a budget-sheet approach to the issue, concentrating on the cost of inputs rather than taking an economic view of costing where the focus is on the cost of the output.

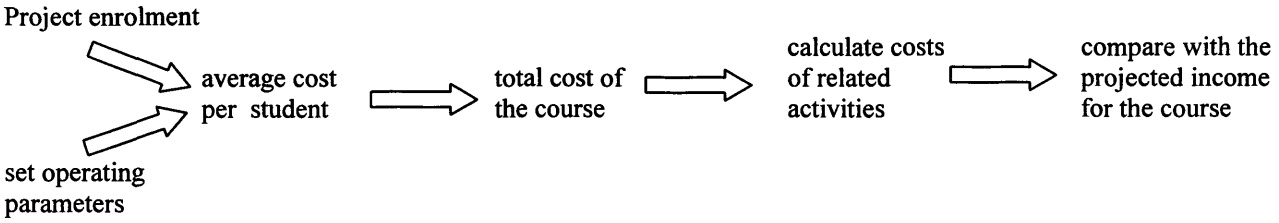
Starting from "knowing what something costs is the first stage in weighing of its value against that cost", Fielden and Peason (1989:95) attempt to define and categorise types of cost. Although this provides a vocabulary and a basic framework to operate within, the practical and logistical issues facing the manager are left unresolved.

Birch (1989:132), approaching the issue from a management systems perspective, defines four steps for programmed budgeting of college based courses:

- set admissions policy (target enrolment)

- calculate the total student hours the course will require
- set SSR (student staff ratio) and average lecturer hours to calculate staff costs to service students
- calculate departmental (intra-course) costs

In diagrammatic form:



Within this system there is the requirement to calculate the unit cost of students (the output), including indirect costs to provide an indication of total cost for a projected enrolment. The information would then be compared with projected income to assess the viability of the course. Although this system provides a management rationale for unit costing, it does not offer a sufficiently detailed approach to address the practicalities. The 'five steps' offered by the Joint Funding Council (1997) of England and Wales to HEIs suggests:

Step 1: Determine the cost objectives;

Step 2: Identify activities which contribute to the cost objectives;

Step 3: Assign resource costs to activities;

Step 4: Link activities to the cost objectives;

Step 5: Analyse and report results

Is very clearly an approach to costing founded upon ABC, where costed activities are related to a specified unit of output (the cost objectives). Likewise, the stages suggested by JCPSG (2000, online) to:

- set an institutional policy for costing
- set an institutional process
- determine the procedures for implementation and review

only offer a very broad outline to the issues.

Jones (1989:103) makes an attempt to bring mathematical formulae to the problem of calculating unit costs, alongside the assumption that "the aim of the operational manager is to reduce unit costs". Where unit cost is defined as:

$$\frac{\text{course length multiplied by the hours taught per week and wage rate}}{\text{number presented for assessment multiplied by the pass rate}}$$

(p103)

The denominator being an expression of educational output (the number of students successfully completing their studies).

The model is designed with further education in mind, to specifically address the issues of open enrolment and excess places. Although it takes into account the direct costs of the course in the calculation of total costs, there is no inclusion of indirect costs or acknowledgement of opportunity costs (either in Fielden and Pearson's terms or those of Levin). As such it does not offer a sufficiently accurate picture of costs for management to make informed decisions.

Carr, examining the various potential approaches to costing further education courses in the UK discusses many of the practical issues involved in calculating a unit cost value (per student). Through a worked example Carr (1994:39) offers a formulaic approach which takes into account input costs including direct administrative costs, direct teaching cost (a function of the number of taught hours and a notional 'hourly rate') and indirect costs (central services), apportioned on the basis of fte students. Unit costs are then calculated by dividing the aggregated input costs by the output (predicted student numbers). Carr notes that, once the management benefits of calculating unit costs are realised, then the next step will be to "assess the potential of an activity based approach to some cost centre apportionment" (1994:40).

Hans (1996:1), writing of the then current experience in the USA, states that: "costing in HE currently lacks uniformity and precision", summarising many of the practical difficulties of accurately calculating unit costs identified above. She continues by observing that "college and university costing is undergoing a rapid and extensive change" (op. cit. p xv). The evidence base for this assertion is the increasingly systematic use of activity based costing (ABC) in higher education, on particularly a macro- but also a micro-costing basis. ABC has developed from the writing of Stanbus (Activity Cost and Input/output Accounting, Irwin 1971) by Professors Kaplan and Cooper working at Harvard University in the mid 1980's. The system was designed to enable economies of scale to be acknowledged within the accounting procedures by apportioning cost

more directly in relation to the usage of resources. In particular, realistic costings, where indirect costs formed a large proportion of total costs, "the identification of the major activities which cause overhead costs" (Innes & Mitchell, 1991:7). Initially it relies on 'backflush accounting', starting with the finished product, the identified output, and working backwards ensuring that all resource costs are justified. Through this justification process, the value of each process and activity that combines to produce the finished output, is questioned. Accurate information is the first step towards being able to make informed decisions concerning the relative merits (costs) of different ways of achieving the same output (level of utility). The availability of information can then allow the decision maker, as discussed above (from Thomas, 1990:13), to make accurate assessments of welfare maximisation.

Within the general approach to ABC, as proposed by Hans, it should be recognised that "full costing of activities and processes is not always necessary or appropriate" (1996:92), in effect the costs of the process of costing must be allowed for. Managers must use their judgement to decide when ABC should be used. In economic terms, the information required for accurate decision making has both a utility and a cost, and the decision maker needs to make a decision concerning their perceptions of the value of the information!

As it reaches the modelling phase it can become very complex, with the potential for subjectiveness as the choice of production activities (cost drivers), and the means by which indirect cost is attributed, is made. (Indirect costs being those "costs that are related to the cost object *(unit output)* but cannot be traced to it in an economically feasible way" - Horngren, Foster and Datar, 1994:28).

A critique of ABC

ABC has been warmly welcomed by financial managers in many sectors of the general economy as a means of effectively identifying, controlling and managing costs of production with much greater precision than was ever possible before. Many costs that were incurred by companies using 'modern production methods' were simply aggregated and assigned to 'fixed cost overheads', their true source not being able to be linked to any particular products. Innes and Mitchell (1991:22) point out that:

> ABC highlights the fact that many overheads, conventionally classified as fixed cost, are in fact susceptible to variation, not in respect to volume changes, but in respect to changes in activities which cause their occurrence.

Given the high levels of 'top slicing' many HE institutions apply to cover centralised costs, which are not normally directly linked to courses, DeHayes and Lovrinic (1994:82) observe that:

> ABC provides a method to trace financial inputs through various production activities....to a variety of outputs of HE.

In this way the "true, long term cost of a product or service" (Howson & Mitchell, 1995:65) can be established and that cost allocation can be made as "a fair distribution of overheads to cost centres" (op cit. p 64) allowing "policies on top slicing and cost allocation to be devised" (op cit. p 68). The decision maker is afforded a more transparent view of the relative costs and benefits of actions leading to the production of an output and is therefore able to make potentially more informed decisions.

There is a significant departure in the underlying approach of ABC compared with previous models, at least according to some of its proponents. According to DeHayes and Lovrinic "current budgetary processes portray the cost of inputs such as personnel, rather than the cost of outputs, such as degree programmes" (1994:83).The emphasis here is clearly on the cost of achieving or producing something tangible. With ABC, all costs must be linked to the end products. To fully assess and judge the value added by various educational processes, DeHayes and Lovrinic claim that the relevant cost components must be included.

Probably the most damming inadequacy that pre-ABC techniques are accused of, is product cross-subsidization, or, as Horngren (et al, 1994:114) describe it "peanut butter costing", where the costs of resources are uniformly assigned to cost objects regardless of the justification. Decisions as to which courses are financially viable can only be made where the information regarding the cost of those courses is accurate and clearly distinguishable from the cost of other courses. It is crucial, in the view of Stone (1992:6), that "reasonable criteria" and "defensible methods" are employed in the apportionment of costs.

Alone, ABC is purely an accounting system which is as clear and accurate as the information that is put into it. The choice of cost drivers, those easily measurable indicators (such as staff student ratio) which are used as a basis for determining the scale of costs to be attributed, is absolutely crucial and, potentially could be manipulated to give a range of different 'answers' to the same question. It is with this point in mind that Hans suggests that "university budgets probably represent....the result of an overwhelmingly political process" (1996:179).

There is the strong likelihood that the costs of particular activities will not be known either because there "is no reliable standard on which to base a cost estimate ... *or* ...there is a range of cost estimates" (Levin, 1983:89). In both cases Levin suggests that a range of values be used. If many such estimates and ranges have to be incorporated into an ABC approach, then the reliability of the outcomes will soon be brought into question.

The true value of ABC is really achieved when the costs, derived from the use of ABC, are applied as constraints to Pareto informed notions of welfare maximisation. The viability (or non-viability) of courses and the most efficient enrolment numbers can then be identified along with the most efficient mix of resources. It will also be possible to identify the point where, although a course may not be covering the full costs, it will be returning more than the marginal costs and so be making a contribution to the fixed-cost overheads. This will ensure that courses that might otherwise be dropped as uneconomic, continue to a point where they are no longer able to cover the marginal costs. Turney (1996:39) calls this avoiding "the death spiral", in which, using full costs, uneconomic lines are dropped leading to overheads being spread over a smaller production base, making those products, in turn, uneconomic. The Joint Funding Council (1997, online) warns that:

> marginal costing should only be used with care in limited circumstances. Marginal costs have led institutions into difficult situations where decisions have been made on the basis of inappropriate cost information.

Coombs and Hallak clearly know the value of accurate financial information:

> good educational cost analysts can literally be worth their weight in gold - provided they ask the right questions and arrive at responsible answers, and provided the decision makers understand the answers and take them seriously. (1987:191)

Additionally Pyke comments:

> For costs to be managed economically, efficiently and effectively it is necessary to have a costing system which identifies where costs arise and who was responsible for incurring them (1998:79)

Problems appear to arise when the cost analysts are either not listened to or their message is not fully shared with all concerned parties. When managers (the decision makers) have access to the information concerning costs, this will need to be communicated to the course design and delivery team for appropriate action to be taken. At the heart of this is the cultural commitment from the HEI, at the highest level, to value such activity.

Review of Research

Over a number of years the finances of higher education have been of considerable interest to the researcher. There has been a very wide range of factors and aspects of finance open to exploration. On the socioeconomic level, the politics of funding higher education has recently been high on the research agenda in this country in an attempt to justify or refute the move from state towards individual payment of course fees. Many of the arguments being put forward are clearly reiterations of those rehearsed during similar changes to the funding of higher education made in Australia during the 1980's. The resultant view then was that "those who benefit from the activities of a university should pay for the cost of those activities" (Lloyd et al, 1988:2). This then leads into the discussion concerning the dissemination of the benefits of education – does it just accrue to the individual recipient or to society in general? How these 'beneficiaries' should bare the cost of the presumed Pareto improvement continues to be a source of debate and disagreement.

Beyond the question of 'who pays?', there is also clearly one of 'how much does one pay?'. What is the level of benefit for each individual within society? Overall funding levels for higher education have been a focus of research for many years within this country at a national level. At such a level it is particularly difficult to disentangle the economics from the political arguments and so, in the context of this study, such research will be ignored except where it has explicit comments to make on costing activities as opposed to funding. One reason for the focus of research being funding rather than costing has been, and continues to be, that the data more readily available – input costs are more easily identified than output benefits.

Although the overall funding of higher education is a crucial factor within this study, due to the potential of the causal effects between funds and costs being income driven, it is necessary to look beyond it to look for studies which explore actual cost rather than allocated funds.

Studies of cost-effectiveness will be the core of the empirical research on costing educational activity presented below. The review of the research will be organised along lines suggested by Woodhall (1987:397) concerning the purposes to which the cost-effectiveness analysis is designed for – the comparison of institutions, courses, mode of delivery or resource use in terms of unit cost minimisation or output maximisation.

Mode of undergraduate course delivery

Traditionally, an undergraduate degree is seen as three-years full-time study at a campus-based university. The development of the Open University in Britain and, subsequently, similar institutions in other countries, notably the University of the Air in Japan, has made a radically different form of course delivery available. Rumble defines this change from traditional to a distance learning approach as when the use of media ceases to "supplement the teachers' role" to become a substitute for it- "in essence capital replaces labour" (1987:72).

During the 1970's there was a significant research interest in the cost effectiveness of alternative modes of course provision. Wagner (1972) was one of the first to make cost comparisons with more traditional institutions. Given that the approaches to both the funding and the delivery of courses are so different, though many of those differences are now narrowing, such comparisons are fraught with difficulties. In particular measures of educational output are problematic given the length of time required to complete undergraduate study on a part-time basis – the key feature of the OU mode of provision. Pettifor goes as far as to claim that the "incomparability of the two systems suggests such studies to be of limited use" (1974:46). With this in mind, the studies, focusing on the relative cost effectiveness of the two systems, are still worthy of examination to evaluate the research model as much as the conclusions.

In many of these studies, choosing appropriate variables by which to measure the output of educational activity, was the prime driving force and issue to be addressed. Verry (1974b), employed aggregated undergraduate student data as the measure of output, but any measures of quality, in terms of completion rates and course length were omitted. In effect, this biased the findings towards the Open University's approach to higher education. The studies by Verry and Davies, and Birch (both 1976) also suffered through the omission of data which would normally have been used by traditional providers of HE to measure output; in the case of Verry and Davies it was the lack of weightings for undergraduate and postgraduate courses, and in Birch, the non-completion rates. The ability of models to accurately compare the cost-effectiveness of alternative means of course organisation and provision is critically dependent upon employing an appropriate measure (or measures) of output.

The 'educational output' problem was also tackled for an extended study of the economics of the University of the Air based in Japan (UAJ). Direct comparisons can be drawn between UAJ and the Open University due to the similarities in mode of delivery and organisation. The work of

Hiromitsu Muta (1985) and Hiromitsu Muta and Takahiro Saito (1989 and 1994) attempts to address many of these problems identified within the earlier British research. They were able to state the specific financial and operating differences between the UAJ and more traditional forms of delivery. In addition, Japan also had a flourishing sector of HE offering the opportunity to study for first degrees by correspondence courses, those these were privately run and relatively small scale.

Writing in 1987, Rumble noted that "a much higher proportion of the costs of a distance learning system is fixed" (p73) as compared with more traditional means of provision. Hiromitsu Muta and Takahiro Saito (1994) also noted the same cost structure for UAJ. They argued that the 'start-up' costs placed particular burdens on the institution initially and made comparisons with other providers in the sector relatively unfavourable. It could also be argued that any new institution would have similar, if not considerably greater, initial start up costs - after all, the UAJ would not require a building programme on the same scale as that of a traditional HE institution.

Laidlaw and Layard (1974), in comparing the costs of the delivery of undergraduate teaching through the Open University and through more traditional methods also brought opportunity cost into the equation. They argued that the distance learning mode of delivery allowed students to continue in paid employment; those studying full-time at traditional universities would have to forgo that potential income, hence the need for student grants - a state subsidy. Hiromitsu Muta and Takahiro Saito (1989) echoed this line of argument in their study of UAJ. So comparisons not only have to contend with differences in preferred measures of output, but costs too.

In general terms it is to be acknowledged that distance learning methods are very efficient in terms of the accommodation required and student to staff ratio as no, or very little, direct teaching will take place. The major cost of such delivery systems is the preparation of learning packages and their transmission to students. The cost-effectiveness of alternative modes of delivery is more finely examined by Rumble (1987) and Hiromitsu Muta and Takahiro Saito in 1994 who explore the economies of scale of different transmission systems for the video teaching materials that accompany the distance learning packages. It is only when there are significant numbers on particular courses that television becomes a more cost efficient mode than posting videocassettes to students. This also leads to Rumble (1987) to argue that although transmission of a programme may be cheaper, it would be more effective if each student had their own copy on video to refer to when required.

In the UAJ paper the researchers also review different approaches to comparing educational outputs. Because of the greater length of overall study time required to obtain a degree through distance learning as opposed to direct teaching methods, they claim that measuring output in terms of graduates or completed years-study is invalid and should be rejected in favour of study units - a measure which can be applied equally well to both delivery modes. The main difference then being the number of study units that can be successfully completed in any one year being greater for students studying via direct teaching.

Various models have been developed to provide a comparative indication of relative costs of different modes of delivery. Such approaches have encountered similar problems of non-comparability as was the case with measures of output. In the mid-1970's, Rumble was using the cost function to demonstrate the cost advantages of distance learning over traditional modes of course delivery:

$$C = a + bx + cy$$

where a = fixed costs

x = number of courses (itself a function)

y = number of students (Rumble, 1987:82)

The variable costs, determined in the function by the numbers of courses and students, have subsequently been confirmed by Ahumada (1992) as being significant cost drivers within traditional universities as well. Clearly this function is focused upon the accountable institutional costs and does not acknowledge any opportunity or actual costs of course attendance (beyond fees) to the student.

Snowden and Daniel developed a slightly more advanced cost equation for distance learning packages at Athabasca University (Canada):

$$TC = a_1x_1 + a_2x_2 + by + c$$

where x_1 = course credits in 'development'

x_2 = course credits in 'delivery'

y = 'weighted' course enrolment

and a, b, & c are cost coefficients (1980:78)

This model takes into account the costs of investing in course development, which may, or may not, be accountable in monetary terms. Clearly all three variable factors would also be appropriate for more traditional means of course delivery. Even so, by their very nature, these cost functions are simplistic and, as Rumble suggests, "economic models and cost functions are no real substitute

for effective financial management" (1987:86). They are useful in predictive terms, suggesting how variations of input factors due to mode of delivery affect overall costs.

Unit cost minimisation at the level of the institution

Many of these studies focus on an attempt to discover the optimum size of an institution operating within higher education. This is either approached as an exercise to discover the level at which unit costs are minimised or maximising output for a predetermined unit or total cost. Pettifor (1974:54) draws the conclusion from a review of past studies that "the larger the institution, the lower the costs" though Pettifor contends that there is little reliable evidence to support this. Clearly this assertion of infinite economies of scale needs to be challenged by reference to the empirical evidence. In a study of the polytechnic sector of HE in the UK, Pettifor successfully related to student numbers through the student:staff ratio (SSR) as being the key determinant of unit costs. In terms of cost reduction strategies, Pettifor "strongly substantiates successive attempts to promote *(cost)* efficiency via staff:student ratios" (1974:267).

When Pettifor excludes capital expenditure from the analysis, any economies of scale that might accrue to larger polytechnics appear mainly to be the result of "joint service unit costs when institutions grow and particularly if .....there is a.....decrease in the number of sites they operate" (1974:267). The implication here, especially for those institutions experiencing growth or those amalgamating, is that they should focus their activities, in a geographical sense, and, where possible move to single site operation. If the operation of a library service for an institution is to be considered, it is self evident that it would be more efficient, therefore less costly per student, if only one library centre were to be required, rather than several at geographically remote locations, particularly if they are all required to service similar needs and units of study.

Throsby (1986), working with data collected from Australian universities for 1984, noted three key barriers to the accurate costing of higher education: the difficulty in attributing costs between research and teaching functions; the predetermination of costs through the method of state formula funding of HE (UK and Australia), and; the "internal allocation of joint costs within an institution" (1986:177), or 'top-slicing'.

In coming to the simplified term:

RTC (real total cost) = RDE (departmental expenditure) + RCE (central expenditure)

(1986:179)

Throsby demonstrates that RDE is a multinomial function of the total number of fte students; the proportion of those that are undergraduate and commencing their studies; and the proportion of academic staff in medical and scientific disciplines. RCE is a different function of those same factors. It is only through estimation that the cost attributable to teaching and research within an institution can be arrived at and is, therefore, highly dependent upon the validity of the underlying assumptions.

By use of this centralised data Throsby (1986) was able to show that small institutions could keep their costs within manageable limits as long as they either specialised in science or medical-type courses, or avoided them entirely, whereas larger institutions were able to provide a very broad range of courses due to their scale economies. From this it is possible to calculate, for mean faculty sizes, the average and marginal cost of arts, science and medical-type courses and use this to suggest appropriate tuition fee levels for each. Again, this study worked with aggregated data that took no account of institutional uniqueness. Lloyd et al claim that:

> Throsby has shown that at the university level average cost curves for Australian Universities are U-shaped, with a minimum at around 13, 000 EFTSU (weighted full-time student equivalent units) (1988:12)

Clearly the existence of U-shaped average cost curves disagrees with Pettifor's earlier conclusions concerning unlimited economies of scale. The implication of these findings is that there is likely to be an optimal position for each institution which will include an optimal level of educational provision of arts, science and medical-type courses. There would also be the suggestion that is likely to be optimal enrolment positions for the courses that combine to offer that faculty provision.

Another fine example of this approach is that of Ahumada (1992), applying costing techniques developed in the HE sector in the USA to Mexican Universities. The focus of the study was to identify the extent to which the variations in the cost of courses could be attributed to particular factors. The basis of the study is very clearly postulated:

> The rationale for doing costing is that more informed decision making will occur when administrators: (1) understand the origins of costs incurred by their organisations; (2) have information relating to judging operational efficiency, evaluating comparative performance,

> and deciding upon various resource allocations and reallocation strategies, and; (3) understand how to make use of various sources available for funding their organisation. (1992:363)

Like Throsby, Ahumada found it necessary to distinguish between arts, science and medical-type courses, but even so the conclusions that were presented were equally valid for all direct teaching courses. By far the most significant determining factor was found to be the SSR, accounting for 60% of variations in costs. Two other important factors were the number of courses offered by the faculty (16%) due to administration costs, and class size (15%).

Although Ahumada's findings clearly relate to the institutional level of cost-effectiveness management, there are also important considerations for the course manager. The determination of class size and SSR are likely to be within the sphere of influence of the course manager so the institutional level studies described above can be used as a basis for more detailed and more specific course-level investigations.

Unit cost minimisation for individual courses

Australia, in making the transition from a traditional British form of financing HE (full state funding of fees), to a system more towards the approach applied in HE in the USA (student payment of fees with state sponsorship), provides several good examples of research into approaches to costing courses, as a precursor to pricing. As students apply to and enrol on courses rather than the HEI or some notion of a 'faculty cost centre', then it appeared sensible to Sharma, that the course, rather than the cost centre, should form the basis of any costing exercise. Program budgeting is dismissed as an option because of its superficiality in favour of a direct costed approach. The need to recognise that some comparably named courses are taught in different faculties at different universities and that some courses require teaching input from a range of academic departments when comparative data is used is highlighted in this particular study. This approach is employed as a means of acknowledging the consultancy and research aspects of academic activity and their impact on teaching loads and costs.

This cost-analysis model is based upon two relatively simple relationships that encapsulate a significant data collection obtained from a range of diverse sources. The first relates to 'student load' as a result of enrolment of a particular course of study:

$$S_i = W_i/A_i$$

Where S_i = student load in department *i*,

W_i = weekly student contact hours in department *i*, and

A_i = weekly student contact hours as a ratio of the average weekly contact hours for full time students (a common measure of student load in Australian HEIs which acknowledges the differences in actual contact time between students in different faculties). (Sharma, 1986:88)

The unit cost for the course (D) can them be expressed as:

$$D = \Sigma_i S_i C_i$$

Where Ci = the direct teaching unit costs in department *i* (Sharma, 1986, p88)

A key assumption is that for any department, the unit cost of teaching any subject within that department is constant, though other functions could be incorporated into the model to allow more flexibility there. The simplicity of the model prevents it from being able to offer guidance to the manager in terms of resource allocation but it does perform the task of being able to be used to set prices for individual courses. As it cannot take into account step economics, its validity will only hold for a particular range of student enrolment. Also, the model only holds for a particular form of course delivery and so only acknowledges the impact of teaching staff costs on the unit cost of the course. These drawbacks make the model useful for comparative analysis of similarly delivered courses and to provide an indicative figure for course pricing as a prelude for more exacting calculations.

Lloyd, McDonald and Williams (1988), mainly to examine the appropriateness of the imposition of a 'graduate tax' as a means of funding HE, carried out further research in Australia on costing and pricing. They began from the premise that:

> If pricing does not reflect the costs of subjects or units then there will be insufficient incentive for individuals to economise on the use of university resources.
>
> (Lloyd et al, 1988:6)

The study suggested that this was coupled with the perception of a government policy of reducing the real per-capita fees on cost-efficiency grounds in an attempt to discover what that base price was: at what point would the sector no longer be able to provide courses of a sufficient quality within the resources they were receiving. The implicit implication behind this line of thought might be that actual direct course costs (mainly staffing) can only be squeezed so far and beyond that point, it is the income that has been centrally retained (the 'top slice') that efficiency savings will need to be made from. In order to expose this and move away from historical budgeting, a marginal

cost approach needs to be applied. They offer, as a model, working over a range of activity where step economies do not intervene, the following marginal cost (MC) function:

$$MC = (h/t)(w_a + gw_g) + q(c + s_f + s_u) + c_u + k$$

Where q = the number of enrolled students

h = the number of lecture hours for subject per week

t = staff teaching loads (hours per week)

w_a = annual average cost of academic staff

g = ratio of general to academic staff in the faculty

w_g = annual average cost of general staff

c = computing costs per student per subject

s_f = departmental and faculty variable cost per student

s_u = general university variable cost per student

c_u = central university costs for the subject

k = building rental costs per subject (Lloyd et al, 1988:13-14)

Quite clearly there is an error in the terminology employed as marginal *student* costs would be given by the expression:

$c + s_f + s_u$ those cost elements which vary directly according to student numbers. The cost function is actually an expression of total cost and the pricing policy that is suggested:

Fees per student = MC/q_m *(sic),* where m is the maximum number of students that can be enrolled without duplication of teaching is an average cost approach to pricing. Once these inaccuracies are acknowledged reasonable implications can be drawn from their approach.

The study suggests that such costing and pricing activities are not worthwhile if "the fees are not related to the cost of courses and the revenue does not accrue to the supplying faculty" (Lloyd et al, 1988:19). It is important that there exists an incentive for courses to be carefully costed and efficiently managed. This study concludes by implying that fees need to be closely targeted to the cost of courses and this fee differential will then become part of the decision making process when a student makes a choice of course and institution.

Kedney (1991) addresses some important logistical issues while performing a 'bottom up' costing exercise for a small, stand alone, part-time course. Although it examines further rather than higher education, many of the issues and problems are the same. Taught sessions are seen as being relatively easy to cost, as a function of the tutor hours and the cost of the accommodation, but for

the course as a whole, 'hidden' costs must be accounted for. Much of the administration of new courses, Kedney argues, is run on "initial enthusiasm" (1991:1) and good will. "It is often easy" Kedney continues (1991:2), "to lose sight of the costs of overheads or to argue that they exist anyway and so should be excluded." This is an argument for pricing courses at less than full cost, arguing that they will, at least, make a contribution to overall costs - an argument that is only cogent if there exists 'slack' in the system. Kedney also argues in favour of full costing in order to identify any "time bombs ticking away" (1991:1) that may become apparent at a later date. Although acknowledging, like many researchers in this field, that "costing does not equal pricing" (1991:4), costing is important in order to realise the relative orders of cost and price.

Palfreyman continues this line of argument for HE courses. Noting that:

> most institutions of HE have poorly developed management accounting systems and hence are not at all well placed when it comes to providing accurate, timely and relevant financial data for management decisions on the costing and pricing of self-financing activities.
>
> (1991:26)

Starting with incremental direct costing (IDC) or better, IDC plus a flat rate overhead, Palfreyman moves from simple and relatively cheap indicative methodologies to more expensive, but financially sophisticated systems such as ABC and the profit/cost centre approached where all costs, direct and central are charged. However, Palfreyman suggests that none of these systems can successfully distinguish between marginal cost increases and step increases (a 'Kedney time bomb') where an "extra handful of students really do equal the straw that breaks the camel's back" (1991:27). Where the cost of provision of car parking can be charged to both staff and students, the step increase comes where demand has risen to a point where a new car park needs to be constructed for existing provision to be maintained. Although no discrete model is presented the parameters for the design of such an approach are suggested.

Innes and Mitchell (1990) claimed that managers found the use of ABC a more reliable, accurate and credible method of allocating over head costs than more traditional methods. The use by Oxford Brookes University, England of an ABC approach to move the institution from a "'fair' distribution of overheads to cost centres or to services" (Howson & Mitchell, 1995:64) through the use of FTE student numbers to "seek a 'true' long-term cost of products and services" (1995:65) was reviewed. Howson and Mitchell conclude that one of the biggest problems of price setting at long term departmental costs plus, is the arbitrary nature of top slicing. They argue that, through the proper and institution-wide use of ABC, "policies on top-slicing and cost allocation can be

devised" (1995:68), based upon a sound financial foundation for examining the viability of "major ventures" alongside the monitoring of the cost-effectiveness of central services.

Researchers investigating the possibility of identifying the point at which costs are minimised for a particular output, or output is maximised for a particular cost, are faced with the problem of accurately determining the costs that are attributable to a particular course. ABC would appear to offer the possibility of 'back-tracking' costs for the course to their source through the identification (and costing) of all the activities that combine to deliver the course. By accurately identifying the sources of the costs, it will then be possible for resources to be more effectively allocated and organised in respect of those sources of cost.

Resource allocation

In many respects, the use of cost-effectiveness analysis to determine the most effective allocation of resources is very similar in practice to those studies using the technique to compare mode of course delivery. Once the costs of particular actions or resources can be accurately determined then it becomes more possible to identify that combination of resources capable of providing the most cost effective output.

In Britain, Birch, Calvert and Sizer (1977) performed a set of calculations in an attempt to cost teaching activities in HE. They were particularly interested in the efficient use of educational resources - academic staff and teaching rooms. One factor that they highlight, in relation to step economies, is the actual enrolment as a fraction of optimum student capacity. By focusing on average class size for a course, they derive the expression based upon the aggregate work load of tutors. (Birch, et al 1977, p72)

This is an attempt to demonstrate that different units within a course may require different teaching approaches (large group lecture, seminar, lab,..) and if these are not properly weighted within the calculations, any 'average' figures produced will contain bias. Effectively, the approach was used for comparative purposes between similar courses taught in different institutions using different modes of group organisation. The key question being that 'if tutor time is the key cost factor, can it be organised more efficiently for the same quality of outcome?'. In purely financial terms it would be true to say that the more 'student-hours' that a tutor can deliver, the more cost effective they would appear to be. To examine this line of thought further would need an exploration of the literature concerned with modes of effective learning, aligned to the above in the discussion of

effective and efficient modes of course delivery. There would also need to be an examination of a potential optimum lecturing position where quality is maintained – too many hours and the lecturer might become 'jaded', too few and they might become 'rusty'.

A study exploring the factors that affect the unit cost of HE at a university in Nigeria came to the conclusions that "Teacher and non-teacher costs were found to dominate recurrent costs....about 73% of the total recurrent cost", according to Ajayi (1988:4). Cost effectiveness is largely determined by the cost of one key resource – teaching staff. The variation between faculties, noted by Ahumada (above) are also seen to be present, with the Faculty of Law being significantly more cost effective, per student, than Health Sciences. As Jandhyala (1983:12) notes, "the cost of higher education revolves around the cost of academic staff", consequently most institutions have absorbed these financial cuts by introducing 'productivity improvements' - in effect, allowing the SSR to worsen.

The methods employed by Jandhyala and Ajayi were based upon data which included actual aggregated expenditure and non-weighted student enrolments to calculate the average cost of training a student per year. Making the assumption that 'all students are equal', even all undergraduate students, is a simplification, an over simplification according to the work of Verry (1974a&b), Verry and Davies (1976), Layard and Laidlaw (1974), and can lead to inappropriate comparisons being made. In addition central university expenditure appears to have been shared, equally, between all students, a further inaccuracy overcome by an ABC approach.

DeHayes and Lovrinic, attempted a more exacting approach to resource allocation by applying an ABC model to Indiana University, USA. In "facing the challenge of increasing costs and diminishing state support" (DeHayes & Lovrinic, 1994:82), Indiana University devolved financial responsibilities to the Deans at one of their eight, mainly urban, campuses. The cost-effectiveness model used was of the 'resource allocation' type and was capable of being implemented using a conventional desktop computer spreadsheet. "The models" according to DeHayes and Lovrinic (1994:83) " were seen as viable tools for analysing operations and costs and for creating scenarios of various alternative resource allocation decisions". The underlying economic model provided a sophisticated and detailed 'map' of the educational 'production' process. The authors note that the reliability of the model was dependent upon the initial costing process and that "in studying the B.Sc. in business administration degree, more than 250 separate tasks were identified and costed" (1994:85).

The results of the task costing exercise were combined in a four-level matrix; in effect a series of linked spreadsheets. The bottom layer held details of the "cost components of faculty and staff labour"; which fed into a spreadsheet identifying "labour hour allocation per task"; building into "tasks that make up the activities", and; finally into "activities that make up the production process for each (educational) output". There are many limitations to such a multi-component model. It is self evident that if the quality of the data collection is inadequate, then the model can only provide inaccurate responses - and it must be acknowledged that the costings used were estimates. Queries made of the model can only relate to the parameters that the model contains, ie the activities, tasks, and labour groups and costs. Finally, quality measures can only be taken into account by the model if they are expressed in quantitative terms (eg SSR).

The use of this model enabled the university to identify the source of some of its financial problems and to take informed and well directed action to address them. Overarching financial analysis demonstrated that concerns could be "attributed to high administrative costs", the solution being to "cut the number of academic departments", also that "some of the graduate programmes were found to cost more than three times the value received from student fees" (DeHayes & Lovrinic, 1994:92). The main worth of the model is through it "examining the interrelationships among a college's.... organisational units and the outputs and services shared among them" (DeHayes & Lovrinic, 1994:92). It is the selective attribution of costs that makes this model from so effective as compared with earlier developments.

This problem of the allocation of a central overhead costs was addressed in a case study of the University of Southampton Library (Goddard & Ooi, 1998). They developed a two-stage ABC model. The first stage comprised an "analysis of staff activities" (p33), essentially costing the internal activities of the library such as cataloguing. A second stage translated these "activities to another set of activities more identifiable to 'service users'" (p33) such as inter-library loans. This second stage allowed the true cost of these second stage activities to be identified and thus charged to faculties through actual usage rather than the previous system that was driven by staff and student numbers. Although initially developed to allocate cost to the cost centres of the university (the academic faculties) it is noted that the model "could be readily extended to individual courses" (Goddard & Ooi, 1998, p36), the income generating units. The approach does encourage a more equitable distribution of costs based upon usage but the authors note that the costs of developing and maintaining such a system may be expensive in comparison to more traditional methods.

Such knowledge of costs will enable the course leader or designer to make more informed decisions. Given the work of Birch et al, Jandhyala and Ajayi, it would appear that any alternative mode of course provision which reduced the demand for teaching staff time, without reducing quality, would be likely to improve cost efficiency. If this change were to, for example, require students to make more extensive use of the library (a reduction in teaching achieved through an increase in research tasks), then Goddard and Ooi argue that there will be definite cost implications – though they might be hidden within the central cost of the HEI and not be attributable to the course unless the appropriate financial accounting systems were in place. Unless the HEI has accounting systems in place that are sufficiently detailed to allow the necessary level of cost analysis to take place, such procedures as ABC may not be possible. This reiterates Palfreyman's concerns about the capability of HEIs to produce the necessary raw data.

Practical issues are seen as being key to the development and introduction of a coherent approach to costing educational activity within the HE sector. The JCPSG (1998:2), citing the case of a particular HEI, identifies several issues that HEIs need to address prior to the introduction of a costing system for purposes of cost-effectiveness analysis. These include:

- institutional culture
- clearly stated objectives for the costing process (the potential for staff distrust)
- lack of an overall costing framework
- lack of a consistently applied framework
- insufficient institutional guidance to departments
- imposition of a overly complex system
- poor information and information systems
- lack of commitment and motivation.

Summary

The key themes which arise from the review of the literature, both theoretical and empirical, revolve around the purposes of cost-effectiveness studies and issues concerned with the identification and collection of cost and output data. Woodhall (1987) provides a clarity of vision which enables empirical studies to be classified with some regard to the purpose of the cost analysis

being carried out. Recognising that cost-effectiveness is an attempt to identify either the least-cost for a given output, or greatest output for a given cost position, within quality constraints, suggests that such studies are comparative in nature. The nature of this comparison requires careful consideration. Woodhall suggests comparing the cost-effectiveness of different HEIs or courses, or modes of course provision or alternative resource allocations. This is with the proviso that comparisons can only take place where the factors taken into account and the units of measurement are themselves comparable.

The nature of this comparability can be explored from both the perspective of costs and of output. The output of educational activity has been demonstrated to be a contentious issue, with the motives and contexts of the researchers being the driving force behind the choice of units. Those studies which have attempted to compare the cost-effectiveness of different modes of HE provision, in particular Hiromitsu Muta (1985) and Hiromitsu Muta and Takahiro Saito (1989 and 1994), Laidlaw and Layard (1974), Verry (1974b) and Verry and Davies, (1976), have paid particular attention to the choice of unit of educational output employed. As this study will focus upon a relatively well defined qualification, measures of educational output, superficially, appear not to be an issue. When differences between the length of the course (3 or 4 years) to receive effectively the same qualification, wider issues of economic utility in respect of the student, suggesting a cost-benefit analysis, become cogent.

Due to the historic focus on budgets (the distribution of available funds), costing is a relatively underdeveloped science in education. The cost issue centres around the ability to identify and accurately measure the costs involved in educational activities. In particular it concerns the position taken with regard to joint costs and how these might be fairly attributed to the units of output. These practical issues include;

- the availability of accurate data and data collection systems (Palfreyman, 1991; DeHayes & Lovrinic, 1994; Howson & Mitchell, 1995; Goddard and Ooi, 1998)
- the recognition that the cost of existing provision may well have become centralised and embedded (Pyke, 1998)
- and that costing systems are likely to underestimate the embedded costs (Kedney, 1991)

Although measures of educational output have been identified and costing systems devised, they have tended to be specific to the particular needs and purposes of the empirical studies. The

theoretical perspective and empirical research offer a range of approaches for consideration as a basis for the development of a model specific to the needs of ITT. Following the work of researchers employing an ABC approach (such as DeHayes & Lovrinic, 1994; Howson & Mitchell, 1995; Goddard and Ooi, 1998), it is clear that an important element of any model will be the process by which activities are costed and combined to provide an indication of the cost of a unit of output. The availability of accurate financial data, as stressed by Palfreyman earlier, will be crucial to the success of any costing strategy.

In the context of this study the purpose of cost-effectiveness analysis is quite limited by the operational parameters laid down by the TTA who, for each provider of ITT, set enrolment numbers and also set, nationally, quality thresholds and target unit costs (student fees). Given these limitations, cost-effectiveness analysis is used initially to determine the feasibility of basic provision – the target unit cost for the student intake to achieve the quality threshold. In effect, given Woodhall's classification of purposes, this will focus the course leader on using costing to determine the most effective allocation of resources or mode of delivery to exceed the quality threshold by the greatest margin.

The review of the literature offers clear indications of the likely purposes for which costing will be employed in ITT – course viability and resource allocation. It also suggests a number of key issues that will need to be addressed, including the identification of a common 'output' and the availability of financial costing information. Where cost functions are offered, they tend to be of such a specific nature that they are only useful as a guide to the construction of new models. Most of these models appear to have been constructed on the basis of the availability of data in a particular format, or new data collation systems have had to be designed (such as in the case of Goddard and Ooi, 1998). This suggests that any model developed will be highly dependent upon the accounting systems in place. It also suggests that unless sector-wide accounting systems are agreed, the likelihood of directly comparability is very limited.

Chapter 3 METHODOLOGY

Background

It is often possible, through the literature review, to identify similar pieces of research. By careful analysis of the research methodology, it is then possible to determine a course of action which builds upon the strengths of previous approaches whilst avoiding the pitfalls that may have befallen them or even to use an alternative approach with the same data for comparative purposes. The key research questions in this study are:

- to what extent are ITT courses costed by HEIs?
- how are ITT courses costed?
- to what extent is costing information used by the course management?
- can a suitable, generic, costing system be developed?;

These questions, leading to an evaluation of different approaches to costing, have not previously been addressed in a form that has led to publication. Since this study does not directly reproduce a previous piece of research it has been necessary to examine methodologies employed by researchers in allied areas. From the strengths and weaknesses of the research methodologies used in these studies it will be possible to draw general conclusions which can then be refined to address the specific requirements of this study.

The case studies, identified in the literature review, employ similar approaches which rely upon the availability of raw data in the host institution. Any comparisons made are with other similar case studies (for example the Open University, UK, and the University of the Air, Japan). It is therefore possible for subsequent studies to be improved through a refinement of methodologies and an analytical approach to the data.

National studies tend to rely upon the availability of nationally collated, published data. The form and scope of these data then suggest a particular range of approaches to the analysis that are most appropriate. It does mean that this form of research can be repeated by other research teams using the same data, but possibly using different analytical tools or by researchers using subsequent data from the same source using the same tools. In both cases confirmation and comparability is possible and a bench mark for subsequent research in the area has been established.

As it was not possible to identify a directly comparable study in the review of the literature it has not been possible to identify a methodological approach that could be repeated. Although other courses within higher education have been costed, these studies have not focused on courses that have had the particular difficulty of combining both academic and professional elements; they do give an indication of a partial approach to be followed. As far as it is possible to ascertain, no national data on the extent to which ITT courses have been costed has been sought or collated, though it is noted that the TTA is currently collecting and examining case studies of how resources are used within ITT partnerships (pre publication). This only represents part of the costs attributable to an ITT course.

By examining the approaches employed for the case studies and the national surveys, discussed above in the review of the existing literature, methods suitable for this particular study are suggested. Where there is a lack of published nationally collated information, the use of a survey approach to generate the necessary data should be considered. For the development and testing of costing systems realistic data are required, suggesting a case study approach where empirical data, obtained via the analysis of internal documents, are used.

The research tools chosen need to ensure an increasingly focused approach to the key question 'how can ITT courses be costed?' As time is a very valuable commodity for all those working in ITT, any approach must reveal the key sources so that they can then be concentrated upon, causing minimal disturbance to those who are unwilling or unable to contribute further. In order to identify the institutions in which costing of ITT courses takes place, it is necessary to approach all ITT institutions. For this reason it is necessary to address the question of which ITT institutions represent the population on which this study will be based.

The Population

The scope of the study was narrowed to ensure that all potential respondents would be working in similar circumstances. Undergraduate ITT courses were chosen because they would offer the widest range of cost sources of ITT courses offered by HE. Post Graduate Certificate of Education (PGCE) courses are often quite limited in their scope. Students enrolling on these courses will already have completed a first degree in the subject in which they wish to offer a teaching specialism, so relatively little teaching at advanced subject knowledge level would be likely. As the

courses are of one academic year duration, some of the key aspects of costing multi-year courses might not arise, thus limiting any conclusions that might be drawn. The PGCE aimed at students wishing to teach in the 11-16 (or 18) age range are highly subject focused and often resulting in highly specialised courses relying on a limited range of resource inputs.

Undergraduate courses leading to a primary QTS tend to be much more varied in their nature. Courses may be of either 3 or 4 years duration and the structure and organisation of such courses can be distinctly different. Although the TTA lays down strict regulations on the minimum amount of time that each student should spend in schools during the course and a basic entitlement to a core curriculum, all other aspects are the responsibility of the course designers.

Since the undergraduate courses are generally less similar than PGCE's, it would appear reasonable to assume that if undergraduate courses could be costed, then costings for PGCE's would be likely to be a simplification of the processes applied. Any costing system that is designed for a PGCE course may need significant adaptation and extension to be able to accommodate the intricacies of an undergraduate route.

In order to ensure that any practical outcomes from this study would be applicable over a range of courses, the option of focusing on the costing of primary undergraduate ITT courses was taken.

Once suitable institutions have been identified, the participant within each institution needs to be considered. Following several informal discussions with colleagues in other institutions it became apparent that the likelihood of being able to identify any one particular individual within an institution was remote. Costing may take place at one or more levels within an institution and there may not be a free flow of information between the various levels of management. This had the immediate effect of increasing the potential population by four, representing the different levels of management within an institution:

course - the actual ITT course to be costed;
school - the group of similar courses sharing some resources;
faculty - the cost centre responsible for the resourcing;
institution - the management which determines course viability.

This complication would need to be addressed through the choice of research tool used to narrow the population down to those institutions in which costing takes place.

Approach

In order to identify the appropriate subset of the primary undergraduate ITT providers - those who cost their courses - it necessitates the use of a research tool that will be both accurate and inexpensive, particularly in terms of time. Since, as has already been determined, there is no nationally collated data to refer to in order to complete this task by documentary analysis, some form of direct approach must be made. Surveys, as Moser and Kalton (1985) explain are "one way, and an extremely useful one, of exploring the field, of collating data around as well as directly on the subject of study, so that the problem is brought into focus and the points worth pursuing are suggested" (p4).

Identification of the key individuals to be directly involved in such a survey is the core problem in cases such as these. Either significant time and effort must be expended identifying named individuals, or unsolicited approaches, by post or by telephone must be made to 'post holders'; a method which relies upon the post holder being known within the administration of the institution and recognisable terminology being used in the form of address. A compromise solution is to use known contacts within the institution as a means of 'opening doors' and identifying the individual to whom further enquiries might be made.

A survey approach, "eliciting equivalent information from an identified population" (Johnson, 1994 :11) may take the form of either a questionnaire or an interview. Both forms may vary considerably in structure and may be virtually indistinguishable except mode of delivery. Normally a questionnaire will take the form of a series of open and/or closed questions to be completed by a respondent in isolation from the researcher. An interview may follow a very similar format but, due to the potential for the interviewee and researcher to interact, it allows for the possibility of feedback; the immediate reformation of questions to take account of previous responses. Unstructured interviews do not fall into the category of 'survey' because they are not intended to elicit comparable data.

Johnson (1994:16&17) offers three strengths and three weaknesses of the survey approach. Strengths include:

- breadth of coverage - once standardised the questions can be used on a large number of respondents.

- generalisation/comparability - where probability sampling has been employed.
- descriptive power - a relatively large amount of factual data will be generated.

Weaknesses include:

- shallow coverage - a standardised approach may prevent "the opportunity to explore a topic in depth"(p16).
- unsuitability for 'sensitive' issues - without the encouragement of the researcher, or a sense or 'rapport', a respondent may be unwilling to divulge information.
- scope for bias - the sample may be unrepresentative of the population.

A simple questionnaire to identify the institutions which costed courses, with follow up questions to gain further information about those who did, was consequently identified as the only viable option. For the means of delivery there were three options: post, telephone and electronic mail (email). Email is still used inconsistently and would not allow the full potential population to be reached. Telephoning would be very time consuming, particularly given the expected high proportion of 'missed' calls. A postal survey allows the respondent to reply at their leisure or to pass the questionnaire onto a more appropriate individual if required.

To discuss the nature of course costing in greater detail with those respondents in institutions in which it takes place requires a research tool that is both more interactive and more flexible than a questionnaire. Some form of research interview would appear to be the most appropriate choice. An alternative option that was briefly considered was to request documentary evidence from HEIs, but as financial information is often considered as highly confidential within institutions it was felt that such a request would be met with a negative response and might also lead to any further verbal or written requests for information via an interview being responded to similarly.

In order to address the final research question, the development of a costing system, it will be necessary to evaluate different approaches using a common data set. To obtain a common data set, the data can either be obtained from a known and reliable source or they can be invented, to provide anonymised and simplified sets of figures. Since the object of this study is to produce realistic options, then the emphasis should be on realistic data - a case study approach. The necessary data can be drawn from a range of sources, most notably from course documentation and

from papers and discussions held with course managers and others involved in the management and provision of resources directed at the undergraduate ITT primary course.

From this discussion it has been determined that three distinct methods of information gathering will be employed:

- questionnaire sent to all appropriate HEIs in order to assess the extent of costing and to identify individuals for further follow up interviews;

- interviews with self nominated individuals who take part in costing processes within their own institutions; and

- documentary analysis of a case study institution, supported by questionnaires and interviews with the key personnel, to be used as a basis for the application of costing systems.

The Questionnaire

Johnson (1994:15) notes the "need for a common frame of reference between survey research designer and the population researched". The use of language within the questionnaire was to prove crucial as costing, being a relatively new area of study, could not be said to have a universally understood vocabulary. It was clear that such issues would have to wait for the interactive interview stage to be fully resolved and that any questionnaire might only be used to establish some of the broader distinctions of process and practice. Even so, as Nisbet and Entwistle (1970) suggest, "since there is no interviewer present to explain the ambiguities or check misunderstandings, the questionnaire must be especially clear in its wording" (p44). Walker (1986:91) also comments on the "lack of interpretive opportunity" with questionnaires, claiming it to be one of the "problems of mass production".

Once the questionnaire has been finalised, it does allow the researcher to approach relatively large numbers of potential respondents with little extra effort. This is the key strength of the approach - mass production. "The questionnaire may be considered", according to Walker (1986:91), "as a formalised and stylised interview...a structured transcript with the responses missing".

As there were two main purposes for the questionnaire (see appendix 1), both areas of information needed to be gathered as effectively but simply as possible. Firstly it was necessary to establish the identity of those institutions that actually carried out a costing of their primary undergraduate courses along with the individual who would be willing to discuss their particular approach further. Secondly it was hoped that the questionnaire might establish the extent to which costing was used by the managers of ITT courses.

Although it was hoped that each questionnaire would be given to a named individual, it was recognised that this person might not be the actual respondent. Borg and Gall(1993) warn that "the anonymous questionnaire poses many research problems. Follow-ups are difficult and inefficient because non-responding individuals cannot be identified" (p424). To keep track of the returns, which may be completed anonymously and to ensure that reminders would not be sent to those who had already responded, each questionnaire would be given a reference number which would correspond to a master list. Respondents, if they were willing to discuss the issues further, were asked to include their name and contact address on the return. In any case, the accompanying letter assured the respondent that any return would be treated in strictest confidence and although any data included in it might be published at a later date, it would be in an anonymised form.

Using the advice of Walker (1986), to use a mix of multiple choice and open questions to allow a "form of integration between 'qualitative' and 'quantitative' forms of data" (p106), a questionnaire format was devised.

The key question to establish the extent of costing simply asked 'is the course costed?'. If the response to this was 'no' then the respondent would only be asked to comment on the extent to which they perceived that costs influenced the design and operation of the course (if at all). If the response was that courses were being costed then further questions were posed.

Firstly, there was a need to establish at what level in the management hierarchy the costing was carried out, and at what stage, in the life of the course this occurred. Following on from this, respondents were encouraged to 'tick' the factors (from a range offered) which were used in the costing process, adding other where they were not already included in the list. This would help to identify the range of information that was available to be included in the calculations (both Kedney(1991) and Hans (1996) note that the effectiveness of costing is limited by the availability

of relevant data). It was also important, given the comments by Coombs and Hallak (1987), to identify who had access to this information and to what purpose it was put. Again, possible options were identified for respondents to 'tick', with space for other factors to be added where necessary. (see appendix 1)

Initially it was hoped to send four, identical, questionnaires to each institution:

- primary undergraduate ITT course leader;
- the relevant head of the academic division (school, department or faculty);
- the senior academic in the institution responsible for finance; and
- the chief financial administrator in the department/school/ faculty.

Following on from Coombs and Hallak (1987), this approach was suggested by the work of Lucey (1996b) and Hans (1996) as it would also indicate the extent to which costing was used as a management tool within an institution, particularly in those terms defined by Woodhall (1987). It should also identify whether the approach prevailed at all tiers of management and the levels of consistency and availability of information. By using the same questionnaire for each grouping it would make the responses directly comparable and the differences in perceptions of each group could be verified through standard validity tests. It would then be possible to identify, within calculated degrees of confidence, the extent to which costing systems were consistently and confidently applied within an institution, and at which level of management the costings were carried out and the resultant information applied.

As a trial, of both the questionnaire and the approach, responses were received from the relevant individuals within the case study institution. At this stage there was an indication that some problems might arise from the use of this format. Individuals who received the questionnaire deduced that they had been sent it because they must be involved in the costing of courses, which was not necessarily the case. Communication between the individuals involved in the costing process appeared not to be as effective as may have been anticipated, particularly on the part of the administrator who was concerned that this might be an unfulfilled part of the job description.

This suggested that a further, more extensive trial, would be in order. Making use of close contacts within other institutions, questionnaires were passed on to ensure that, as far as possible, each questionnaire reached the appropriate person within each institution. The return rate was very poor,

with only one of the ten institutions returning all four questionnaires (and that with a 'no costing' response). The problems were three fold: two of the institutions were chosen inappropriately and did not offer undergraduate routes; in five the contacts found it impossible to identify the appropriate individuals; and in the final two the relevant personnel were wary or at least unwilling to participate. As a consequence of this it was decided to reduce the number of questionnaires sent to each institution to one, concentrating on the designated leader of the primary undergraduate ITT course, with a request that the questionnaire be passed to another person within their organisation if they did not feel qualified or able to complete it to their satisfaction.

Identifying all the HEIs in England that offered primary ITT courses was a relatively simple matter of contacting the TTA for the data, which they duly supplied along with the addresses. An initial problem was that the addresses supplied related to the administrative centre of each institution, which was not necessarily the site at which the ITT courses took place. It was therefore necessary to contact every one of these institutions to ensure that each questionnaire was sent to the appropriate, named, individual at the correct address.

Sixty-five questionnaires were sent to fifty-three institutions (some institutions having more than one undergraduate primary course leader) at the beginning of February, with a request that they be returned within three weeks of receipt. Twelve institutions responded by the initial deadline, though ten made contact by telephone, some to query the status of the questionnaire and the use to which the information would be put, others were more concerned that the tone of the questionnaire inferred that it was a process that they should be involved in, by implication revealing that it was not the case in their institution. There was also an element in the queries that demonstrated concern that the questionnaire was based upon some directive from the TTA that they had missed!

As the result of a reminder sent out in March, 34 of the 53 (64%) institutions (no more than one response form each institution) had responded by the end of June, by which time most of the individuals who had offered to take part in further questioning had been contacted and interviewed. Borg and Gall (1993) note that "if more than 20% are missing,... findings of the study could have been altered considerably" (p434). This is more of a problem when the survey has been carried out on a sample chosen to represent a larger population. Although, in this case, the whole population was approached, the potential for bias is still acknowledged and will be discussed further alongside

that analysis of the responses. Summaries of the findings were sent to all individuals who had responded to the questionnaire and could be identified either by name or position.

Due to the nature of the final questionnaire and the limited range of individuals to whom it finally directed, it was no longer possible to test for significance or reliability as originally envisaged. As there was now only one response per institution, it was now impossible to achieve the original aim of establishing the extent to which a costing system was used and understood at different managerial levels within an institution. All that could be successfully ascertained now was which institutions costed courses and, within those, how the costing is achieved and used.

The data were recorded in tabulated form, with any short statement that had been added being assigned to newly defined categories. Forms of graphical presentation, appropriate to the nature of the data were then considered (Burton and Wright, 1998). Given that the data sets were categoric and non-ordinal, the use of pie and bar charts was clearly the most suitable choice to reflect the balance and comparative nature of much of the data.

The Interviews

Hughes (1996:169-70) offers a number of strengths and weaknesses of the interview as a research tool. In the context of this study the strength that is most applicable is that interviews "facilitate access for immediate follow-up data collection for clarification and omissions" (p169), in that the "principal advantage is its adaptability...(to provide)... immediate feedback ... thus obtain more data in greater clarity (than questionnaires)" (Borg & Gall, 1993:436). Walker (1993) asserts that "the interviewer ought to...attempt to understand, take on board and explore the interviewee's questions as well as pursuing the interview agenda" (p117) making it a truly interactive experience.

According to Patton (1990) there are four main types of research interview:

- informal conversational - each one being unique.
- interview guide approach - each is asked the same type of questions.
- standardised open questions - same questions in the same order.
- closed quantitative interview - a verbal, impersonal questionnaire.

(p206)

Given that this particular study required that the written questionnaire was first verified then expanded upon, a combination of the approaches would need to be employed. Borg and Gall (1993) support "the semi-structured interview (which is) reasonably objective while still permitting a more thorough understanding of the respondent's opinions and the reasons behind them" (p442). To ensure that the most effective use of both the researcher's and respondent's time was achieved during the interview it was important to achieve a balance: to "impose a considerable degree of standardisation on the interview without losing the spontaneity of participation by the subjects" (Nisbet & Entwistle 1970:33).

Although the first part of the interview could be formally structured, as a result of the questionnaire, much of the interview would be dependent upon the responses given by the interviewee. The follow-up questions would need to be devised during the interview, placing a significant emphasis on the skills and background understanding of the interviewer. As Howard and Peters (1990) stress: " the most important thing an interviewer should remember to do is listen. Interviews are primarily a way to gather information, not a conversational exchange of views." (p27)

Non-verbal communication may give the perceptive interviewer significant insights into the responses that are being given. Facial expression and body language may provide additional clues as to the confidence or completeness of the replies being given and so will give the interviewer clues as to when further details might be extracted by continued probing (Hughes, 1996:169). Given the expected sensitive nature of the information that interviewees might be requested to divulge, the actual physical presence of the interviewer might encourage the interviewee to make "illuminative 'asides'" (Johnson, 1994:47). It was recognised that much of the information being sought through these interviews would be factual in nature and that cultural or environmental issues, a key benefit of face-to-face interviews (according to Hughes, 1996:169), would not be of paramount importance to this study.

The rapport that can develop between interviewer and interviewee, particularly in circumstances where there is a shared interest and purpose, may lead to a situation where the interview can revert to a two-way discussion (Hughes, 1996:170). Where time is not an issue the anecdotes or information that may come to light as a result of open discussions would be worthwhile. Such an

expenditure of time might also encourage the interviewee to offer documentation to further illustrate issues covered by the interview.

Given the national spread of the respondents, a series of 'face-to-face' series of interviews would have both been overly time consuming and costly. These problems can be overcome by the use of telephone interviews. Borg and Gall (1993), claim "significant advantages" (p447) for this approach, in that the question control is easier. Also the problem of non-answered calls is reduced, in as much as the unexpected non-availability of a telephone interviewee is much less disruptive in terms of time wasted for the interviewer than had it been arranged as a 'face to face' encounter. These benefits, in this particular study, were deemed to outweigh the loss of non-verbal communication and interacting with the interviewee in their local environment and culture (Hughes, 1996:169) that could have been gained from a face-to-face interview. Given the lack of resources, particularly the time required to travel to other institutions, no other practical options were available. With the state of communication technology ever improving, it is quite likely that had this study been carried out a couple of years later, there is every chance that face-to-face interviews, via video conferencing, would have been employed.

Telephone interviewing presents a series of particular opportunities for the researcher. As with all interview approaches, time must be allocated and identified by both the interviewer and interviewee to ensure that the interview can proceed without interruption. Due to the lack of any physical or visual interaction a purely aural rapport must be developed and the telephone manner and technique of the interviewer is of crucial importance, both in order to put the interviewee at ease and to focus and direct the interview. As these interviews were to be a direct follow up to a questionnaire, the problems of 'cold call' telephone interviewing would not be experienced. As Borg and Gall (1993) comment, "pre-contacts may place a more personal or human face on the researcher" (p427).

Although telephone interviews may be classed as a poor substitute for face-to-face meetings, it must be recognised that the use of research tools, particularly for a 'part-time' researcher, will be, of necessity, a compromise. As time would be the most limiting constraint, given the geographical spread of the potential interviewees, face-to-face interviews were never a realistic possibility.

The record of an interview may take several forms, though ultimately in this case, a written form would be required for the purposes of this thesis. Walker (1986) offers advice by explaining that "note taking draws the researcher in to interpreting at an early stage...tape recording (disguises) the

interpretative process by burying it in the editing and the selection of extracts from the transcript" (p109). Given that the researcher would be required to interpret responses and devise follow-up questions during the interview, then the interpretative process would already be active, thus making note taking the favoured choice. Though not all of the information could be recorded by concurrent not taking, it would ensure that an appropriate focus would be maintained.

Of the 34 questionnaire returns, 16 (47%) respondents offered to discuss the issues further. Twelve were contacted and agreed to be interviewed. Four potential interviewees were summarily rejected on the grounds that their questionnaire responses unequivocally indicated that they were not undertaking any form of costing, and so would not be able to assist further with the main research aims. Each interview took place over the telephone at a date and time pre-arranged by email and lasted for approximately 30 minutes, with notes being made concurrently.

The twelve institutions provided a 75% sample which satisfied a range of factors; ensuring that 'new' and 'old' universities (those institutions attaining university status after and before 1992) were represented along with existing 'university colleges'. Only two institutions that responded negatively to the costing question were interviewed, and this was entirely due to an element of doubt or ambiguity in their responses, which implied that a certain level of informal costing was actually taking place.

All institutions that did formally cost their courses, and offered the opportunity to be interviewed, were chosen. These interviewees were able to represent the widest range of approaches possible: costing by course leader, to costing by institutional finance officer; costing using many factors, to costing using only one; and a wide and varied use of the information to a strictly confidential approach for identifying course viability only.

Additional interviews took place with individuals involved in the process of costing courses in the case study institution. Due to lack of comparability with the interviewees from the other institutions, these will be presented and analysed separately.

For the telephone interviews, a standard format was chosen. For the first ten minutes the interviewee was asked to confirm and expand upon their questionnaire responses as necessary. This allowed a comfortable dialogue to be established and for any ambiguous responses to be clarified. A further ten minutes was used to explore the mechanics and application of the costing system in

greater detail. This focused mainly on the type and source of information used any formulaic approach that was employed and how any resultant findings were used within the institution.

The final section was used to allow the interviewee the freedom to offer information and insights into the process as they saw fit. There is always a possibility that any interview will not obtain full and open responses because the questions are either not asked or framed in such a way that the interviewee is unable to answer fully. Unless the interviewee is purposefully attempting not to reveal more than absolutely necessary, this approach will hopefully overcome any oversight by the interviewer or misunderstanding of previous questions by the interviewee due to a lack of shared terminology. As Walker (1986) states: the "interview relies upon the fact that people are able to offer accounts of their behaviour, practice and actions to those who ask the questions" (p90-91). By asking the respondents to self nominate for an interview, there is a presupposition that they wish to be open and truthful.

At the completion of the formal interview, the notes that had been made were read back to the interviewee to ensure that no errors had been made. Initially it was envisaged that all interviewees would be provided with a copy of the notes that the interviewer had written at the time of the interview in order for any mistakes, points of clarification or misrepresentations to be identified and altered as necessary. Although at the completion of each interview the offer was made, on every occasion it was refused. In some cases because the interviewee felt that the verbal summary was sufficient, in others that so little information, in their view, had been able to be given to the interviewer that a written summary was superfluous. A third reason, expressed as a concern by a proportion of the interviewees exemplifies the difficulty of researching this area of educational management. Some did not want a written record because they felt, rightly or wrongly, that their institution would not have wanted them to discuss such issues with a third party. In most cases this was not because they had passed on information that would have had any financial value attached to it, such as a complete and working costing system, but because it clearly identified what their institution was not doing. Although individuals were willing to tell the interviewer what was happening in practice at their institution, they were not willing to receive written evidence of what they had said, particularly where it may have diverged from what the management of their institution thought or expected to be taking place.

Where these interviews have helped to clarify issues arising from the questionnaire responses, then these amendments have been noted and will be discussed during the analysis section of this thesis.

The tabulated questionnaire responses can therefore be compared to the responses to the interviews, particularly where these have clarified points where the original vocabulary or categories resulted in inappropriate responses. As such, the interview responses can provide methodological triangulation, within the clear understanding that the interviews were explicitly conducted as an extension to the original survey response, covering much of the same ground only in greater detail. Given the confidential nature of these comments, to preserve anonymity a general summary of these comments will be presented, but their main purpose will be to reinforce and add background to evidence obtained from other sources.

Approaches to documentary analysis for the case study institution.

In order to be able to evaluate and trial different approaches to costing courses realistic data have to be obtained. Indeed the act of obtaining the data forms part of the test of the system - if the raw data cannot be obtained, then the system cannot be judged as being appropriate for that particular system.

A documentary analysis approach has been taken for this part of the study because of the mathematical and, where possible, absolute nature of the data being sought. Until figures become written down in the form of a balance sheet, they can remain fluid and open to wider interpretation, not just through the figures themselves, but also through the language being used to communicate them. Even so, the use of documentary analysis is still fraught with the problems of bias and interpretation.

There is a rich background of documentary analysis in research within the social sciences, including education, most notably where the events or individuals cannot be observed or questioned directly, or where the bias of the author is at least part of the question. Madge (1975:15) argues that the use of documents implies an historical approach to the analysis of events; as soon as it is is written down it becomes a thing of the past.

Many authors in the field of documentary analysis broach the reliability of such evidence. From the outset Mann (1968:iv) stresses the importance of distinguishing between primary and secondary sources; between published and unpublished works. Silver (1983:97), offers four stages in the selection of documentary evidence:

- authenticity
- reliability
- corroboration
- relevance

Allen and Skinner (1991:73) claim "social scientists are only interested in sources for the evidence they can get out of them". And continue by offering six questions that researchers should ask of any documentary source before deciding how to use it:

- authenticity
- the relationship of the author to the event
- the possible author bias
- the accuracy (can it be verified with respect to other known information)
- the degree of clarity or ambiguity in the text
- potential author bias

Shipman (1973:44) maintains that "the test of reliability is still whether another researcher would extract the same information from the available documents". The selection process offers an avenue where significant bias might be imported - by omission of data. In any case the data will only be of use to the researcher once they have been selected and analysed. It is for that reason Carr (1951:132) insists that the potential bias of the author be acknowledged.

According to Kane (1985:24) "most documentary evidence is collected for purposes entirely unrelated to those which researchers put them". Although the documents used in this case study, definitive course documentation (West Anglia 1996a and 1996b), was produced for the purposes of course validation, resource requirements are an important factor in that process. It is possible for actual costings to be derived by reference to additional information, most notably from the personnel section of the institution. Subsequent rewrites of the course documentation, which have occurred on an annual basis, have been for the purpose of ensuring that the course maintains its ability to deliver a valid course according to the current TTA regulations. Any movement in costs following the updating of the course have to be derived from an interpretation of the implications of these changes in terms of resource use and allocation.

Suitability of the documentary analysis methodology

In this case study, the Definitive Course Documentation (West Anglia, 1996a and 1996b), and the subsequent revisions, have been fundamental sources of information. To assist with the interpretation of the documents, and as an attempt to overcome any personal bias by the researcher, informal interviews with course and departmental managers have taken place. These interviews related specifically to the expertise and role of the individual in respect of the production of the documentation, hence the particular questions asked of each were different. This does not detract from the fact that authors were, at times, unaware of the full implications of the documentation, which were written to meet particular regulations, not in consideration of costs or resource allocations.

Much of the documentary analysis literature (cf. Allan & Skinner(1991), Kane(1985), Mann(1968), Robson(1993), Scott(1990), and Shipman(1973)) focuses on the use of this approach to analyse different written views of a situation or environment; in effect, interviewing at one (or more) step removed. The use of maps, plans, ledgers, spreadsheets or other non 'written-prose' is less well covered by the literature, making the approach used in this case study less easy to justify. Numerical data are being used in educational research more frequently now, particularly the information gathered in a quasi-numerical format from inspections of schools - discrete data from lesson grades. In many of these cases the end result is descriptive of the situation rather than used for numerically predictive purposes.

The collation and analysis of numerical data within education has increased significantly in recent years and this trend is having an increasing impact on Higher Education. Nationally collected quantitative educational data, such as examination results, have been used for predictive and target-setting for some time. The increasing use of nationally set examinations (at ages 7, 11, 14, 16 and 18) is allowing an analysis of the data which describes patterns, trends and allows for the identification of those outside of the 'norm' - either in terms of performing much better or much worse than expected. Past performance is then being used to set future targets. These targets tend to focus on a narrow range of activity and may lead to an inappropriately balanced use of resources. Such narrow-focused indicators have recently been introduced into ITT and the impact of this on the use of resources has yet to be established (DFE 1993, DFEE 1997, DFEE 1998). It does demonstrate that the use of documentary analysis, of a numerical nature, is on the increase in the HE sector and that the subsequent analysis of it is leading to the setting of predictive targets. What is currently being applied to education in terms of input/output academic quality, this study hopes to do on a financial basis.

The source of the documentary data for this case study is particularly narrow, which reduces the ability to corroborate by reference to other sources. So, although the authenticity is unquestionable, the absolute validity must always be in doubt. Due to the swift changes in course regulations since Circular 14/93 (DFE 1993), the case study institution is currently in a situation where there are four year groups of students, and each cohort is, effectively, on a different course. For this reason it is difficult to verify documentary data with actual course organisation because of this constant state of flux. It is particularly difficult to distinguish between 'start up' costs and the 'steady state' resource requirements of the courses. This is a difficulty with all written predictions, that they are just that - predictions, which can only be confirmed by recourse to further testing in the same conditions, which is only really possible with an established course.

Given that the department services several courses with very similar input and resource requirements, it is frequently difficult to establish precisely which costs can be attributed or apportioned to particular courses or cohorts. In all cases there needs to be a degree of judgement, often made in retrospect, as to the actual, as opposed to planned, costs of any actions.

In this case, it is the task of the researcher to assess the validity of those predictions prior to using them as a basis for further financial analysis. The ability of the researcher to do this with any confidence relies upon his insight or 'insider knowledge' of the situation. Assumptions do have to be made concerning the accuracy and reliability of figures in documents, and the unstated parameters that have been employed as the basis for the production of the documentation. By making these assumptions, the possibility of flaws in the analysis increases and this is acknowledged and accepted. An interpretation of such data cannot be definitive, at best it can only be the most reliable and widely agreed. The merits of the documents to be analysed, even in this potentially flawed state, must be judged to outweigh the limitations on this study that would be imposed by their non-use.

The most significant point in favour of documentary analysis is that it reflects the format of the sole source of the information - a document. Since the documents were used with a particular outcome in mind, the calculation of predicted costs, only a relatively small proportion of the text was relevant. This selection of information is a crucial aspect of this approach and is demonstrative of the researcher's ability to focus on a particular issue.

The key documentary source remains the Definitive Documentation (West Anglia 1996a and 1996b), as they are based upon course regulations as defined by Circulars 14/93 (DFE 1993) and (in subsequent revisions) 4/98 (DFEE 1998). To support and further define the identification of costs attributable to the case study, a wide range of supplementary documentary evidence, internal and confidential to the institution, has also been employed. These range from personal memoranda between course team members to management documents identifying the sources of costs on an institution-wide basis. Due to the very confidential nature of the data it will be necessary to introduce some of the financial information without making specific reference to the source.

Summary

Although the three research tools employed in this study; questionnaire, interview and documentary analysis, do not provide a fully triangulated view of a single issue, they do provide an increasingly corroborated approach to the key aim of providing a practical methodology for research on the costing of ITT courses. The questionnaire identifies those who have costing systems to discuss. The interviews enable the researcher to explore these costing systems with the interviewee in greater detail. Finally, the documentary evidence provides a standard data set against which to assess the relative merits of each system.

Chapter 4 PRESENTATION OF FINDINGS

Introduction

In this chapter it is intended to present the data obtained from the research. In the first section the returns from the pilot questionnaire will be presented and discussed followed by the returns from the national survey. A graphical representation of the findings will be presented within the text with a copy of the blank questionnaire contained within Appendix 1. Due to the sensitive nature of the content of the interviews and the assurances that the researcher found it necessary to give to the interviewees concerning the strict confidence in which their responses would be used, the general and strictly anonymised interview responses will be presented in the next section. The final section of evidence to be presented will be from the case study. The resource requirements of a three-year undergraduate ITT course, reduced to their financial components will be offered. This information will then be used as a basis for further analysis. The prime data can then be applied to various costing models in order to evaluate the appropriateness and effectiveness of each.

Trialing of the Questionnaire Survey

From the review of the research literature in chapter two it would appear that while the thinking in Britain is still linked to the use of formulaic approaches, in the USA, where HE has been on a much more commercial footing for considerably longer, a more open approach to costing is taken. With this distinction in mind it was felt that the question 'do you cost courses?' would be a much more appropriate and diplomatic opening than 'how do you cost courses?' After narrowing down the respondent group to those institutions that offer undergraduate primary ITT courses in England, the difficulty arose of targeting the enquiry to a named addressee.

Internal pilot

An initial pilot of the questionnaire was carried out at the proposed case study institution. All five participants, academic finance director, dean of faculty, head of school, leader of Initial Teacher Training and the faculty administrative officer (with responsibility for finance) returned completed questionnaires within the week. The feedback on the questionnaire was as enlightening as the responses themselves. It was clear that the level of confidence with which the questionnaire was

completed varied tremendously. Some respondents expressed the view that they were unsure of the 'correct answers' and concerned that, as the questions were asked of them, they should be more aware of the answers. The faculty administrator was particularly concerned as this was, she reasoned, part of her job description, to manage the finances of the faculty, but she was not conversant with the processes.

All respondents were aware that costing of courses took place. The level of understanding of the process or the component costs diminished the more remote the individual was from central management. The course leader, for example, was aware of the key sources of costs for the course, but was unaware of how this information was collated and used. The academic finance director, at the other end of the spectrum, was fully aware of a 'institution wide system' but failed to identify some of the key sources of cost to an ITT course. Similar differences were apparent from the responses to the question concerning the purposes of costing: the director stated it was to assess course viability; the course leader, to design and plan courses. Clearly there exists a communications problem between the different levels within the management hierarchy. An outside view of the process seemed to be one of long chains of communication. Management would request information in order to carry out the costing process; the number of staff-years required to perform the taught elements of the course. This request would be passed down the line to the course leaders, who would then aggregate tutor-hours to form a response. This information would vary considerably, in both content and total, as no allowance would be made for course structure (mode of delivery) or the inclusivity of the data (some faculties 'counted' individual tutorial time, others did not). Any inconsistency at the course leader level would impact on the institution wide decisions. This lack of communication and lack of a clear and consistent approach is exemplified by the response to the question regarding the use of an institution wide costing system; the director and the dean were the only respondents to confidently answer 'yes', the head of school thought that there 'must be one', and the others thought that there 'might be'.

External pilot

Given that it was possible for different levels of the management hierarchy to have a different perspective on the issue of course costing, a more extensive trial of the questionnaire was attempted. In the internal pilot, the researcher's intimate knowledge of the institution enabled the identification of the individuals likely to be involved in any costing process to be achieved without too much difficulty. It was immediately apparent that such access to individuals in other institutions, without a clear understanding of the management structures and roles, would be

considerably more problematic. For this reason it was decided to use known individuals in institutions to act as 'intermediaries'. These individuals, knowing their own institutions, would be able to redirect the questionnaires to the appropriate personnel. Ten institutions were identified and colleagues in each identified to act as intermediaries. Rather than five copies of the questionnaire, due to possible ambiguities of financial management at the faculty/school level, which emerged from the pilot study, four was thought to be a more realistic number. These would be directed at; senior management, cost centre (faculty/school) management (academic), cost centre (faculty/school) management (administrative), and course management. The colour coded (for position) and number referenced (for institution) questionnaires were distributed to the acting intermediaries at a conference.

In the week following the distribution of the questionnaires, it became clear that some intermediaries were having significant difficulty being able to identify the key personnel, particularly at a more senior level. Senior management had explicitly told others that such information should not be communicated outside of their own institution. The sensitivity with which certain institutions treated such information was very apparent. Due to the lack of response, it was impossible for certain to tell whether this was because institutions wished to keep their costing systems to themselves, or because they did not have a system and did not wish to reveal this. Only one institution returned four completed questionnaires.

Unlike the internal pilot, there was substantial agreement between the different levels of management. Unfortunately for this study, they all agreed that a costing system did not exist in their institution, though they all confirmed that a workable system would be very advantageous and that when these studies revealed a workable system they would be very pleased to hear about it. It was clear that a different approach would be required to gain information concerning the extent, approach and use of costing systems within the ITT sector. As one of the aims of this study is to identify costing systems that would assist with the decision making around course design, and that the course designers would be the individuals who, if anybody, would have a clear understanding of the sources and effects of cost on the courses, then a direct approach should be made to them. They would be the individuals, who would probably be required to manage the implications of the effect of any costing information, so if a costing system were truly in place, they would be aware of it. The task of identifying the course leaders of primary undergraduate ITT was made possible by reference first to the TTA to identify all institutions offering such courses, then to the Home Pages of the web site for each institution. Where the web site failed to identify course leaders, a telephone

call was made to the administrative staff in the relevant school or faculty office. Where institutions offered more than one primary undergraduate ITT course, all course leaders would be approached.

The key areas of interest to be explored through the questionnaire were to establish: which institutions (courses) actually costed their courses; which sources of cost were taken into account; and how this information was used and who was it used by. Because of the sensitivity of the area of investigation and the perceived degree of 'discomfort' and insecurity of some of the respondents, a considerable time (4 months) elapsed before a 'reasonable' return rate of 64% (34/53) was achieved.

The nature of the data - categoric, non-hierarchical - effectively precludes statistical tests to confirm confidence or bias in the sample. As well as the aggregated totals, the results may also be presented as either pie or bar charts.

Survey Findings

The responses from the survey will be presented question by question. Throughout, all charts will present data as a percentage of the responses for that question, with the actual number of responses for that question being enclosed within the accompanying text.

Are undergraduate ITT courses costed?

The question as to whether or not the courses were costed did cause some difficulty due to a lack of common understanding of what 'costing' actually meant, which usually revolved around the number of cost factors or the accuracy of the data. In some cases, subsequent interviews were able to clarify definitions and terminology further.

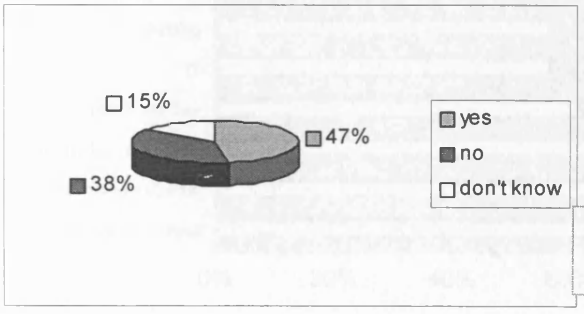


Figure 4.1
Are undergraduate ITT courses costed?

As can be seen in figure 4.1, nearly half of the institutions that responded claimed to cost their courses to a greater of lesser degree. Following the discussion of the initial pilot, it is clear even where there was a negative or non-committal response it still may be that the institution does employ some form of costing process at some level, just that in 53% of cases the course leader was unaware or was unclear of the existence of such a system.

Which factors are used to cost your ITT courses?

It is interesting to note that whereas 16 institutions claimed, initially, to cost their courses, 18 responded to the question asking which factors they included in their costing calculations. The identification of academic staffing costs by all but one of the respondents, in figure 4.2 (below), is not surprising given that in most HE institutions this one category will represent a significant proportion of the total institutional costs (Ahumada, 1992 and Ajayi,1988). It is also relatively easy to identify based on the number of tutor contact hours associated with the course.

The cost of other notable factors from this list; in particular the funds transferred to school, staff and student school transport expenses, administrative staff, IT and printing tend to be more accessible and available for inclusion into a costing system. In the case of school, staff and student expenses during placement, these tend to be amounts that either need to be calculated or claimed prior to payment, usually requiring the course leader or head of school to check and agree amounts. Awareness of costs, relative to availability of funds can then become a very immediate concern. Although other costs are identified, such as teaching rooms, they are often more difficult to associate with a particular course when the faculty or school of education (cost centre) operates

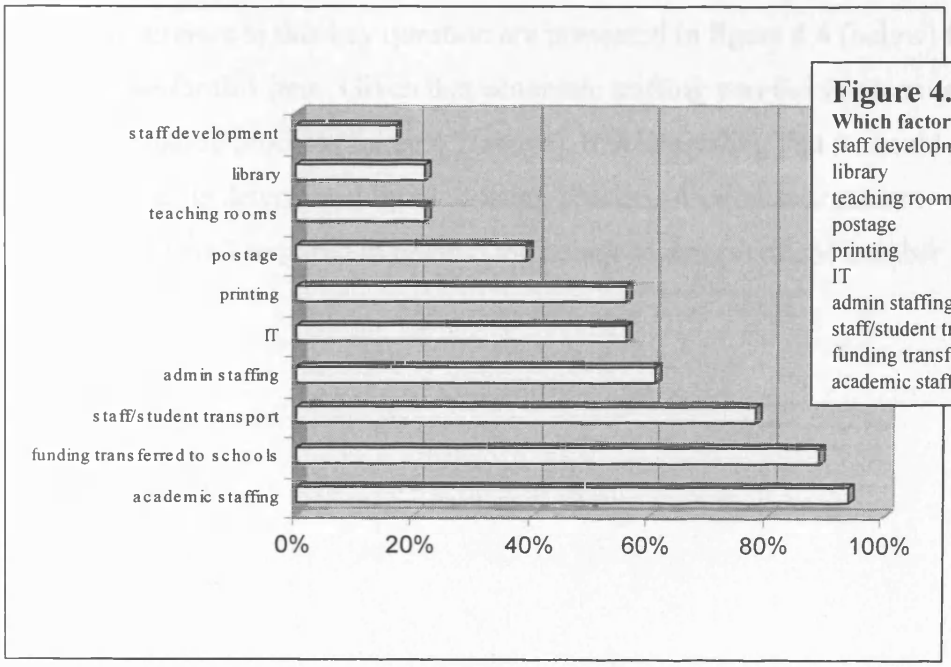


Figure 4.2

Which factors are used to cost your ITT courses?

staff development	17%
library	22%
teaching rooms	22%
postage	39%
printing	56%
IT	56%
admin staffing	61%
staff/student transport	78%
funding transferred to schools	89%
academic staffing	94%

Who has access to the costing information?

Of the 18 responses to this question (figure 4.3), it is interesting to note that in 11% of cases even the cost centre manager (head of school/faculty) does not have access to the information that is available. Also, in only 39% of the cases where costing takes place does the course leader, the person who is charged with managing the course, obtain access to the information. The information is clearly seen as sensitive in most institutions with only two allowing open access to it. For the information to be of use, it needs to be used; to be used, it needs to be available. As in 61% of the cases the information is not available to the course leader, the purpose of the costing exercise is brought into question, an issue which will be addressed in subsequent chapters.

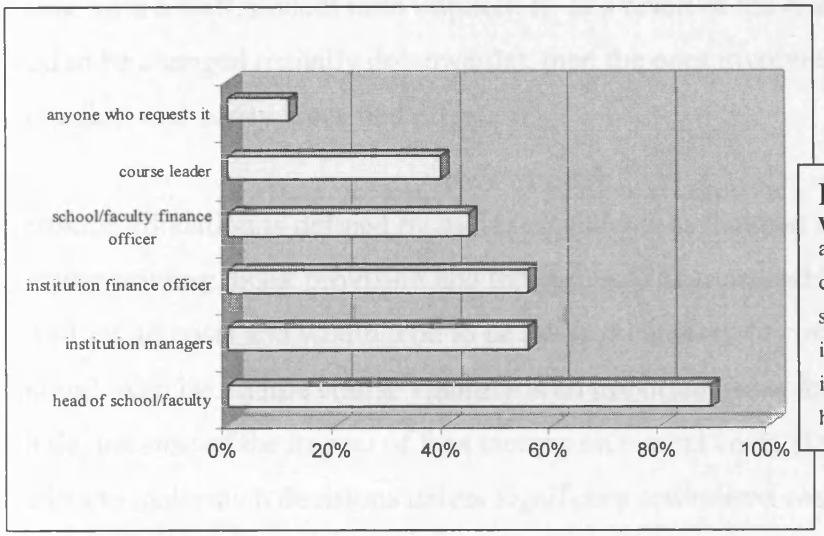


Figure 4.3
Who has access to the costing information?

anyone who requests it	11%
course leader	39%
school/faculty finance officer	44%
institution finance officer	55%
institution managers	55%
head of school/faculty	89%

How is the information used?

The responses to this key question are presented in figure 4.4 (below) from the 18 responses received for this item. Given that academic staffing was the single most important factor identified in the costing process (figure 4.2 above), it is interesting that it should also be the most important factor that is determined by the costing process. A circular argument – using the number of academic staff required to operate the course to determine the number of academic staff to be used.

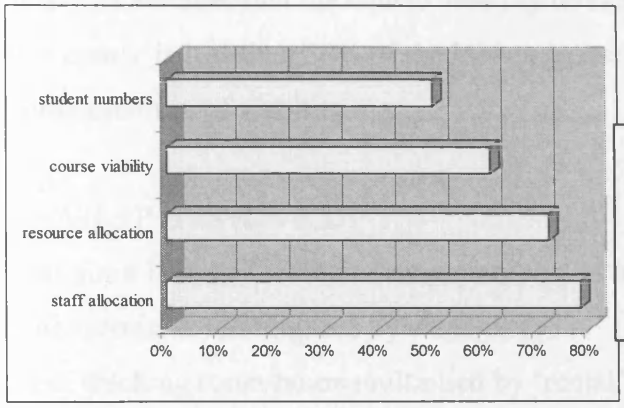


Figure 4.4
How is the information used?

student numbers	50%
course viability	61%
resource allocation	72%
staff allocation	78%

The reasoning behind such an approach would be that the allocation of staffing needs in the original calculations would be based upon assumptions concerning the number of students expected on the course with a staff:student ratio implicit. If, as a result of the costing calculations, the assumptions need to be changed (usually downwards), then the ones involving staffing would have an immediate and easily identified effect.

Resource allocation is defined by most respondents as that part of funding targeted at copying/printing, book provision and the purchase of consumables. This factor is probably the least 'fixed' of all costs and would tend to be the first category of costs to be investigated in any 'cost cutting' exercise. While course viability is an important issue for the faculty or institution as a whole, because of the impact of fees income on central costs, it would be very difficult for course leaders to make such decisions unless significant centralised costing information is made available. As student numbers are determined by the TTA on an annual basis, with a small degree of 'bidding for extra numbers' available to those institutions judged through inspection to be a high quality provider, the extent to which any internal costing exercise would affect student recruitment is worthy of further analysis and explanation.

Course viability would appear to be the ultimate concern of institutional managers. Their main aim is to ensure that the income received from the course covers the cost of provision, or at least makes a contribution to fixed costs over the margin. Two respondents elaborated further in their responses to this question by enclosing the formula used to calculate the viability of courses within their institutions:

1. (no. FTE tutors required to run course)(average tutor salary) < (income generated by course)/2

This model assumes that the course viability threshold is where the cost of the academic staff used on the course is less than 50% of the income generated by the course, and that academic staffing is the only measure of viability.

2. $T+A+R+P+F+S+D < 0.65I$

T = no. tutor hours allocated to course multiplied by wage rate

A = no. admin hrs (multiplied by wage rate)

R = no. teaching room/hours multiplied by 'rental' rate

P = proportion of total phone, postage and printing costs by student numbers

F = funds transferred to schools

S = proportion of total staff/student travel expenses by student numbers

D = staff development costs associated with the course

I = income generated by the course

Within this institution, to be viable, costs must be less than 65% of the income generated by the course. In effect it is similar to the first module with a 15% allowance for other costs to be incorporated.

These formulae will be applied to the data generated by the case study institution for comparative purposes in the next chapter.

Is an institution, faculty or school wide costing system used?

The internal pilot of the questionnaire exposed the differences of understanding between the different management levels within the institution with regard to the use of an institution wide costing system. The nineteen returns for the question of whether a school, faculty or institution wide costing system was being employed brought the following responses (figure 4.5). As can be seen, 39% of costing systems are institution wide, with 33% of respondents claiming systems used only in their schools. Given that in figure 4.1 (above) only 16 institutions claimed to have costing systems and that 17 appear to do so from figure 4.5 (11% or 2 respondents claimed that no system was being used), it is worth commenting that one respondent ticked both school and institution systems (resulting in the aggregate of figure 4.5 being 105%). In a written amplification of the answer, the respondent stated that a different system had to be employed by the school because the institutional one did not take account of school based costs and so presented an unrealistic representation of the costs of an ITT course.

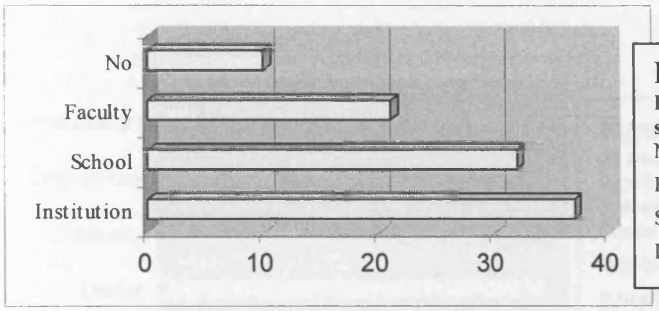


Figure 4.5
Is an institution, faculty or school wide costing system used?

No	11%
Faculty	22%
School	33%
Institution	39%

Are school, faculty or institutional costs accounted for?

The use of a costing system that identified costs beyond those that could be directly attributed to the course, was behind the question which sought answers concerning the inclusion of school, faculty and institutional costs (figure 4.6), to which there were 18 responses.

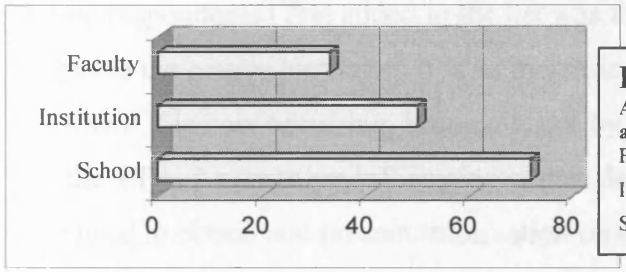


Figure 4.6
Are school, faculty or institutional costs accounted for?

Faculty	33%
Institution	50%
School	72%

It is difficult to avoid the inclusion of school (of education) costs (as opposed to the cost of school-based activities). Some elements, services and activities are organised on a school-wide, as opposed to one individual course, basis. Administrative staff are likely to be appointed to the school rather than individual courses, creating difficulties in apportioning costs. These problems are likely to continue through printing and postage costs, to the costs incurred in course design (due to current course requirements, the same or similar subject-based taught modules may be delivered to all ITT courses). It is interesting to note that faculty costs are less likely to be accounted for than institutional costs, even where the faculty is defined as the cost centre. This may be due to the use of the first costing formula described above which effectively assumes that 50% of course costs can be attributed to centrally provided services.

At which stage(s), if any, do costs have a significant impact on course structure and operation?

Even those respondents, who claimed not to have an operating costing system either for their institution or their course, stated that costs did have an influence on the decisions that they made.

29 of the 35 respondents stated that at least one stage of the course design or planning process, the decisions being taken were influenced by the costs involved.

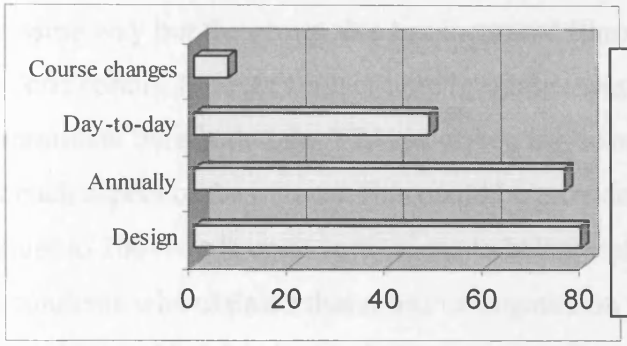


Figure 4.7
At which stage(s), if any, do costs have a significant impact on course structure and operation?

Course changes	7%
Day-to-day	48%
Annually	76%
Design	79%

Clearly respondents were able to identify more than one stage. Of the alternatives originally offered on the questionnaire, it was the long term planning, annually or at the design stage, that appeared to be most important. At the day-to-day level it was a focus on the more immediate variable costs, such as the use of the photocopier and the impact that this had on teaching. An important aspect that two respondents (7%) added to the list was that of the influence of cost when considering changes to the course provision. It is an increasingly important stage mainly due to the frequency with which it is now occurring, brought about by the also frequent changes in course regulations from the TTA. As costs are influencing course design and operation, it gives increased importance to the need to obtain and present information on the sources and effects of costs to enable managers to make their decision making more effective and reliable.

How do costs impact on your ITT courses?

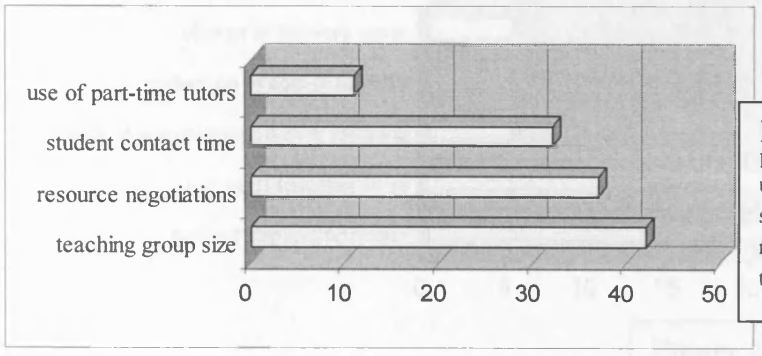


Figure 4.8
How do costs impact on your ITT courses?

use of part-time tutors	11%
student contact time	32%
resource negotiations	37%
teaching group size	42%

The question of how costs actually impacted on ITT courses brought a diverse range of responses from a total of 19 respondents, of which the most popular 4 are presented in figure 4.8. Of the other single response comments (each representing 5.5%), 'the elimination of waste' indicates that, whereas in the past fee income might have been in excess of direct costs, the match between

income and costs is felt to be much closer. The most popular response, 'teaching group size', can be interpreted in one of two ways. Firstly that the course has been redesigned to include more large group lectures at the expense of small group teaching, or secondly that courses are being taught in the same way but the group size has increased (through the reduction in the number of groups for any one cohort. Student contact time is another way of viewing this same issue, the important determinant here is that the TTA, in effect, lay down 'guidelines' as to the expected contact time for each aspect of the course. This could be provided on a one-to-one basis or through a large lecture to 200+ - it is up to institutions to balance efficiency with quality. Of the 37% of respondents who claimed that resource negotiation was the key impact of their awareness of costs, three (16%) added that it was that awareness of costs and their ability to present figures that strengthened their position, relative to courses that were less aware of their costs. These negotiations may be over matters such as the retention or appointment of additional staff, or additional funding for the extra cost of printing due to partnership documentation.

Are the costs of resources having an increased influence on the nature of your undergraduate ITT courses?

The 19 responses to the final question in the survey are presented in figure 4.9, below. The results identified two features in particular, firstly that there are fewer teaching staff each with increased teaching loads, and secondly that the expectations of school partners have changed.

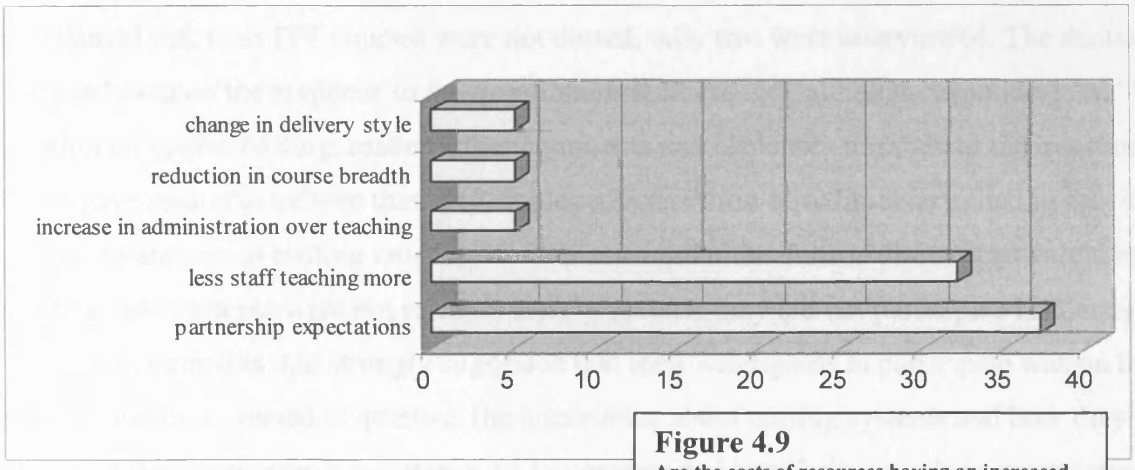


Figure 4.9

Are the costs of resources having an increased influence on the nature of your undergraduate ITT courses?

change in delivery style	5%
reduction in course breadth	5%
increase in administration over teaching	5%
less staff teaching more	32%
partnership expectations	37%

The partnership issue is double edged and is also linked to the staffing issues within the institution. Due to the reduction in overall resourcing and the expectations of Circular 14/92 (DFE, 1992), HE is requiring of their school partners a greater involvement and responsibility for all aspects of the school based elements of the course. In return schools are expecting a greater share of the resources. HE is responsible for quality issues, which is heightened during external inspections and which occur, for the majority of institutions, on an almost annual basis, ensuring that quality assurance procedures attract a proportion of the available resources. As more tasks are being devolved to school based staff, HE based staff are no longer required to perform these tasks (leading to redeployment or redundancy). With a reduced teaching force in HE, the remaining staff are required to teach more, given the same student numbers. Further discussion of the quality versus cost issues, particularly as it relates to school-based elements of ITT courses, will be contained within the analysis chapter.

Interview Responses

Although the questionnaire was treated as an anonymous response survey, it did offer the respondents the opportunity to nominate themselves as possible candidates for a subsequent interview on the content of their questionnaire responses. Ten of the 16 questionnaire respondents who offered to take part in the interviews had claimed that they, or their institution, costed their ITT courses, consequently their offers were accepted. Of the six that were willing to be interviewed but claimed that their ITT courses were not costed, only two were interviewed. The decision for this was based on the response to the questionnaire. These two, although responding 'no' to the key question on course costing, made further comments and responses throughout the questionnaire which gave reason to believe that they employed some form of rudimentary costing process, or at least an awareness of costing issues on their part would make further discussions valuable. The four potential interviewees were not rejected merely because they did not participate in costing. They had added comments that strongly suggested that their willingness to participate was on the grounds that they wished to question the interviewer about costing systems and how they might be able, with the interviewer's assistance, to incorporate one into their own planning structure. Keeping to the interview structure indicated in chapter 3, methodology, meant that each of the interviews were pre-arranged by either email or post. Throughout, the twelve interviewees will be referred to as participants 1 to 12 (P1 to P12), denoting the chronological order in which they were interviewed.

Non-'course costing' Interviewees

The first interviews were with those respondents who had originally claimed not to have a costing system. It was clear that the use of terminology was going to be a potential barrier to communication. In both of these interviews, the interviewer spent several minutes at the beginning explaining what costing was, the forms of data that were used and what the information might be used for. Both realised that they did, in part, cost activities within their courses, particularly within the school-based elements. Issues, which, in the past, had not been their concern, such as the cost of transport and partnership fees, were now being brought to their attention. One particular element that had had significant impact on the management of their courses was the cost of transporting students to schools for their placements. This cost is easily identifiable because of the number of cheques to individual students that are written. They were now in a position where an appropriate placement for a student was not one that just met their professional needs but one that was also cheap to access (P1 & P2). This extra factor made placements more difficult and therefore more time consuming for the staff involved. A second issue that they both (P1 & P2) brought up was that of partnership costs, again identifiable by the cheques being sent out from the institution. They were under pressure to reduce payments, or require partners to do more for those payments, whist at the same time maintaining the professional partnership and ensuring quality. Both (P1 & P2) expressed the opinion that, by having reliable cost information, they were in a better position to make decisions about course design and, more importantly in the case of one, use this information to explain decisions made to teaching colleagues. Their (P1 & P2) main concerns about the process were the unavailability of the necessary data, particularly to do with institutional costs, and the lack of clear guidance being offered by their management.

General Preliminary Issues

Even though the other interviewees were in a more advanced stage of development in terms of costing systems, it was clear that they had the same issues and problems as those above. One interviewee (P5), recently appointed from a school-based post, talked about the cultural differences between school and HE in terms of the awareness of costs and the effect that it could have on the wider ability of the institution to provide the services that it has set out to perform. In his view (P5), he felt that many of his colleagues had moved into HE over the last few years to avoid facing up to issues of cost and teaching to a curriculum, and now seemed unwilling or unable to face the new economic realities. He (P5) was particularly frustrated by the lack of embedded costing systems to provide him with information in order to make informed decisions about the course he managed.

This was a view expressed by several other interviewees (P3, 7, 8, 11), though in less strong terms. Most (P3, 6, 7, 8, 11, 12), thought that the availability of such information would be 'helpful', or 'a good idea'. Many (P3, 5, 6, 7, 8, 11, 12) thought that this lack of clear information was more an institutional issue than one specific to ITT courses within HE.

One interviewee (P7) commented that nobody had been concerned about costs until 'the finance department started to send out whacking great cheques to schools' – a view shared by several others (P3, 6, 8, 12). In discussing this point more fully it would appear that ITT courses have 'drawn attention' to themselves within HE institutions because they have a different set of priorities and a different cost profile from the other departments – internal costs are not noticed, whereas external ones are (P11). The move to pay partnership schools for performing duties that were once performed by HE staff was judged by eight (P3, 4, 6, 7, 8, 10, 11, 12) of the interviewees to be the point where the cost of provision 'suddenly' became an important issue for HE institutions. As one interviewee explained: the management 'know we've lost staff to save money, but they seem unwilling to transfer it to our non-pay budget to pay our partner schools' (P4). Another (P6) also complained of senior management: 'they're very hot on winning research bids, they just can't get their heads around TTA funded courses'.

Costing Systems

Nine out of the ten (bar P5) who claimed to have working systems, prefaced their comments with variations on ' I don't think that I should be telling you this but..', which gives an indication of the level of secrecy that these systems appear to be operating at. In seven (P3, 5, 6, 7, 8, 11, 12) out of the ten cases a simple institution wide system was in place involving one or, in two cases (P5 & 8), two cost drivers. The secrecy may have been due to embarrassment rather than commercial espionage when it was revealed that the key cost driver was simply 'the number of staff hours (often converted to 'staff years') required to teach the course' (P3, 6, 7, 11, 12). This costing system, in the view of the interviewees (P3, 7, 8, 12), appeared to focus on course viability with the possible addition of overall resource needs. The other cost driver mentioned by two of the interviewees (P5 & 8), was the number of courses offered within the school, which they assumed management used to identify and provide the course management resource requirements for the department. 'I suppose it's like schools receiving more funding if they have a lot of children eligible for free school meals', commented one (P5), referring to the formula funding system used in state education. A further two interviewees (P4 & P9), when questioned further, acknowledged

that their institution probably did have a costing system, but that they were not party to its workings or findings.

One course leader (P10) who had been faced with such a simplistic, institution wide, system had encouraged senior management to accept, in the case of his cost centre, a different model which took account of school-based costs: T+A+R+P+F+S+D< 0.65I (described above). Most of the complaints of other course leaders (P3, 6, 7, 12), required to feed information into simplistic costing models, were that it gave an unrealistic representation of their viability. ITT course costs, stripped of the school-based elements, can appear to be highly efficient when costed on a 'staffing only' basis. One interviewee (P6) commented that she had converted partnership costs in to 'fte staff' (full-time equivalent), and whilst it had provided management with a more 'realistic' representation of the true scale of costs on the course, she had been told 'in no uncertain terms, not to do it again'.

Where school or faculty-based costing systems existed, which was the case in five (P3, 4, 8, 10, 11) of the institutions, all interviewees complained at the lack of available information concerning institutional costs. Even the institution which had a clear policy on the practice of 'top-slicing', retained a fixed proportion of fees income to pay for centrally provided resources (such as campus security). The interviewee (P3) regarded this as 'unfair' because it still made the central service provision 'unresponsive to change'. The other four had taken a more pragmatic view of top-slicing, but even then two were unhappy with the findings of the costing activities: 'the way I've worked it out, the course isn't getting the resources that's due to it – it's certainly subsidising somebody out there', commented one (P10). When asked how they knew that all of their costs had been accounted for, all agreed that they didn't. One comment, representative of the five, was that ' you can't be sure – nobody seems to have all the information, or if they have, I can't get hold of it' (P3). When asked if it was any different for new courses, most of the ten (P3, 5, 6, 9, 11, 12) responded that the actual process of course validation was more a bureaucratic exercise, ensuring that the paperwork was correct, rather than an examination of the financial viability of a course. Two (P3, 6) complained that resource allocation promises made during the validation process were often forgotten after.

Almost all course leaders were currently involved in making changes to their courses in order to comply with new TTA regulations. When asked about the cost implications, one replied (P9) 'no change is ever cost free' – the acts of developing the course, rewriting documents, having meetings,

all have costs attached. Another commented that he would 'love to have a system, that you could feed different structures into, which would tell you how much each would cost' (P3). 'Without having reliable figures, you just don't know how much leeway you've got' (P10) and 'I've given up trying to err on the side of caution'(P4), were just two of the concerns expressed. When asked about sharing these concerns with other members of the course team, there were a variety of misgivings ranging from: 'I'm supposed to keep the financial information to myself' (P12); through 'they wouldn't appreciate/understand it' (P4); to 'tried it – ending up with the meeting being taken over with an hour long political discussion about state funding of education' (P5). One noted that 'even when you do manage to find a way of doing it cheaper or in less time, you don't gain by it' (P7). This lack of incentive to find more efficient and effective ways of doing things appeared to be a common theme.

When asked about actual costing systems, most responded that they did not have a system, as such, more an approach to 'adding up and making sense of the numbers' (P11). Most (P3, 4, 7, 8, 10, 11, 12) claimed only to be aware of the financial costs where 'money actually changed hands' and that they relied upon an 'awareness of the resources available' for other items, such as staffing. As a base line, one said 'when it comes down to it, you've got to do it, you've got to do it and forget about the cost' (P8). This cost seems to be measured in staff hours as much as anything, with all the course leaders complaining that the administration loads that they were expected to carry, seemed to be increasing constantly.

Actual costing systems, where they could be defined, were of the simplistic type, relating mainly to academic staff usage, with other factors included where they could be identified and have numbers placed upon them. All of them used some form of formula, though most were very informally applied and used mainly to 'give an impression' (P9) of the scale of costs.

Availability of Information

Eleven of the twelve interviewees expressed at least some degree of frustration with respect to the financial information that was available to them, the twelfth regarded acceptance of the situation as the only sensible option to take. For ten, their biggest complaint was that they were constantly under pressure from 'senior management' to reduce course costs but had very little information or control over costs. One spoke of the 'pettiness of asking colleagues to reduce the font size on their handouts to save photocopying costs' (P4). All were aware that funds were devolved to their cost centre from their institution but few were aware of the scale of fee income that the institution

received for their course. There was a general impression that too much of 'their course's funding' was being retained centrally and that other, non-TTA funded courses received more of their income in the form of staffing and other resources. None were able to offer any evidence to substantiate this claim; three of them stressed in various terms that this was 'the whole point, I don't have the information so I don't know what's happening to our funding' (P12). The availability of, and access to, the pertinent information being the key factor in their argument.

All interviewees felt that they would be able to perform their duties better as course manager if they had more information available. Several added to this by saying that it would only really be useful if they received appropriate training. Over half commented that they didn't believe that their institutions had the information to give, or if they did, they would not be able to present it in a form that would be helpful to them.

Summary of interview evidence

To summarise the interview evidence, the general view of the interviewees was that:

- costing was an important tool in terms of course management decision making.
- most of the information available was concerned with the school based elements of the course.
- informal and 'rule of thumb' costing systems were being employed.
- there were insufficient data concerning the HE based elements of the course and the use of funds retained centrally.
- course leaders retained control over a very limited range of variable cost items leaving their options for cost-cutting exercises very limited.
- there was a concern that the financial structure of the HE institution would make the availability of these data unlikely.

Case study data from documentary sources - Overview

The case study institution, originally constructed as a 'teacher training college' in the 1970's, has grown and developed to encompass many other courses at both undergraduate and postgraduate level. Although the School of Education remains one of the largest schools on campus, in terms of numbers, courses directly related to teacher education now represent less than 10% of the institution's student numbers. Due to the institutional goal of gaining university status, it has

recently been accorded 'university college' status, documentation has been rigorously completed and collated for potential inspection and quality assurance purposes. It is this documentation, and various internal memoranda, supported by informal interviews to clarify the documentation where necessary, which forms the basis of the evidence presented below.

Overall the HEI has a fte student enrolment of 7722 and an academic staffing of 485 (both 1997/98) resulting in a student:staff ratio (SSR) of 17.75 (West Anglia 1998b). By the intake of 1999/2000 the four-year undergraduate ITT course will have been phased out to be replaced by a three-year BA(QTS) course. It was originally conceived as two separate courses, representing the main division in primary education in schools in the country, 4-7 and 7-11 year-olds, but subsequent changes to TTA regulations resulted in the conversion to one course with two 'phase specialisms'. As a member of the course development team, the background to the original course documentation (West Anglia 1996 a&b) and subsequent revisions is known and so can be discussed here. This does also mean that there is some increased potential for author bias because of the close relationship with the subject matter.

The philosophical issues of the organisation and educational direction of the new course were discussed by the course team during the development period of 1995 to 1996. The costs of the provision of such a course were not on the agenda of the development teams, although the implications of basing a course on the income of three rather than four-years of fees income was raised but summarily dismissed. Their prime consideration, alongside that of ensuring that the course would be of high academic and professional quality, was to meet the DFE (1993) course requirements. A prime concern for management was that, as a 'college of higher education' rather than a 'university', the institution would be less desirable to potential students and so would have to rely on other means to entice students to enrol. This 'edge' over other institutions was to be the ability to offer QTS in three years rather than four. There was the additional possibility that all HE ITT providers would develop and introduce a three-year undergraduate course, making a four-year course at a college of HE even less desirable.

Course Structure

The basic design was for there to be two courses, determined by age-phase specialism, which would have a shared core of subject specialist courses, hence the dual documentation (West Anglia 1996 a&b) where many of the sections, organisationally, are identical in both documents. An equal number of students for each age phase was envisaged, with each student choosing a subject

specialism from: English, mathematics, science, geography, history, art, or physical education - there was an expectation that there would be twice as many students wishing to take English as any other subject. Periods of school experience, totalling 120 days, were to be evenly shared between the three years, with teachers assuming the responsibility for student supervision in school.

As the result of subsequent changes to the course regulations, as laid down by the TTA in circulars 10/97 and 4/98 (1997 & 1998), the course required immediate revisions, the most significant of these being:

- the two parallel courses to be treated as one, with phase specialisms;
- due to reductions in allowed recruitment across the sector, one subject specialism, geography, would be dropped;
- students now required experience of working in classrooms covering the whole primary age range (5-11) whilst retaining their phase specialism;
- time in college spent studying 'core subjects' (English, mathematics, science and information and communication technology (ICT)) would be increased, at the expense of the other subjects.

Due to the phased introduction of these changes it was necessary to develop and resource courses that would only be taught for one year. It was necessary to instigate course development and planning teams to develop a course that had not even been in operation for a year, let alone produced its first graduating cohort. A constantly evolving and changing course presents a particular challenge in term of costing, since the process of course development must be isolated from the process of course delivery. The other option is to assume that the rate of change will remain, leading to a constant need for significant course development (as opposed to the option of spreading 'start up' costs over a number of years). This will need to be accounted for in the costing information to be gathered.

The taught sections of the courses can be sub-divided into three categories (West Anglia 1998a):

- subject studies - the study of all of the English National Curriculum (DFE, 1995) subjects for the primary phase plus religious education.
- professional studies - pedagogy and related studies
- subject specialism - study of a subject to an advanced level aimed at the particular needs of the subject co-ordinator in the primary school.

Case study data from documentary sources – Presentation of raw data

Student Tuition Entitlement

Each student receives the following number of hours tuition in each of these areas:

Studies	**Number of hours tuition**			
	Year One	**Year Two**	**Year Three**	**Totals**
Subject	130	160	110	400
Professional	50	40	40	130
Subject Specialism	30	50	40	120
Totals	210	250	190	650

Table 4.1 Number of hours tuition, per student, in the various study areas

Source: West Anglia 1998a

The total contact time that any one student might expect over the three years of the course is 650 hours. The demands that this makes on the academic staff to deliver this number of contact hours are dependent upon the mode of delivery. It is conceivable that the students might be taught in a cohort sized group, thus requiring 650 hours of 'tutor time', or at the other extreme, taught individually creating a demand for tutor hours of 650 multiplied by the cohort size (currently 160) 104000 tutor hours – a considerable range.

Although these hours are the contact time expectations for students, they will, naturally be taught in groups so from this point the SSR and actual group sizes become a crucial determinant in the calculations. In addition to this number of taught hours there are a similar number of hours identified as 'directed time', in which tasks set by college are to be carried out, and 'self-study', which is self explanatory (West Anglia, 1996 a&b).

Due to the professional nature of the course, students can expect to receive individual tutor attention at various stages throughout their initial professional development. All students are allocated two half-hour tutorials per year in order to discuss their academic and professional progress and to maintain their record of professional development (West Anglia 1998a). Additionally students will receive tutor support whilst on periods of school experience (see table 4.2 below).

Partnership Costs

The course documentation (West Anglia 1998a) gives schools the opportunity to provide professional placements for students at two distinct partnership levels. In an 'associate partnership' school, students are fully supervised by college based staff and consequently there is no transfer of funding to schools. 'Full partnership' placements rely entirely on the schools to supervise, for which a fee is payable, and provide much of the professional support for the students whilst they are in school. The funding transferred to schools is based upon the cost of paying a tutor, at the casual hourly rate for lecturing staff, to perform the same duties. As an example, for year one it represents six hours of supervision, one hour of tutorials and one hour of report writing (8 hours at £25 per hour). College based tutors visit purely to moderate marking procedures and ensure quality thresholds are maintained. For schools new to full partnership, additional support and advice is available on request, resulting in an open-ended demand on tutor time. Table 4.2 below shows the number of tutor hours and transfer of funding attached to each partnership level in each of the three years of the course.

Partnership Level	**Year One**		**Year Two**		**Year Three**		**Totals**	
	Transfer to school (£)	**Tutor time (hrs)**	**Transfer to school (£)**	**Tutor time (hrs)**	**Transfer to school (£)**	**Tutor time (hrs)**	**Transfer to school (£)**	**Tutor time (hrs)**
Associate	0	5	0	6	0	5	0	16
Full	200	2	175	3	150	3	525	8

Table 4.2 Funding transferred to schools and tutor hours required for each partnership level

Source: West Anglia 1998a

Partnership training consists of three distinct elements. Initially schools new to partnership require intensive induction into the course, the procedures and the expectations in order to become 'full partners'. During the current academic year at the case study institution, 149 different schools have been used to place the 446 students, with a maximum of 82 schools used for any one cohort (Burton, 1998a). Potential errors in calculation arise due to the on-going 'merger' between schools in partnership to the post graduate course and those allied to the undergraduate course, resulting in some schools focusing their efforts on only one of the courses while others accept students from both. The situation is complicated further with a few schools working as full partners with one course and as an associate partner for the other.

A significant area of cost that was expected to decrease after partnership had become the norm was partnership training. Given the turnover of staff in schools and the number of new entrants to the profession, it has become apparent that there is a 'steady state' need for training that will continue for the foreseeable future. On an annual basis, all ITT co-ordinators in school require updating on changes to course regulations and procedures; in addition it is expected that eight new schools will be trained each year (West Anglia 1998a). The cost implications are that all partnership schools will require updating each year which will take two hours of tutor time for each of the five meetings of 30 schools. Partnership training requires in the region of 6 hours per school, depending on session delivery methods, at a cost of 48 tutor hours. In addition to this, local groups of partner schools meet on a termly basis which have been, in the past, convened by a tutor. On the basis of four groups meeting termly throughout the year for two hours at a time, there is a further demand for 24 hours of tutor time. Partnership training therefore, has a cost, purely in terms of staffing, of 82 tutor hours.

Staffing Requirements

Further pieces of information are required before staffing requirements can be determined. Firstly the number of students enrolled, or expected to enrol on the course, secondly the teaching group size, and finally the proportion of Associate and Full partnership schools. Using the approach suggested by Birch (1989), a key first step in costing is to identify the target enrolment. Since the TTA sets fairly predictable targets for the recruitment of each institution, and that primary ITT courses are invariably oversubscribed at this institution, then it is possible to set overall recruitment targets with a considerable degree of confidence.

Unfortunately there are three significant areas of uncertainty:

- the balance between the age phases is unlikely to be even;
- the distribution between subject specialisms is unlikely to be equitable;
- the number and type of placements offered is unlikely to be fully predictable.

The first of these uncertainties has been overcome to some extent by the introduction, for the latest cohort, of non-phase specialist teaching groups (West Anglia 1998a). This has allowed a more equitable distribution of student numbers between groups for professional and subject studies.

Even so the number of tutor hours can be calculated within limits:

- number of taught hours (group) = 650 (from Table 4.1)
- number of tutor hours (individual) = 19 (max) to 11 (min) (To include both school-based and personal tutorials) (from Table 4.2)

Moving to step 3 of the Birch(1989) approach, it can be seen that for between 11 and 19 hours there must be an SSR of 1:1 and for the remaining 650 it can be varied according to institutional policy and norms. Some institutional norms are commonly known, within the institution, and worked towards, though, strictly speaking, they cannot be called 'policy'. Apart from large lectures, the normal teaching group is not expected to exceed 30 students (West Anglia 1998b). Tutors should expect to perform 'teaching activities' for between 500 and 550 hours per year (West Anglia 1998c) which represent between one-third and one quarter of the number of hours an academic might be normally expected to work during a year. So, working at 'maximum efficiency', tutors should expect to teach groups of 30 students for 550 hours per year. Realistically it has to be acknowledged that cohorts are seldom in multiples of 30, nor are some practical subject rooms equipped to cope with such large groups.

Many of the operating conditions are set by regulation (DFE, 1993), for example: for administrative purposes it would be much less expensive for the students to have one, long professional placement of 24 weeks (to make up the required 120 days in school for a three-year course). Professional sensibilities and the regulations also require the student to have experience of more than one school and have school experience in each of the years of the course. Beyond this the decision to make the placements a mixture of serial (the same day each week) and block (completely school-based for a period of up to half a school term) is argued in the rationale of the course documentation (West Anglia, 1996 a&b) on both academic and professional grounds. In addition, there are also organisational grounds, concerning the most efficient use of the available accommodation - by ensuring that the students are 'off campus' on a certain day each week throughout a complete teaching period, this will reduce the demand for teaching space on that day. By having each cohort in school on a different day, the demand for teaching space can be spread throughout the week making more efficient use of the available accommodation.

By reference to other sources of data within the institution (Personnel), it is possible to determine the average cost of an education tutor - £28400 pa (1998/99 salary levels). This figure is significantly higher than the average for academics in other areas of the institution but it is

explained by the previous experience of the staff. Each will have held senior (ie relatively highly paid) positions in schools or the education support services prior to moving into higher education. Taking into account 'on costs' such as pensions and sickness payments, a 'reasonable estimate' (Personnel) of a further 25% can be added to this figure, bringing the average salary to £35,500.

Jandhyala (1983), Ajayi (1988) and Ahumada (1992) all highlight the high proportion of university costs accounted for by academic staffing. The average academic salary for an Education tutor can be converted into an hourly rate (550 hour maximum) of £64.55 (rounded up to £65). This figure is more than double the casual hourly rate for a lecturer but is consistent with the approach that dictates that all costs need to be related to the income that supports them.

With this information it now becomes possible to calculate the staffing requirements for the course, and through the average staffing cost, the cost of the key resource necessary to operate the course. Clearly there are various options as to how the staff might be used, particularly in respect of teaching group size, and this will be one of the key variables, or cost drivers, that will be explored in the analysis chapter.

Placement Costs

There are other costs directly related to the course, the most significant non-staffing ones being school placement transport expenses. The average cost to transport students to and from their placement school was £2.24 per day per undergraduate student (Burton 1998a) for the academic year 1997/98 (see Table 5.4). This followed a severe cost reduction (or more accurately 'cost transfer') activity where all students in local placements (within four miles) were to be made responsible for their own expenses and the issue of transport was made one of the key criteria for placing a student in a particular school. Savings in expenses paid to students were made at the cost of staff time in ensuring an efficient and effective placement of students. Staff transport expenses are less easy to manage. Although tutors are assigned to students in schools that are either near their home address, thus reducing potential claims or with a group of students in one or a few neighbouring schools, it is not always possible to predict accurately the number of trips that will be made. Tutors are placed with students on the assumption that they will be able to see four students in any one day (Burton 1998a). A tutor who is attached to four students in one outlying school may be expected to see them all in one visit, but this assumes that they have a complete day free from other commitments to perform their duties. If this is not possible, due to teaching commitments, it will immediately increase the cost of transport in that particular instance by necessitating (an) extra

visit(s). On the experience of the academic year 1997/98, the average cost of tutor transport per visit per student was £4.10, found by aggregating tutor travel expense claim forms and dividing by the number of students multiplied by the number of expected (or planned) visits (Burton 1998a).

Reprographics Costs

At present reprographics is charged per subject, and as individual subjects are taught across courses, apportioning costs to particular courses is problematic. But even if the full amount of the delegated budget was attached to these courses it would still work out at £25 per student per year (Davies, 1996). Due to the relative freeze on the subject reprographics budget, this figure should have remained the same, though with the lack of subsequent budgets to be prepared or presented, confirmation is not possible.

Within the reprographics cost area, growth has been allowed in documentation sent to schools as part of the partnership. To ensure that teachers in partner schools are fully aware of the requirements and expectation for each placement, booklets have been produced containing the relevant details. Copies of these booklets are provided for the class teachers, students and tutors at an approximate cost of £2 each or £4 per student per year. In addition, students also have a professional assessment booklet that costs approximately £2.50 each, which are designed to last the life of the course. Calculations here are based upon the number of pages in each multiplied by the cost of reproduction, with an allowance for over production to allow for 'spares'. This estimate, of £6.50 per student for reprographics costs associated with partnership, will be taken forward to the aggregate cost table, 5.5. Further reprographics costs, a result of communications with partner schools, are detailed below.

Administration Costs

Course management costs are now possible to identify in terms of tutor hours, as a negotiated 'non-contact' allowance to allow staff time to perform their duties. From the Head of School's memo on the subject (9/9/98) it is possible to identify the following allowances:

- course leader 200 hours
- year group leaders (3@50 hrs) 150 hours
- subject leaders (7@25hrs) 175 hours
- admissions 100 hours

Total 625 hours

The duties of administrators and clerical and technical staff have similarly been nominally attached to particular courses, so that relative proportions of their time can be identified (Personnel):

Partnership and placement	58% of 1.5 staff	£13775 (see Table 5.5, row 7)	
Secretarial	1.5 staff	£22500	
Registry	1 staff	£12250	
Technical	66% of 2 staff	£14000	Total £62525

The calculations for these staff have been based upon, in the case of partnership and placement staff the number of student placements, and in all other cases the number of students as a proportion of the aggregate number of students on courses within the school of education. It is estimated that 60% of partnership and placement administrative costs are due to work with schools.

Central and Shared Costs

Library and information technology (IT) costs are attributed to subjects or to the school of education as a whole. Both have aspects that can either be attributed to staff or student focused activity, but ultimately both have to be borne by the income for student fees. An IT renewal program based upon a five-year rolling upgrade of existing provision, within the school of education rather than the wider provision from the institution, is put at £10k per annum, or approximately £15 per student calculated on an equal basis (IT Group, meeting minutes 22/6/98). Purchases for the library are of a similar magnitude, funds being devolved to subjects to identify individual books and other resources.

The cost of **consumables** purchased for use on the course is difficult to calculate due to resources being shared across courses and the varying shelf life of different items. By aggregating the total sums devolved to subject leaders and calculating on a 'per student' basis the figure for 1997/98 is approximately £10 per student (Head of School memo 9/9/98). To attempt any greater accuracy than this is meaningless as the extent to which some materials were used more by one course than another becomes very debatable.

Centrally paid expenses, such as **lighting, heating and estate management**, are much more difficult to apportion to particular courses. Intra-course costs (step four of Birch, 1989) are addressed by means of apportioning ('top-slicing') income received by the institution, in respect of the course, to pay centrally for **support and managerial staff, accommodation, and all administrative and support services**. This also enables the institutional management to direct funds to support particular initiatives and activities which do not, directly, generate income (eg.

some forms of internally funded academic research). The institutional accounts that are available only provide very broad categories of costs, thus making the distinction between known costs within a category such as 'administrative staff costs' – departmental secretary – and administrators within central registry impossible to determine.

Some of these costs can be identified by a careful collation of outgoing expenses. Until 1994, there was no attempt to calculate the total cost of student transport, as a consequence it was left unmanaged and allowed to grow; as soon as reliable data became available, it could be controlled (Burton 1996). The same could be true of a range of other expenses such as the communication costs of postage and telephone charges; the key element is collecting and collating the information. As the state of the information currently stands, estimates can be made based upon samples, but no definitive figures are available. From sample evidence collected over the 1997/98 academic year, when only two cohorts of the undergraduate course existed, there was an average of five telephone calls and 7 mailings to each school (7.5 and 10.5 for three year-groups) (school placement staff). In total this comes to less than £7.50 per partnership school per year, but it is a cost that can be attributed to the course, and the more of these that can be accounted for, the more accurate any cost projection will become. The costs of the actual content of mailings to each school does vary, but a general position can be established. If the duplicate documentation for students and teachers is excluded, in a normal year any one school might expect to receive ten mailings:

- to request and accept offers of placements (2);
- notification of up-date and network meetings (3);
- notification of placements (5) – two placements in each of the first two years.

In each of these mailings there will be a mail merged letter, on headed paper, and, in the case of the request for offers, further documentation, some merged, providing further information on dates and placement commitments and expectations. The total cost per school, based upon paper and printing costs, being approximately £2 (based on document available to reprographics staff).

Some costs, outside the control of course leaders, are more difficult to obtain precise figures for. The use of rooms is one of these. Despite several appeals for information on the **costs of room use**, or the factors, such as light, heat, cleaning and maintenance, which contribute to it, no information was forthcoming, or it seems, even available. If precise costs are not available, it is sometimes possible to obtain near approximations in the form of 'market rates'. External bodies are able to hire teaching rooms on an hourly basis. This hourly rate is meant to both reflect the market value

and also cover direct costs and contribute towards fixed costs on a renewal basis. This scale of charges is negotiable but general 'conference rates' can be obtained from the appropriate personnel. The hourly cost of a general teaching room, inclusive of presentation facilities (OHP, video), to seat up to 30 delegates is £25 (outside normal teaching hours). For a similar room to seat up to 50, £35 and for a lecture theatre with 'teaching wall', seating 150 the charge is £80 (Conference Manager). Other specialist rooms are available with prices based more on ensuring a cost contribution rather than actual cost. For £75 it is possible to book a suite of 20 multimedia computers, with Internet access for one hour, including the 'on-call' support of a technician (IT Manager). The only rooms that proved impossible to cost were those offices belonging to the academic staff. Clearly, those hiring the rooms out do not have a full appreciation of the total cost involved in the operation, but there is an indication of the price that the institution feels is likely to cover estimates of those costs.

Other central costs can be identified but they are not responsive to changes in the nature, operation or scale of course activity. Senior management, corporate marketing, estates management will exist regardless of whether a course has two students or two hundred. A decision must be taken as to how these costs will be accounted for in relation to the income generated. It would appear that to apportion them on a 'per student' basis would be the most appropriate way to progress, if figures for the cost of 'corporate marketing' were available (which, unfortunately is not the case).

Some activities of even those staff teaching on the course in question will not have been accounted for and costed so far. Academics also take part in professional development activities; they attend courses and engage in research. These activities must all be paid for, but what by? Should all of these activities directly relate to the development or other improvement of the course to gain funds? For some issues there are no clear-cut answers from either the documentation or current practice of the institution.

To summarise the documentary evidence, it has been possible to:

- cost school-based elements of the course
- identify direct taught-element costs
- make estimates of the proportion of certain joint costs to be apportioned to the BA course
- obtain 'market values' or prices for certain resources

It has not been possible to cost all of the activities of the institution as they relate to the operation of the course. These areas of cost will need to be considered through the costing models analysed and evaluated in the next chapter.

Summary

The questionnaire was able to identify the extent to which course leaders are aware of costs and costing within their own institution. An awareness of cost factors was implicit within many of the responses, but there was a lack of any formal approach. Where costing systems and formulae existed, in only one example did they go beyond the cost of academic staff employed on the course. In many cases costing was performed to establish course viability rather than to assist and inform the course managers in the fulfilment of their duties.

Subsequent interviews with twelve of those who had participated in the survey revealed a considerable degree of frustration. Most expressed their awareness of the impact of costs on the operation of their courses and agreed that tools to identify and manage these costs more effectively would be welcomed. The purpose of costing appeared to be for institutional rather than course management needs. The lack of access to data, both raw and final, was a concern and a source of frustration. Only where payments were made to external bodies were the figures readily available. Costing systems appeared to be limited in scope and appropriate for courses that had professional elements within them.

Within the case study institution, accurate and reliable evidence became more difficult to obtain, the further the source was removed from the original course documentation and the cost centre. It was the centrally managed costs – accommodation, salaries and non-course central costs - that were the most difficult to obtain accurate information on. Some documentation, such as that relating to room costs and reprographics, was considered as 'commercially sensitive', or the holders of the documents were unsure as to their authority to release copies, even within the institution. As an alternative to obtaining copies of the actual documentation, the holders felt more able to release the content through discussion.

Costs relating to partnership and placement, which were determined and managed within the course team, were the most accessible to both the course and senior management. Given the lack of

collated data it was necessary to provide estimates based upon small samples for some areas of cost. Throughout it has been difficult to distinguish between costs where it is possible to attribute them to more than one course.

Chapter 5 ANALYSIS

Introduction

The evidence presented in the previous chapter will be analysed in respect of the purposes of the research identified in the introduction to this thesis in order to answer the following research questions:

- to what extent are ITT courses costed by HEIs?
- how are ITT courses costed?
- to what extent is costing information used by the course management?
- can a suitable, generic, costing system be developed?

Comparisons will be drawn with previous research findings, identified in the literature review.

For much of this chapter the focus will be the development of a suitable costing system using the data obtained from the case study institution. The data will be organised and arranged in various formats, as suggested by the literature, in order to identify and analyse the various components. Costing systems obtained from the literature of costing, previous research and the survey undertaken for this study will be applied to the data obtained from the case study institution. The results and effects of the different costing systems will then be presented and compared. Through this analysis, further costing systems will be developed and tested and analysed for their usefulness and accuracy.

The extent to which ITT courses are costed by HEIs

Fewer than half of the respondents to the survey claimed to cost their ITT courses. Those responses do confirm that the cost of course provision is an issue that institutions are attempting to address, or they are at least concerned and very aware of the fact that they are not addressing it. Those institutions that were not formally costing would appear to be becoming increasingly aware of the need to recognise and control the sources of cost. This seems to confirm the observation by DeHayes and Lovinic (1994:81) that "the importance of cost information increases as resources diminish". It is unclear whether these pressures are internal or external to the institution. It may be

due to "informing and guiding management in resource utilisation and monitoring" (Carr, 1994:28), or it may be a result of the increasing levels of financial accountability requiring institutions to:

- set an institutional policy for costing
- set an institutional process
- determine the procedures for implementation and review? (JCPSG, 2000, online)

It would seem that HEIs are still more content to allocate the funding that they have been given rather than investigate the actual costs of providing courses of appropriate content and quality. Although no specific evidence has been gathered concerning the methods of internal resource allocation employed by HEIs, from the interviews it was apparent that course leaders relied upon historical budgets and a certain degree of bidding for extra funding for specific purposes – the "marginal change and specific funding" identified by Kedney and Davies (1994:447). More advanced budgetary systems, such as ZBB or MYTH, may have been present, but this information was not sought. Given the adverse effect that the changes in cost patterns appeared to have on many of the HEIs, from internal staffing to partnership, is seems unlikely that any dynamic systems were being used. The comments from interviewees suggest that most HEIs appeared to be using some form of incremental approach, seemingly 'muddling through' (Davies, 1994).

The costing systems that course leaders are aware of appear to be of limited value in actual course management decision making. They lack the precision necessary for the course management level of operation, clearly limiting the potential for any form of cost-effectiveness analysis, as defined by Woodhall (1987) to be performed. Those systems which do exist, and may be used to give a general indication of viability, are based upon the premise that all courses offered within the HEI operate along similar lines, with very similar cost structures. With substantial sums being transferred to school based activities, this is not the case with ITT courses. It is poorly conceived models like these that have led (Carr, 1994:27) and others to strongly support the development of ABC based methods. In many institutions the realisation of the scale of funding being used to pay for the school based elements has awakened renewed interest in HE based teacher education. When these costs were effectively hidden within the HEI, with HE based staff performing supervision and quality control duties in schools, these costs were not an issue because they were hidden within the general operation of the course.

The very visible nature of these partnership costs has allowed HEIs to contemplate the "weighing of its value against that cost" (Fielden & Peason, 1989:95). This gives the impression that it is the awareness of these costs, rather than their absolute value, that is the guiding principle behind management interest in controlling them. Although it is probably not sufficiently focused at the management level to suggest that "the cost-effectiveness of educational provision has to be demonstrated" (Thomas, 1990:46), it does appear to be part of management's search for "acceptable ways of saving money" (Kedney and Davies, 1994:443). It also brings into sharp relief the comment (by interview participant 4) concerning the font size on handouts to students.

The single difficulty facing all the respondents and interviewees was the lack of adequate financial information - they were aware of the sources of costs, but in many cases, were unaware of the scale. During the interviews a point repeatedly made was that course leaders were increasingly aware of the relative scarcity of resources, but they lacked the ability to make informed decisions.

The responses to the questionnaire and interviews provide an overall picture that is very indistinct, as far as the extent to which costing is being employed is concerned. There are three key factors behind this;

1. that the awareness of the existence of a costing system is unlikely to be universal within an organisation,
2. that the costing system can vary in sophistication from the number of teaching staff employed on the course to a multi-variant formula,
3. the information arising from a costing system might not be in an appropriate form or even made available to the course manager, -echoing points made by the JCPSG (2000).

Since it is very difficult to have a shared and common understanding of 'costing', it is virtually impossible to have a definitive response to the extent to which costing takes place. This lack of commonality confirms Levin's suggestion that inconsistencies arise from problems concerning "no reliable standard on which to base a cost estimate ... *or* ...there is a range of cost estimates" (1983:89). Much more work will need to be done to develop a common terminology and shared practice before any meaningful comparisons can be made. The JCPSG (1998:2) go further to suggest that there are other issues concerning institutional culture and practices that need to be addressed prior to the imposition of a costing system.

How ITT courses are costed

Several of those respondents who made early returns were very keen to obtain feedback in order to discover how other institutions were addressing the problem and how their own compared. One typical response was of isolation "I knew that there must be others out there trying to cost their courses, but who do you contact...and how?". It is clear from the responses that the demand for adequate costing systems is there but equally clearly, there is a lack of structured information, knowledge of costing systems and appropriate experience.

With most tutorial/seminar/lecture based HE courses, the academic staffing requirements would appear to give a very good indication of the overall costs of the course. This links very well to the findings of Ahumada (1992) that staffing, through the SSR, accounted for 60% of the variation in costs, and of Ajay that staffing accounted for "73% of total recurrent cost" (1988:14). The staffing information is not difficult to identify and collate and can be seen as being a 'cost driver' in the terms used by Han (1996) and Horngren (et al, 1994). Within a range of activity this indicator may be seen as being a highly cost efficient means of assessing the viability of a course. Unfortunately it would also indicate that if cost savings had to be made, the only effective tool would also be academic staffing levels or rather the reduction of them. What is not apparent here though, is the effect of 'step economics' (from Lucey, 1996b) at the margins of student enrolment - the 31st student may require the cohort to be divided into two groups, thus doubling the staffing requirements (and costs) whilst only gaining the extra income of one student.

From figure 4.2 (above) it is clear that the availability of the information is an important factor in determining which cost sources are used in calculations. Along with academic staffing costs, the sums transferred to schools and payments made for travel expenses incurred can be identified and collated with relative ease (if the accounting systems are in place). The actual cost driver associated with these, if an ABC approach were to be used, would be based upon the number of student/days in school. It was frequently these identifiable 'school-based costs' that course leaders had more control over, simply by having clear information about them – a consistent theme throughout the interviews.

Even in institutions where the course leader was able to identify a range of factors that were included in cost calculations, information about how these data were to be used was not

forthcoming. Ownership of such information, both on the input and output sides, is of crucial importance because, as DeHayes & Lovrinic (1994) note, the reliability of any model is dependent upon the information fed into it from the initial costing process. Those providing the input data are likely to take more care where the outcomes of the costing process are to be both shared with them and useful to them, a point not lost on Carr, (1994:28).

Where the questionnaire asked the respondent to explain how these figures were used in costing calculations, only one course leader was able to respond with a system that identified more than academic staffing costs. It would seem that, while course leaders are involved in the gathering of evidence for costing systems, they are not involved in the actual costing process. This is supported by the responses presented in figure 4.3. Although courses are designed and managed by those who teach on them, they would appear to be the ones least likely to be given access to the information. In 80% of the questionnaire responses, courses, it would appear, are being designed and managed in ignorance of the true cost implications of decisions that are being made. The efficiency of this style of management must be questioned at the highest levels within an institution. Coombs and Hallak maintained that: "good educational cost analysts can literally be worth their weight in gold ... provided the decision makers understand the answers and take them seriously" (1987:191). And also provided that the information is shared with those who are actually managing the courses.

Apportioning the costs to courses is possible where the sources are recorded. As one travels further down the rank order of the cost factors, it is apparent that each further item is increasingly more problematic to apportion to a particular course, either through cross subsidisation or because there are inadequate systems to gather the data. Some of these factors may be related to the number of student group sessions (hours) - teaching rooms for example; others to the numbers of course year group cohorts - some of the more central costs such as registry administration and examination/course boards. But it is apparent that some of these factors, even the funding transferred to schools, are more likely to be understood and acknowledged by the course leader than senior management. A possible reason why course leaders are not given access to the costing figures obtained by more senior managers for assessing course viability is because they would not be able act on the information based upon factors outside their control.

If the costing system was so vague in terms of its outcomes that it could not be used by course leaders in their decision making processes, merely as a general indication of course viability for senior managers, then why was this not the most popular response in figure 4.4? As the most

frequently, and in some cases only, factor used in the costing process, the staffing allocation then becomes the only factor worthy of variation. Levin (1983:89) suggests that simplistic models can only produce simplistic solutions. If the course, as determined by the number of staff attached to it, is not viable, then change the number of staff allocated to it and immediately it becomes, in these crude terms, viable once more. In this model there is no attempt to assess the quality of staffing within the provision.

From the survey responses it is unclear how resources are allocated within such systems, and no indication that there is consistency between institutions at all. This is a concern expressed by (1983), Thomas (1990), and Carr (1994).The JCPSG, in particular, refers to:

- lack of an overall costing framework
- lack of a consistently applied framework (1998:2).

In one situation resources may be allocated in reward for maintaining an efficient course in terms of staff allocation, in another it may be allocated in proportion to the number of staff used. All the questionnaire reveals is that course leaders felt that staff and resource allocations were as a result of the costing process. When this point was returned to during the subsequent interviews, course leaders gave the reason that they sent off the staffing needs data and back came the staff and resource allocation.

In terms of the costing process it would seem that in all institutions the funding transferred to partner schools can be accounted for and therefore managed. Direct variable costs, such as the employment of academic staff, reprographics, and communications, can be identified but the actual costs are less often available. It is relatively straightforward, in most cases, to identify the resources that are being directly applied to the course, but their monetary values are not so available for public scrutiny.

Costs which are likely to be incurred whether the course ran in any one particular year or not, namely those which are central to the institution, are less easy to identify and relate accurately back to the class. From the findings of both the questionnaire and the interviews, these are virtually impossible to obtain appropriate and useful information on. In order to ignore the lack of accurate financial information, Kedney notes the ease at which it is argued away on the grounds that these overheads "exist anyway and so should be excluded" (1991:2). Another reason for their exclusion, according to Palfreyman, might have something to do with the "poorly developed management

accounting systems" (1991:26) in most HEIs. Attempts have been made to accurately account for central overhead costs using ABC, most notably those studies by Goddard & Ooi, (1998) and Innes and Mitchell (1990), but their success has been limited and localised.

The use of costing information by course management

It was clear that where costing did take place, the level of sophistication was quite low, frequently with only one cost factor being taken into account. Perhaps these single cost driver approaches should be compared to the one developed by DeHayes & Lovrinic where, in order to cost one degree course "more than 250 separate tasks were identified and costed" (1994:85). The reliance on information concerning the number of academic staff required to teach the course indicates a level of accuracy and usefulness to management not likely to assist course mangers. The approach is an adequate response to the demand for information concerning overall course viability but it is not of help to those attempting to design or manage courses. Following the analysis of such data, senior management may call into question the benefits of operating with certain courses that appear to employ too many staff relative to their income generation, and may even recommend a reduction in the staffing complement. Given the rudimentary nature of the input data, they will have very little else to base their decisions upon. Even Ahumada (1992) recognised two other key factors, class size and the number of courses offered by a faculty.

There is the possibility, for which no evidence has been found, that this approach to costing, which is relatively cheap and easy to apply, may be supported, should the need arise, with more sophisticated costing tools which would provide more detailed information. The formulaic costing systems recorded in the questionnaire will be used later in this chapter, though such systems were regarded by many of the interviewees as being little more than general indicators or 'rules of thumb'.

Given the current financial situation of HEIs, the lack of an institution wide costing system in 80% (28/35) of the HEIs must be a cause for concern (figure 4.5). There is a possibility, as was found in the case study institution, that the course leaders who were responding to the questionnaire were unaware of the existence of a system but that one actually existed. This then returns to the concern that if a system exists, why are the course leaders not using it, let alone being unaware of it? The

JCPSG suggest that "insufficient institutional guidance to departments" (1998:2), is a significant problem across the HE sector.

It is possible to take the view that, if course leaders are not able to make decisions on the basis of carefully costed options, then regardless of whether a system exists or not, it is clearly not being used and therefore it is redundant. When questioned, several interviewees had less than complimentary things to say about the communication of information, particularly to do with financial matters, within their institution. With the considerable sums of public funding passing though these institutions, the lack of accountability here is worthy of further comment and recommendations, which will be presented later in this thesis.

Clearly, as presented in figure 4.7, costs do have an impact on course design and at annual resource allocation times. But the extent to which this is based on referral to the actual figures, as opposed to perceptions and hearsay, is not clear. Several of the interviewees (P4, 6, 7, 10, 11, 12) claimed, to a greater or lesser extent, that the courses that they presented for validation, were not the same as the ones they eventually came to manage, because of the non-arrival of expected resources. The follow-up procedures on newly validated courses do seem questionable but, with constantly changing course regulations from the TTA (DES 1989, DFE 1993, DFEE 1997, DFEE, 1998), it is difficult to identify a fixed point to assess the situation from. The annual situation is again closely linked to the changing demands of the TTA; course leaders had an expectation that they would have to introduce changes with a standing assumption that no more resources would be forthcoming – 'a matter of juggling what you've got'.

Most course leaders demonstrated an awareness of the sources of costs and were able to base their decisions on an understanding of how at least some of these costs were sensitive to change. The factors that they had an appreciation of were those that had a well-defined cost. Many of these were linked to payments concerned with school experience and partnership. It would seem that these, relatively recently introduced, costs are much better accounted for than many other more established ones. It is also the case that ITT involves the transfer of funds to bodies out side the HEI, whereas non-ITT courses do not, again making the identification much more apparent.

The funds transferred to school to pay for partnership are not 'new money'. It has been made available by the reduction of staffing, related to these ITT courses, that has been made as fewer staff are required to perform those school based duties now performed by schools. In effect, it has

always been in the course budget, only now it is within the non-pay rather pay side of that budget (applying JCPSG (1998) terminology). It would seem that many institutions have had great difficulty in coming to terms with that key distinction. It could be that course managers are having similar problems appreciating that to allow for this transfer of funds there must be a balancing reduction in staffing. It would appear that the introduction of the requirements of Circular 14/93 (DFE 1993) have had a significant impact on the perceptions of cost even if this is not what has been the actual result in reality.

There at least seems to be the willingness to consider the benefits that costing of provision might bring in terms of the effectiveness of management. Even where responses to the questionnaire have been minimal or possibly non-existent, the contact that has been made has given the impression that course leaders within institutions would value a workable costing system. The purpose of costing suggested by Woodhall (1987), using costing to determine the most effective allocation of resources, would appear to be the basis for this demand. It is possible that this movement is linked to developments in the self-financial management of schools. As new staff enter HE from schools they bring with them not only the skills to teach on the courses, but also a different management culture. A culture that accepts the need to work within limited resources and is experienced at taking decision based upon an understanding of the financial implications.

The need for a clear and open costing system that allows for both HEI and partnership costs is a key theme running through both the questionnaires and the interviews, reinforced by the recent TTA publication (1999) concerned with the allocation of resources in partnership and the JCPSG (1998) developments in respect of financial transparency. Course managers are very aware of the financial constraints that they are under but lack the financial information on which to base their decisions. From the responses it is evident that HEIs appear to have only become aware of the true scale of costs involved with ITT courses when funding began to be transferred to schools. With pressures seemingly coming from both senior and course management in HEIs to introduce systems which will provide a clear picture of the sources and means of controlling costs, the time is perhaps right to explore the potential of different approaches. Using the parameters laid down by Woodhall (1987) and Carr (1994) as a guide, there will now be an attempt to apply the financial data available from one undergraduate ITT course to develop an appropriate costing system that might be applied generally to ITT courses.

The development of a suitable costing system for the case study institution

To develop an effective and appropriate costing system, the underlying purposes must be made clear. This can be achieved both in terms of unit costing, based upon the work of Carr (1994) and cost-effectiveness analysis, from Woodhall (1987). To reiterate the main points of each. Firstly Carr offers seven reason for calculating the unit costs of an educational activity, so that managers are able to:

1. allocate resources for a course/student to the cost of delivery
2. evaluate the alternative delivery methods
3. determine course viability
4. develop a case for additional funding
5. identify the marginal costs of additional students for bidding purposes
6. base budgets on outputs rather than input costs
7. set targets and monitor performance based on the cost of delivery (Carr, 1994:27)

Alternatively, Woodhall offers five uses of cost-effectiveness analysis within the educational setting:

1. feasibility or viability of provision;
2. projection of future educational costs;
3. estimating the cost of alternative actions;
4. comparing alternative means of achieving the same educational objectives;
5. improving the efficiency of resource utilisation. (from Woodhall, 1987:399)

Combining unit-costing with cost-effectiveness analysis suggest that the uses of a costing system should include:

1. course viability
2. comparison of alternative resource allocations/modes of course delivery
3. prediction of future costs on the basis of changed parameters
4. estimating marginal costs (student).

This provides the foundation for the underlying strategy which will be suggested for the case study institution and beyond, where generalisations are possible. There are several ways in which the financial evidence obtained from the case study institution and presented in the previous chapter

may be categorised. If a budgetary system were to be employed, the costs would be categorised under various headings, mainly on the grounds of ease of identification, usually with a significant 'miscellaneous' or 'central costs' heading for those that could not. An economic approach would be to identify fixed and variable costs in order to develop a series of cost curves from which marginal cost can be derived (Lucey 1996b). The application of ABC (activity-based costing) will require the identification of cost drivers of varying degrees of sophistication (Innes and Mitchell, 1991; DeHayes and Lovrinic, 1994; Hans, 1996). In each case the choice of 'unit output' is crucial. In choosing the 'student' as this unit, it will be done in the knowledge that the student's stage of training will also be an important factor.

Setting up an educational activity for the first time, which is, in effect, what HEIs have done in moving from tutor to school-based supervision of students in school, allows for costs to be inspected more easily. In many respects this is why the costing of the courses offered by the Open University (Birch (1976), Verry (1974, 1977), Verry and Davies (1976), and Laidlaw and Layard (1974)) and The University of the Air, Japan (Hiromitsu Muta and Takahiro Saito (1984, 1989, 1994)) are easier to achieve than for an institution which has been operating similar courses for some considerable time where costs have become, in terms offered by Pyke (1998:87), "embedded and hidden".

The income from ITT

The focus of this study is the examination of costs and there is no evidence to suggest that there is any direct relationship between course income and course costs. Even so, the identification of costs is important as it offers parameters for the question of course viability. The first task of this analysis must be to collate and categorise this information in a format that can then be applied to a variety of different costing systems. On the one side of the equation there is the income received by the case study institution for the course: £2609 per student per year, with student enrolment of 162, 148 and 136 for years 1 to 3 respectively. This reflects an 'over recruitment' for year one of 20 students, and an average non-completion rate of 5% in any one year-group. The over recruitment is significant because for those students no fees are forthcoming from the TTA and, in addition, there is a 'fine' of 20 students for subsequent years. The result is that an over recruitment of 20 students results in a subsequent reduction of 60 (20 for each of the three years of the course). Consequently the total income from the course is:

£1,111,434 from 426 students

Even though Lloyd et al (1988:19), note that costing and pricing activities are not worthwhile if "the fees are not related to the cost of courses and the revenue does not accrue to the supplying faculty" it is useful to identify the extent to which fees and costs are related. Clearly this implies some form of 'buy back' internal financial management system that does not appear to exist, at least from the perspective of the course leaders, in any of the institutions responding to either the questionnaire or the interviews.

An illustration of school-based costs

From the presentation of the evidence for the case study institution in the previous chapter, it is clear that the identification and calculation of costs will be a challenging exercise. Given the information available it will not be possible to adopt a Course Life Cycle costing model (Bascich et al 1999), to include development and evaluation costs in addition to those concerned with delivery. It is acknowledged that the model is constrained by the current accounting processes. The survey evidence has shown that the costs accrued due to partnership and placements are relatively more easy to identify than those internal to the HEI. These school-based costs, using an 'ingredient' (Gray, 1994:12) or 'full' (Pyke, 1998:80) costing approach, comprise several key elements:

- transfer of funding to schools;
- partnership training costs;
- transport costs of students;
- quality assurance (tutor) costs;
- transport costs of tutors;
- communications costs; and
- administration costs.

These are consistent with the categories identified by the TTA (1999). In ABC (activity-based costing) terminology these elements should not be taken to be cost drivers in the definition applied by Innes and Mitchell (1991:22) or DeHayes and Lovrinic (1994:82) but as cost centres as defined by Lucey (1996b:111) in the sense that they are an arbitrary gathering together of costs. At this stage, it is a matter of gathering together the various input costs that are the basis of educational activities leading towards the outputs that will be the ultimate focus of the costing exercise.

The questionnaire revealed that respondents in all institutions were aware of and could identify the funds transferred to schools as a payment for partnership, regardless of whether they were formally costing their courses or not. It is one of the few areas where the information is readily and publicly available. The length of the placement can be seen as the main cost driver behind the level of payments made to schools. The different fee, for each of the year groups, is not only a factor of the 'usefulness' of the student to the school, but also of the length of the placement. As a result of the interview responses, it is clear that this link between the fee paid to school and the length of placement is often made more explicit in other institutions with the identification of a 'weekly' or 'daily' rate.

Partnership Costs	**Year One**		**Year Two**		**Year Three**		**Totals**	
	£ (per student)	**No. of stdnts**	**£ (per student)**	**No. of stdnts**	**£ (per student)**	**No. of stdnts**	**£ (total)**	**students (total)**
Full	200	162	175	148	150	136	78,700	446

Table 5.1 Partnership Costs – transfer of funding to schools

Source: West Anglia 1998a

This table, based upon data from table 4.2, indicates the position where all students are placed in full partnership schools. It is a position where there is maximum transfer of funding to schools, and a minimum use of staff for school-based student supervision. Where all the students are placed in associate partner schools, then no funds would be transferred and there would be a significant rise in the need for tutors to become involved in the supervision as well as the quality assurance roles. It is a point between these two extremes that will be the actual position. Currently almost 75% of placements are with full partner schools, with an aim to increase this to 100% during the next academic year, though the actual number of 'partner schools' is not expected to rise significantly. If this proportion were applied to these figures then the actual transfer of funding can be calculated to be £59 025 (see Table 5.5, row 1). According to the findings of the questionnaire and the interviews, it was these costs that made the institutional management acutely aware of the costs of the school based elements of ITT. When these sums, previously internal to the institution, began to be paid externally to schools the scale of costs became apparent.

Given the information presented on page 97, annual training for partnership schools is costed in terms of the tutor time required. Essentially 82 hours of tutor time results in a total cost of £5 330 (see Table 5.5 row 2). The annual up-date will have the additional costs of any HE based session

and all will have associated communication and administration costs, which are included as discrete headings below.

From the questionnaire responses and, subsequently from the interviews, there was strong evidence of most course leaders being very aware of the costs of partnership training. Some institutions have chosen to 'hide' these costs by making payment in kind rather than cash. Schools are either given 'vouchers' or 'credit' with the institution to be exchanged for admittance to professional development courses, they are offered consultancy or, in one case (P6) mentors receive accreditation for 'prior learning' in recognition of their role.

Quality assurance procedures continue to require the presence of tutors in schools. The calculations in Table 5.2 are based upon the information presented in Table 4.2.

Tutor costs based upon £65 per hour (partnership)	**Year One (per student)**		**Year Two (per student)**		**Year Three (per student)**		**Totals (per student)**	
	Tutor Cost (£)	**Tutor Hrs**	**Tutor Cost (£)**	**Tutor Hrs**	**Tutor Cost (£)**	**Tutor Hrs**	**Tutor Cost (£)**	**Tutor Hrs**
Associate	325	5	390	6	325	5	1,040	16
Full	130	2	195	3	195	3	520	8

Table 5.2 Cost of Tutor Time per Student for the Different Partnership Models

Source: Based upon West Anglia 1998a

In the same way that maximum and minimum figures can be calculated for partnership costs (associate and full partnerships), the same can be achieved for tutor costs. Table 5.3, below, presents the tutor costs for each year based upon the type of partnership. As was stated above, in this current year 75% of students are placed with full partner schools, making the ratio of associate to full partnership placements a key ratio.

Tutor costs (partnership)	**Year One**		**Year Two**		**Year Three**		**Totals**	
	Total cost(£)	**Number of students**	**Total cost(£)**	**Number of students**	**Total cost(£)**	**Number of students**	**Total cost(£)**	**Number of students**
Associate	52,650	162	57,720	148	44,200	136	154,570	446
Full	21,060	162	28,860	148	26,520	136	76,440	446

Table 5.3 Total Cost of Tutor Time for the Different Partnership Models

Source: Based upon West Anglia 1998a

A current figure, T, given this ratio, would be:

T= 0.25A+ 0.75F (where A represent the total associate cost, and F the total full cost)

T= £95 973 (see Table 5.5, row 3)

The figure is a product of a number of factors, namely:

- average tutor salary
- maximum permitted hours of 'teaching related duties'
- number of students by year group
- number of visits per students (a factor of the placement length)
- balance between associate and full partnership schools.

It is these factors that are the variables in any decision-making system that management may wish to use to control the cost of tutors within school-based activities. Clearly tutor salaries and maximum hours are controlled by national agreements. The numbers of students has income as well as cost implications requiring that, at all times, the maximum permitted number of students should be enrolled. The aim of the TTA (DFE, 1993) is to see all students placed in full partnership schools, leaving the number of tutor visits as the only tool available to the manager. The decision then becomes a clear issue of cost versus quality assurance. The approach suggested here is one of cost minimisation within constraints concerning quality maximisation, very closely allied to Woodhall's (1987) classification of the purposes of costing. Potentially this is a linear programming problem similar to those approaches to modelling suggested by Rumble (1987) to predict, rather than explain, costs.

Although the cost of tutor transport appears to be determined by number of tutor visits, at a rate of £4.10 per visit, this is purely as a consequence of the aggregate total being apportioned in this way. For the purposes of Table 5.5, row 4, the tutor transport costs for each year group have been calculated on the basis of:

Tutor transport costs = £4.10(number of students)X(number of visits)

From the basic data it was evident that there was a very significant variation between cost for each tutor and for each student. When looking at these variations a certain degree of 'cancelling out' occurs: long journeys with short ones; schools with several students in, schools with one; tutors with small engined cars, those with large. The one factor that clearly stood out was that of the number of visits that needed to be made, which is fixed for any one placement. It is quite possible

that a management decision is taken to only use schools that can offer two or more placements at any one time, or only use schools within a limited radius on major direct routes, or to restrict the mileage rate payable to tutors (transfer the costs). If such decisions are made then a reappraisal will be required.

From the interview responses it was apparent that tutor transport costs varied considerably between institutions, based mainly on their geographical position. One interviewee (P11) identified this as one of their key sources of cost as students were often relocated to other parts of the country for their placements so tutors had to be accommodated in those areas in order to make their visits. At the other extreme, institutions placed within large conurbations claimed this to be a negligible cost. In other cases there were strong indications that some costs were being transferred directly to students, similar to the findings of Bacsich et al (1999). Clearly when generalising this model to institutions beyond the case study institution, such factors need to be acknowledged.

Between the postgraduate and undergraduate courses the effect of such decisions is evident. The decision that a student will be attached to particular tutor for the duration of the course has been made in the case of the postgraduate ITT course (West Anglia, 1997:26). This results in tutors going to many different schools as they follow their students from placement to placement. It frequently results in the three or four students placed in a particular school each having different tutors. So where one visit might be made, four actually take place. All of this is done in the interests of ensuring quality of support, provision and assessment as one tutor follows any one student throughout the duration of the year long course. The undergraduate course makes no such requirement allowing for a more efficient placement of tutors. In fact as a quality assurance issue, tutors are not attached to a particular student for more than one placement. Effectiveness, in terms of the quality of output, (Rumble, 1987:72) must have a higher priority than pure economic efficiency. With 94% of the questionnaire respondents identifying academic staffing as being a key costing factor, most other institutions must be forced into balancing cost with quality.

The cost of student transport is related to the number of days that they are placed in school. In this way the number of days that students spend in school during the course may be classed as an example of a 'cost driver' that might be recognised by Hans (1996). For each day that they are in school, the expenses paid out average £2.24 per student. Total student transport costs are calculated in table 5.4 below, with the totals being taken forward to Table 5.5, row 5.

Transport costs of students	**Year One**	**Year Two**	**Year Three**	**Totals**
Number of students	162	148	136	446
Placement length	40	55	38	133
Cost (student/day)	£2.24	£2.24	£2.24	
Total Cost	£14,515.20	£18,233.60	£11,576.32	£44,325.12

Table 5.4 Cost of Student Transport

Source: Based upon West Anglia 1998a

HEI/school communications are crucial for the health of the partnership, both in terms of relationships and quality assurance. To calculate the cost of printing partnership letters and other partnership documents, whether through reprographics or by computer generated mail merges, it is important to set up systems that will enable the costs to be identified. Currently, as Palfreyman notes, the "poorly developed management accounting systems" (1991:26), prevent this from occurring. Costs need to be communicated and collated in a manageable format and, once installed, tend not to be obtrusive nor should they, in themselves, add significantly to the costs. The case studies by Innes and Mitchell (1990), Howson and Mitchell (1995), and Goddard & Ooi (1998), all indicate that the availability of the data was a key problem. The cost of stationery; envelopes, headed paper and such like, are known and it is little more than a simple clerical task to ensure that this knowledge is provided to those who need it. The use of franking machines make the cost of mailings available very easily, as long as the different courses (or other defined cost centres) batch their letters effectively. Itemised telephone billing may well allow for an effective and efficient means of allocating telephone calls, made to schools, to individual courses.

Since such systems do not exist in the case study HEI, other than as a central cost item, then other less direct means have to be employed. The actual cost involved in collecting information by these means is very considerable, particularly in terms of time. This is unlike 39% of the institutions who responded to the questionnaire for the case of postage, and 56% for the case of printing – though the results do not make it clear if it accounts for all printing or just course handbooks and lecture notes.

The effort required to uncover the cost of each mailing is currently prohibitive given the lack of a co-ordinated approach. The figure of £7.50 per school per annum, for both postage and telephone, relates only to the partnership office and does not take into account any telephone calls made by tutors. Also this figure does not take into account the cost of producing each mailing, although the cost of stationery and reprographics is estimated at £2 per school per year.

Personalised mailings are essential to ensure that the relationship with partner schools is cultivated. As these can only be produced through mail merges on the office machines there is an apparent saving to the operation. Less printing goes through the central reprographics channel, which reduces costs in that area, but there is an increase in the demand for stationery and computer printer ink cartridges. More significantly there is a cost in staff time required to collate the documentation. The more efficient use of time and expertise within the institution as a whole for such an activity has not been fully investigated. Comments made during the interviews suggested that some institutions go further by presenting the teachers who are to receive students not only with the documentation but also folders, note pads or pens and pencils embossed with the name or crest of the institution.

It should be noted that a proportion of the initial enquiries regarding the placement of students in a school for the following academic year will be refused, in effect the cost of the reprographics and postage in these cases is 'wasted'. This situation is similar to the costing problem posed by Carr (1994:43) where the costs of responding to unsuccessful students applying to a heavily oversubscribed course can only be seen as being an unproductive drain on resources. A management decision at the case study institution to place students only in schools that would accept a minimum of two students at a time would have considerable cost implications, both in terms of transport costs and communications (both beneficial). This would imply that the number of schools used for student placements, in any one student cohort, is a cost driver that needs to be brought into the costing system.

Financial efficiency must dictate that if a school were to offer three student placements for the year, they should all be for the same cohort as this would reduce communication and transports costs (for both tutors and students), which is consistent with the approach taken by at least four other institutions according to the interviews. Clearly there is a physical maximum number of students that any school can take at any one time, but specialising in a particular year group might also be argued for on grounds of quality as well as efficiency, which would also allow increased familiarity

and comparability with the expectations and assessment of students. In essence this is much the same argument made by Ahumada (1992) concerning teaching group size.

The current level of clerical staffing employed to service all partnership and placement administrative needs (page 100), is rather less than the number suggested by the TTA (1999:6). As briefly stated previously, the proportion of their time devoted to the BA course is calculated on the basis of the number of individual student placements, mainly because the act of allocating places and tutors to students into the database is the single most time consuming element. It needs also to be admitted that the production and collation of mail merges, which are more related to the number of schools, can also be seen to be a key determinant. As with the problems of calculating the costs of communication with partner schools, it is possible to identify and allocate these costs much more accurately to the various courses by relatively simple changes to procedures. Many professions have a need to charge their clients for the time spent working on their cases, and a simple 'booking' system would identify the majority of these costs immediately. Where tasks were being performed that related to more than one course, these costs may be apportioned on the basis of student numbers or student placements – a ratio that can be set at the beginning of the academic year. From the interview responses it would appear that other institutions do not distinguish between the courses as far as administrative costs are concerned.

From an accounting perspective there is a significant difference in the way those different sources of cost are identified and presented in the case study institution. Occasions where funds are physically directed to external bodies for specific amounts for specified duties then the accounting procedures are clear and the amounts are carefully tracked and monitored. Where the costs are aggregated and retained internally until a bulk payment is made, such as staff salaries, telephone and postage, then the true sources are not readily identifiable. Changes to internal costing or billing procedures will be required in order for these costs to be linked to their sources, perhaps in line with those suggested by Pyke (1998) in his review of ABC procedures in the National Health Service. A form of 'internal market' with the billing of costs is also suggested by the work of Goddard & Ooi (1998) in their study of the costing procedures of the University of Southampton Library.

A summary of these costs due to school-based elements of the course in the case study institution is presented in Table 5.5 below. Costs are apportioned according to the assumptions made above, in particular the 3:1 partnership to associate partnership balance of the placements by student

numbers. Following the work of DeHayes and Lovrinic (1994) and Han (1996) it is possible to begin to associate 'cost drivers' with the identified sources of costs. The degree of intricacy provided by DeHayes and Lovrinic (1994:85) of "250 separate tasks costed", will not be repeated here due to the unavailability of appropriate information. The cost driver, 'proportion of full partnership placements', has been bracketed because it is envisaged that this will cease to be a factor when all placements are in 'full' partnership schools in the very near future.

Source of Cost	Year 1 (£)	Year 2 (£)	Year 3 (£)	Total (£)	Cost Driver(s)
transfer of funding to schools (Table 5.1)	24,300	19,425	15,300	59,025	number of students (proportion of 'full' partnership placements)
partnership training costs				5,330	number of schools
quality assurance (tutor) costs (Table 5.3)	28,958	36,075	30,940	95,973	number of students number of student visits (proportion of 'full' partnership placements)
transport costs of tutors (see page 119)	2,027	1,987	2,012	6,026	number of student visits number of students number of schools
transport costs of students (Table 5.4)	14,515	18,234	11,576	44,325	number of students number of schools length of placement
communications costs (apportioned on the basis of student numbers)	1,567	1,432	1,316	4,315	number of students number of schools
administration costs (apportioned on the basis of student numbers)	5,004	4,571	4,200	13,775	number of students number of schools
Totals	76,371	81,724	65,344	228,769	

Table 5.5 Aggregation of Costs for the BA(QTS) Course

Values will be calculated for the coefficients of the cost drivers identified in Table 5.5 during the development of a formulaic approach to the costing of the school-based elements of the BA(QTS) course (Table 5.7). If all students were to be placed in full partnership schools, as required by the TTA (DFE, 1993), there would be a reduction in tutor costs and an increase in the transfer of funding to schools, the result of which can be seen in Table 5.6.

Source of Cost	Year 1 (£)	Year 2 (£)	Year 3 (£)	Total (£)
transfer of funding to schools (Table 5.1)	32,400	25,900	20,400	78,700
partnership training costs				5,330
quality assurance (tutor) costs (Table 5.3)	21,060	28,860	26,520	76,440
transport costs of tutors (see page 119)	1,328	1,820	1,673	4,821
transport costs of students	14,515	18,234	11,576	44,325
communications costs	1,567	1,432	1,316	4,315
administration costs	5,004	4,571	4,200	13,775
Totals	75,874	80,817	65,685	227,706

Table 5.6 Aggregation of Costs for the BA(QTS) Course (full partnership)

The difference in costs, £1053, represents a 0.46% reduction on the mixed partnership model, representing less than 0.1% of the course income. As a very rough indication of the scale; the costs of school-based elements account for a little under 20% of the income derived from student fees and 26% of the course content (by duration). If the payments here are compared with those used by the TTA (1999:6), where calculations would confirm costs at 28% of income, they can be seen to be relatively low. By comparing the figures, element by element, it can be seen that the case study payments are relatively low in each area. There are two obvious possibilities for the case study data; either they are a significant underestimate of the true costs due to poor data collection techniques, or it presents the school-based element of the case study course as a highly efficient operation.

There is some difference in the means of estimating costs and the TTA does include one element not included above, namely the "staff organising costs ... *of £25,700*" (TTA, 1999:6) – the cost of the academic to manage partnership (80 of SL with on costs). Until recently, the academic performing this role did so within a 100-hour remission from teaching duties (effectively at a cost of £6 500). Another notable difference is the £30 000 that the TTA illustration allocates to provide 'teaching cover' for teachers attending training, which is avoided, or more correctly "transferred" (Bacsich et al, 1999) by the case study institution by organising these sessions at 'twilight' (after the school day has ended). According to the interview responses, this might be an increasingly common trend, although two interviewees claimed, at least in part, to be using students to cover staff attending training sessions.

The identification of cost drivers can be seen as a significant step forward towards the development of a practical costing system. Once these are determined, their values, along with certain fixed constants and multipliers, can be combined to provide costing data for managers. The importance of this approach, from an expenditure perspective, was discussed in the review of the study carried out by Ahumada (1992) that focused on direct teaching courses. By involving cost drivers, an ABC approach can also be incorporated.

Derivation of a formulaic approach to costing the case study institution

School-based elements

It is now possible to reduce each school-based cost element within the case study institution to a mathematical formula based upon the inputs and identified cost drivers. Initially the situation will be simplified with the assumption that all placements are in 'full partnership', which will avoid the complications that a mixed partnership approach brings with it. The use of notation below is consistent with the approaches used in past costing studies, most notably those of Pettifor (1974), Snowden and Daniel (1980), Sharma (1986), Rumble (1987) and Lloyd et al (1988) (allowing for their errors in the use of terminology).

Using the same order for the cost items as in Table 5.5:

Transfer of funding to schools = $C_1S_1 + C_2S_2 + C_3S_3$

Where C – transfer per student (for each year group)

S – number of students (for each year group)

Partnership training costs = adP_a

Where a – coefficient of the average training cost per school (0.55)

P_a – number of partnership schools

d – average hourly pay rate of tutors

Tutor costs = $d(V_1S_1 + V_2S_2 + V_3S_3)$

Where V – number of visits per student (for each year group)

Tutor transport costs = $e(V_1S_1 + V_2S_2 + V_3S_3)$

Where e – average cost per visit

Student transport costs = $b(L_1S_1 + L_2S_2 + L_3S_3)$

Where b – average daily transport cost

L – length of placement (for each year group)

Communications costs = $fP_a + g(S_1 + S_2 + S_3)$

Where f – cost element per school

g – cost element per student

Administration costs = $hP_a + j(S_1 + S_2 + S_3)$

Where h – cost element per school

j – cost element per student

By combining these functions an expression for total school based costs can be derived:

$$T_{sbc} = P_a(ad+f+h) + (g+j)(S_1 + S_2 + S_3) + (d+e)(V_1S_1 + V_2S_2 + V_3S_3) + b(L_1S_1 + L_2S_2 + L_3S_3) + C_1S_1 + C_2S_2 + C_3S_3$$

Which can be reduced to:

$$T_{sbc} = P_a(ad+f+h) + (g+j)(\Sigma S_i) + (d+e)(\Sigma V_i S_i) + b(\Sigma L_i S_i) + \Sigma C_i S_i$$

Though rather different in form than the models presented by Rumble (1987) or Snowden and Daniel (1980) who focused upon distance learning packages, this suggests an approach similar to that of Sharma (1986), who offers an expression for unit, rather than total cost. Unit cost (per student) can be found by presenting the function in terms of ΣS_i, namely:

$$T_{sbc}/\Sigma S_i = P(ad+f+h)/ \Sigma S_i + (g+j) + ((d+e)\Sigma V_i + b\Sigma L_i + \Sigma C_i)/n$$

Where n is the number of cohorts.

Clearly the actual unit cost will vary from year group to year group due to the different structures of the school-based element in each year of the course so this must purely be treated as an average cost. It is possible to take this expression one stage further to arrive at the marginal school-based cost of a student, but at this point it does become more important to identify which year group that 'marginal student' is to be associated with. For this reason there are three marginal cost functions, dependent upon the year group:

$M_{sbci} = g+j + (d+e)V_i + bL_i + C_i$

This is a very different function to the one offered by Lloyd et al (1988:8), due to their erroneous use of marginal cost notation. Clearly there will come a point where the addition of a 'marginal' student will result in the demand for an extra placement which cannot be satisfied by existing partnership schools. At this point a 'step cost' will be incurred along the lines described by Lucey (1996b:295) and Pyke (1998:79). The addition of an extra partnership school, the marginal cost of a partnership school, will be given by the expression:

$M_{Pa}= ad+f+h$ - training, communication and administrative costs per school

Unfortunately it would be impossible to predict at what point this step will take place. There might well be surplus places but they would be inappropriate for the requirements of the particular student. So on quality grounds, even where there is surplus capacity, extra capacity will be sought.

Table 5.7 provides a summary of the current data from the case study institution, which can be applied to these cost functions to reveal the cost driver coefficients.

Cost element	Year One	Year Two	Year Three
Student numbers (S) *Table 5.1*	162	148	136
Transfer of funding (C£) *Table 4.2*	200	175	150
Length of placement (L) *Table 5.4*	40	55	38
Number of tutor visits (V) *Table 4.2*	2	3	3
Training cost coef. per school (a£) *p96*	0.55		
Student transport cost (b£) *Table 5.4*	2.24		
Hourly tutor pay (d£) *page 98*	65		
Tutor transport cost (e£) *page 99*	4.10		
Communication cost per school (f£) *p101*	9.50		
Communication cost per student (g£) *p99*	6.50		
Admin cost per school (h£) *page 100*	55.50		
Admin cost per student (j£) *page 100*	12.35		
Number of partner schools (P_a) *page 95*	149		

Table 5.7 Cost Coefficient Values for School-based Elements of the Course

The total cost function becomes(refer to appendix 2):

T_{sbc} = £227,705.57

The reason for the difference between the figure obtained for the cost function above and that identified within Table 5.6, less than £1.00, can be explained by rounding errors in the derivation of the cost coefficients.

The information contained within Table 5.7, and the total school-based cost function, can be incorporated into a spreadsheet with embedded functions. The calculation of student and partnership school marginal costs is included in appendix 2. This demonstrates that the 'marginal student' will have the same (or similar) effect on costs whichever cohort they join. The spreadsheet will allow managers to model and calculate the effects of changes to the cost elements in respect of the total cost of the school-based aspects of the course. While a 10% increase in tutor salaries will lead to a 3% increase in overall school-based costs, a requirement for extra quality assurance visits to schools by tutors will be substantially more. For example, as a result of, or in the build-up to, an external inspection perhaps, an extra visit per student per year group will incur additional costs of over £30,000 (or 14% of the current school based costs).

HEI-based costs within the case study institution

HEI-based costs, the academic element of teacher education, are the cost factors that would be included in the costing of many other undergraduate courses. The staffing costs of teaching,

managing, and administering the course can be coupled to the cost of accommodating the course and providing such local and central support services as required. To approach the identification of these costs in a similar way to the analysis of school-based costs above, using a 'bottom-up' (Kedney, 1991) or 'ingredient' (Gray, 1984) costing system requires that the key input-cost elements be clarified.

- Teaching costs
  - Staffing
  - Accommodation
- Course management and administration
- Academic services (library, computing)
- Reprographics
- Central institutional costs

The final category, central institutional costs, is an amorphous and ill-defined collection of costs. The responses from both the questionnaires and the interviews suggest that institutions do not have sufficiently well developed financial systems for dealing with certain areas of cost, a confirmation of the findings of Palfreyman (1991). Also that institutional 'top-slicing' appears to be of a rather arbitrary nature, consistent with Howson and Mitchell (1995) and Goddard & Ooi (1998). The case study institution, as can be seen from the limited and increasingly unreliable financial information offered above in chapter 4, is no different in this respect. It is as if central costs, the 'top-slice', are treated as a miscellaneous category in the institution's accounts, where costs that cannot easily be attributed to their sources are arbitrarily spread across all income generating activities as noted by Horngren et al (1994).

Teaching costs

One of the most significant differences between the approach taken to identify and cost the school-based elements and the HEI based elements of the course is the effect of stepped costs, as defined by Lucey, (1996b:295) and Pyke (1998:79). Virtually all aspects of the school-based elements of the course are based around individual placements (individual students), leading to a uniform and continuous marginal cost function, except in the cases where an extra partnership school is required as a result. Due to effective teaching group sizes, the marginal cost function for HEI-based aspects is not likely to be uniform and continuous. The classical stepped total cost curve (figure 2.5) is unlikely to be a realistic representation. There is likely to be a degree of inertia between different

levels in an attempt to maintain continuity within teaching groups. So where '30' is the designated maximum group size, it is unlikely that the 151st student to enrol will lead to the establishment of a 6th teaching group. It is equally unlikely that the loss of the 121st student will lead to the reorganisation of the five groups into four. This implies a stepped total cost curve similar to figure 5.1.

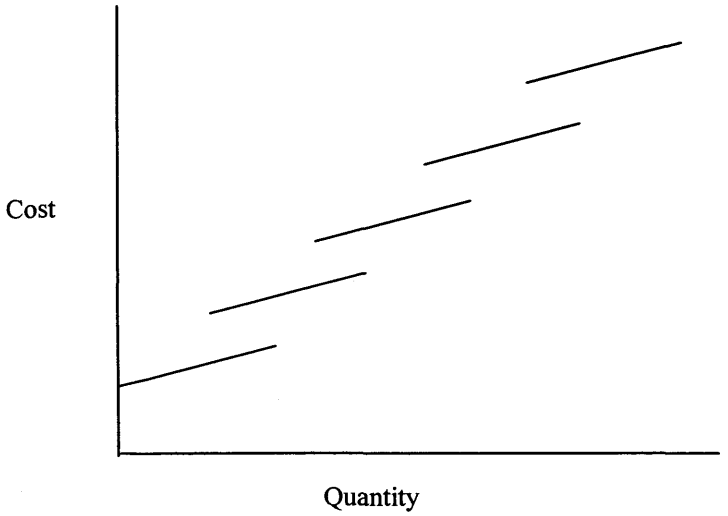


Figure 5.1
Stepped Total Cost

From this version of the stepped total cost curve it can be seen that for certain, particular quantities (numbers of students) two levels of total cost are possible, due to the inertia of moving from one cost function to the next. It should be noted that this is entirely a matter of quantity and has nothing to say concerning quality. Clearly such issues will complicate the calculations of costs for the HEI-based elements of the course. It will be the number of groups in any one cohort that will be the crucial factor, rather than any concept of maximum group size (although this will be a guiding figure).

Data from the case study institution will now be used to illustrate and provide the rationale for the development of a normative model, as described by Lucey, (1996 a:3) to examine the teaching based costs. Although student numbers in the three cohorts at the case study institution vary from 136 to 162 (West Anglia, 1998a), a range of 26, each year group is taught in six teaching groups for the majority of the time. The other main alternatives to this form of delivery are either a lecture delivered to an entire cohort or individual tutorials. Whereas large lecture groups are employed on a regular basis for both the subject and professional studies modules, this is not possible for the subject specialist groups as the cohort is divided into their chosen specialist areas. Within both

professional and subject specialism studies, allowance is made for individual tutorials to monitor professional development (1 hour per student per year) and support dissertation preparation (1 hour per student in year 3). The data in Table 4.1, can be re-presented here in terms of tutor hours rather than student hours, giving both maximum and minimum figures dependent upon the proportion of teaching delivered in group or large lecture format:

	Tutor Contact Hours							
Studies	**Year One**		**Year Two**		**Year Three**		**Totals**	
	Group	**Lecture**	**Group**	**Lecture**	**Group**	**Lecture**	**Group**	**Lecture**
Subject	130	to 780	160	to 960	110	to 660	400	to 2 400
Professional	211	to 456	187	to 382	175	to 370	573	to 1 208
Subject Specialism	180		300		370		850	
Totals	521	to 1416	647	to 1642	655	to 1400	1 823	to 4 458

Table 5.8 Tutor/Student contact hours by mode of delivery

Derived from: West Anglia 1998a

These tutor hours can be presented in terms of 'tutor years' (at 550 hours per year) or in terms of the salary cost (at £65 per hour) – as derived from data supplied by the case study institution..

Delivery Mode	**Tutor Hours**	**FTE Tutors**	**Salary cost**
Lecture format	1 823	3.3	£118 495
Seminar format	4 458	8.1	£289 770

Table 5.9 Tutor cost by mode of delivery

Derived from: West Anglia 1998a

Clearly the actual figure for the case study institution will be somewhere between those two extremes and will be dependent upon the delivery format determined by the course team – the balance between large lectures and seminar group teaching. The information presented in Table 5.9 is the result of a number of input factors, only two of which, student numbers (S_i) and hourly tutor pay (d), were contained within the cost function for school-based costs. The other factors are a combination of the student contact hours matrix (Table 4.1), number of groups within each cohort, individual tutorial allowance and delivery mode. In summary these cost elements are:

S_i Student numbers in each cohort (i)

d(£) Hourly tutor pay

B_i Number of subject contact hours for each student in each year group

B_{li} Fraction of subject contact hours delivered as lectures in each year group

P_i Number of professional contact hours for each student in each year group

P_{li} Fraction of professional contact hours delivered as lectures in each yr. group

P_{ti} Number of professional contact hours delivered as individual tutorials per student in each year group

L_i Number of specialism contact hours for each student in each year group

L_{ti} Number of specialism contact hours delivered as individual tutorials per student in each year group

G_i Number of teaching groups in cohort i

The cost function that is derived from these inputs to provide a figure for the salary costs of tutors teaching on the course (A) is:

$$A = d\Sigma(B_i (B_{li} + G_i - G_iB_{li}) + P_{ti}S_i + (P_i - P_{ti})(P_{li} + G_i - G_iP_{li}) + L_{ti}S_i + G_i(L_i - L_{ti}))$$

If the aim of the course manager was to minimise A, given the constraint of student contact entitlements, then

- B_{li} and P_{li} would tend towards 1 (all teaching to be delivered through cohort sized lectures), and
- P_{ti} and L_{ti} would tend towards 0 (minimise the number of individual tutorials offered).

Clearly a balance must be found between cost efficiency and educational effectiveness - a certain level of quality must be maintained and delivered. Obtaining this balance was the key thought behind the calculations of Birch (et al, 1977), which examined the factors determining average class size. Once basic entitlements (quality thresholds) can be met within the constraints of cost, then the aim, according to Woodhall (1987), is to maximise effectiveness (quality). In the above cost function, only three teaching formats are acknowledged – individual, group and cohort. Other sized teaching units are possible, half and double groupings for example, but those options will not be explored here as further complications to the cost function would not be desirable at this point.

By adapting parts of this cost function it is possible to incorporate the cost of the teaching rooms. It is envisaged that individual tutorials will take place within tutors' offices, which is problematic from the costing point of view because these were the only rooms for which it was not possible to obtain a 'hire cost'. The options are to either ignore the costs of the tutors' rooms entirely (assume that they are within the tutor 'hourly rate') or to attach a nominal sum, say £5 per hour, to their use.

If the cost of hiring teaching rooms (R), is assimilated into the teaching cost function with the inclusion of three additional parameters:

R_t Cost of hiring a tutorial room for one hour

R_s Cost of hiring a seminar room for one hour (£25)

R_l Cost of hiring a lecture theatre for one hour (£80)

$R= B_i (R_lB_{li} + R_s(G_i - G_iB_{li})) + R_tP_{ti}S_i + (P_i - P_{ti})(R_lP_{li} + R_s(G_i - G_iP_{li})) + R_tL_{ti}S_i + R_sG_i(L_i - L_{ti}))$

Although this lacks the level of sophistication in the model developed by DeHayes and Lovrinic (1994:83), who took a pure ABC approach, it is beginning to identify and cost activities in greater detail. This lack of detail in the costing processes identified by the questionnaire in other institutions, was one of the main reasons cited by the interviewees for not being able to base their course management decisions on the costing system.

Table 5.10 provides a summary of the current data from the case study institution, which can be applied to these cost functions for illustrative purposes. The extent to which this approach can be generalised for use in other institutions is clearly dependent upon the form and availability of data. This is a problem that was encountered by many of the respondents to the questionnaire and expanded upon by interviewees as being one of the key reasons why they were unable to cost their courses.

Cost element	Year One	Year Two	Year Three
Student numbers (S) *Table 5.1*	162	148	136
Subject studies contact hours (B) *Table 4.1*	130	160	110
Professional studies contact hours (P) *Table 4.1*	50	40	40
Specialist studies contact hours (L) *Table 4.1*	30	50	40
Number of teaching groups (G)	6	6	6
Fraction of subject studies taught in lectures (B_l)	0.1	0.1	0.1
Fraction of prof. studies taught in lectures (P_l)	0.2	0.2	0.5
Professional studies tutorials (hrs/student) (P_t) *p94*	1	1	1
Specialist studies tutorials (hrs/student) (L_t) *p94*	0	0	1
Hourly tutor pay (d£) *p98*	65		
Hire of tutorial room (R_t£) *p133*	5		
Hire of seminar room (R_s£) *p102*	25		
Hire of lecture theatre (R_l£) *p102*	80		

Table 5.10 Cost Coefficient Values for HEI-based Elements of the Course

Substituting for the data in the cost function A (tutor salary costs)

$$A= d\Sigma(B_i (B_{li} + G_i - G_iB_{li}) + P_{ti}S_i + (P_i - P_{ti})(P_{li} + G_i - G_iP_{li}) + L_{ti}S_i + G_i(L_i - L_{ti}))$$

Results in: A= £303,712.50

And the cost of hiring teaching rooms (R)

$$R= \Sigma B_i (R_lB_{li} + R_s(G_i - G_iB_{li})) + \Sigma R_tP_{ti}S_i + \Sigma(P_i - P_{ti})(R_lP_{li} + \Sigma R_s(G_i - G_iP_{li})) + \Sigma R_tL_{ti}S_i + \Sigma R_sG_i(L_i - L_{ti})$$

Results in:
R= £94,413

Therefore the cost of the taught elements of the course is A + R = £398,125.50
The average academic cost per student ((A+R)/ ΣS_i) can be calculated to be £892.66.
Using the figures from the case study institution, it can be calculated that the taught elements (A+R) account for a little under 36% of the income generated by the course (£1,111,434). The marginal academic cost though is significantly lower as the only cost that an additional student accrues, assuming that there are no changes to the number of groups, is the cost of the tutorials, detailed in the expression:

$$MC = P_{ti}(R_t + d) + L_{ti}(R_t + d)$$

Which is a cost of £70 for years one and two and £140 for year three students.

Over the range of operation that this cost function claims validity for (where there are six groups per cohort), the curves will be linear. It is only when the size of the student cohort extends from the current boundaries (136 to 162) and that either five or seven groups need to be considered. The marginal cost of the student who causes the introduction of an extra group will be more significant. The step costs can be calculated at the margins by interpolating the cost functions A and R for G (the number of teaching groups):

$$A_G= d\Sigma(B_i (B_{li} + G_i - G_iB_{li}) + (P_i - P_{ti})(P_{li} + G_i - G_iP_{li}) + G_i(L_i - L_{ti}))$$

and

$$R_G = B_i (R_l B_{li} + R_s(G_i - G_i B_{li})) + (P_i - P_{ti})(R_l P_{li} + R_s(G_i - G_i P_{li})) + R_s G_i(L_i - L_{ti}))$$

Thus increasing the number of groups from six to seven in year one of the course will have a marginal cost implication of £16,758. Whereas reducing the number of groups in year three (cohort of 136 students) will result in a cost reduction at the margin of £14,175. The effect of increasing or reducing the number of groups in year two is even more extreme: £26,508 – a figure which is more than ten times the income derived from that marginal student. Clearly a strong arguement for unit costing, so favoured by Carr (1994). From these figures it is apparent that the step costs of the marginal student that increases (or reduces) the number of teaching groups within any cohort is considerable. For this reason it is of crucial importance to have a cost effective cohort size, confirming, most convincingly, the educational step costs identified by Lucey (1996b) and Pyke (1998).

The effects of changing the balance between lecture and seminar-format course-delivery approaches are also considerable. Currently 10% of the subject studies course content is delivered through a lecture format. If this were to be doubled to 20% (and for every 10% increase there after) savings of £15,800 would be possible or 4% of the total teaching cost (A+R). A similar percentage change for the proportion of lectures used on the professional studies course would lead to a £8,916 change in costs (or 3%), a point that was not lost on Birch et al (1977).

Changing the number of hours that each student is entitled to receive as individual tutorials in professional studies by one hour per student per year will result in cost changes of £27,725 or 7% of total teaching costs. These findings are consistent with the cost factors identified by Ahumada (1992). These factors are supportive of the importance of unit costing for "informing and guiding management in resource utilisation and monitoring" (Carr, 1994:28) to help course managers appreciate the financial implications of their decisions.

Administrative costs

Moving onto another of Amumada's key cost factors, the cost to the department of course administration, it becomes more difficult to accurately apportion costs as some individuals perform similar tasks over a range of different courses within the case study institution. Although the memo identifying the allowances for these duties within the case study institution (see chapter 4) also identified the course to which each element applied, this may not have been an accurate reflection

of the reality of the situation. For example the 50 hours actually allocated to each subject leader was formally distributed as 25 hours for BA(QTS), 10 for B.Ed. and 15 for PGCE, though the reasoning behind this is not made explicit. This compares with the way in which administrative and clerical tasks are distributed between the available personnel by identifying the key person for each for each course but with the work being distributed between the 'pool'. The actual staffing costs in this area are calculated as a proportion of the aggregate number of students serviced by the department, unfortunately similar to the "peanut butter costing" so derided by Horngren et al, (1994:114). Without the staff in question physically 'clocking on' to courses as they carry out tasks and duties in relation to them it would be impossible to identify more "reasonable criteria" (Stone, 1992:6). It is yet another example of where there "is no reliable standard on which to base a cost estimate ... *or* ...there is a range of cost estimates" (Levin, 1983:89).

Accommodation costs can be included by incorporating a room cost structure similar to the one used for costing seminar and tutorial activity. If the 625 academic management hours are treated as tutorials, then the cost would be £3,225. On the administrative and clerical side, the room space taken up is equivalent to a seminar room (£25 per hour). This is used for 8 hours per day, five days per week for 49 weeks of the year (allowing for institutional shutdown days), of which 50% can be attributed to the BA course - £24,500. Most of the equipment used is classed as 'ICT' and is part of the rolling renewal programme. There are still many discrepancies here, in particular communication costs (postage and telephone) which are accounted for centrally within the institution. Again the problem of a lack of appropriate financial information, as identified by Palfreyman (1991), will lead to an inaccurate assessment of true costs, and was one of the key concerns faced by Goddard and Ooi, (1998) and Innes and Mitchell (1990).

The course management and administration costs (staffing), M, can be shown as:

$M = Cl + 1960R_s + 625(R_t + d)$

Where Cl – clerical and administrative salaries (from page 101)

1960 – number of hours that the school office will be open in a year

625 – number of tutor hours devoted to management tasks

M = admin and clerical cost + course management costs

= 48 750 + 49 000 + 43 750

= £141,500

The extent to which this cost function is responsive to changes in student numbers is unclear. Within the case study institution the size (in student numbers) and complexity of each of the courses is likely to have had an effect on the management decision concerning the allocation of staffing to courses. So it is equally likely that significant changes in student numbers will have an effect on these costs, but the degree to which an increase or decrease in student numbers by one, or even ten, will affect the actual cost of managing the course cannot be calculated with any confidence. An alternative view is to accept that the existence of any course, regardless of size, has an appreciable fixed cost and that any addition to student numbers, at the margin, is virtually 'cost free'. Again it was Ahumada (1992) who noted that the number of courses offered by a department was a significant factor in the determination of departmental costs – the fewer the courses offered, for a set number of students, the more efficient the administration was. From this it would seem that the change in the management of the BA(QTS) from two courses to one, was a very effective move in terms of cost management. To be consistent with the findings of Ahumada, every academic department should always be looking to offer fewer courses with larger cohorts.

Although consumables and reprographic costs might appear to be directly related to student numbers, it is possible for some of these costs to relate more directly to groups or even the cohort rather than individuals. Booklets and other materials are produced for use with groups during teaching sessions and are not retained by the individual students. From this it is possible to determine that consumables and reprographic costs (J), calculated as £35 (£10 and £25, respectively), per student per annum from aggregated data (£15,610) is a factor of both student numbers and the number of groups. It is not possible to determine the balance between the influence of individuals and groups on cost from the data that was available. An estimate of the balance would place 90% of these costs on an individual student basis with the remaining 10% as a result of the number of groups. Given these assumptions the cost function would be in the form:

$J = x\Sigma S_i + y\Sigma G_i$ where x and y are cost coefficients giving: $x\Sigma S_i = 9y\Sigma G_i$

Substituting for known variables x=31.5 and y=86.7

So $J = 31.5\ \Sigma S_i + 86.7\Sigma G_i$ =£15,610

This gives a marginal cost in respect of students as £31.50 and a marginal cost in respect of the number of groups as £86.70.

Academic services

The funding delegated for library and computing services is only really provided to cover the cost of equipment renewal - books and computer soft and hardware that relate specifically to the courses - rather than the provision of the library and IT services. The study by Goddard and Ooi (1998) has demonstrated both the importance and difficulties of costing library services and allocating those costs to individual departments. Although figures for both library and IT were expressed in *per capita* terms in the previous chapter, both were aggregate figures apportioned to courses through student numbers. It may appear that the marginal cost, for each student, is £30 (£15 for each- library books and IT), but the reality is that the extra student will not result in an increase in costs (or a further devolution of funding). It is likely that further funding will be forthcoming when enrolment reaches a certain point, but this may be just as likely to come about as the result of internal, political lobbying as on purely financial grounds, a point noted by Hans (1996:179). For this reason IT and library books are best taken as a fixed cost (K), in respect of the course of £13,380 (£30 multiplied by 446 students).

Completing this 'bottom-up, ingredient' approach to costing (Kedney, 1991 and Gray, 1984) by an aggregation of; teaching costs (A), academic room costs (R), course management costs (M), consumable materials and reprographics (J) and central costs (K) produces a figure for the HEI-based elements of the course:

T_{HEIB}= A +R+M+J+K = £568,615.10 (see appendix 3 for calculations)

Clearly there are substantial costs within the HEI that are not accounted for with this system. None of the centrally costed items such as security, grounds maintenance, institutional marketing and faculty and institutional management costs are accounted for here, nor can they be with the level of information available, a situation that Howson & Mitchell (1995) attempted to address. Certain costs, which are directly attributable to the course, such as coursework marking, interviewing of prospective students, attending course meetings, course planning and preparation, are included within the existing cost calculations as contractual obligations as a result of teaching on the course.

What is not included is any acknowledgement of the costs peripheral, but related to the course, such as academic research, professional development and training and conference attendance. Income derived from the students on the course must be used to fund such activity but there is no clearly identifiable link between the income from the course and the expenditure on such activities. In 17% of the questionnaire responses, staff development was included as one of the costing factors,

implying that other institutions do have systems in place for making such a link. The system currently used in the case study institution, of all research and staff development funding being held centrally and being redistributed through cost centre (faculty) budget bids, inevitably introduces an element of cross subsidy between income generating activities. Since no published record of these internal transactions is made available, it is not possible to assess the extent to which funding returns to the source of the income generation.

This is just one of the ways in which the lack of connection and responsiveness between the income generation and expenditure facets of a 'cost centre' reduces the "incentive for individuals to economise on the use of university resources" according to Lloyd (et al, 1988:6). If individuals cannot see how the income from their courses stays close to them when savings are made, then they are less likely to be interested in attempting to find ways in which the course may be delivered more efficiently. Course 'owners' need to retain a greater element of control over the 'surpluses' resulting from their courses.

This model for the HEI elements of the course is very similar in its findings to the work of Ahumada (1992)and has parallels with the studies focusing on the Open University (Birch, Verry, Verry and Davies, and Laidlaw and Layard) and The University of the Air, Japan (Hiromitsu Muta and Takahiro Saito). Though the work of Ahumada has a wider scope, making calculations based on a range of courses rather than one, the key factors determining cost are very similar – student/staff ratios and class size

The model offered here is much more simplistic than that proposed by DeHayes and Lovrinic (1994), which costed "more than 250 separate tasks" (p85), though it is more detailed than the one proposed by Shama (1986). The marginal cost approach from Lloyd (et al, 1988) is not directly comparable, as it includes elements which do not vary directly with student numbers. The function derived by Birch (et al, 1977) is a useful starting point, identifying many key elements, but fails as an approach to course costing due to its inability to identify key data sources. An attempt to remain true to the purpose of the exercise, as defined by Carr (1994) and Woodhall (1987), is largely achieved, with clear indications that the approach will enable course managers to make more informed resource allocation decisions. It is recongnised that, by the use of cost estimates and the abitary apportionment of costs, the concerns raised by Levin (1983) are embedded within the system.

A unified model for costing undergraduate ITT

Bringing together both the school-based and HEI-based elements of the course presents a realistic presentation of the key, direct sources of cost. It remains a model for calculating and analysing the effect of the direct costs of the course due to the unreliability of data concerned with the central institutional costs that must be supported by all income generating activities within the HEI. A spreadsheet, containing both HEI and school-based cost functions, is presented in Appendix 4. Using such a spreadsheet dynamically, the effects on costs of varying the input data can be demonstrated in terms of changes to total cost, marginal cost and marginal cost as a percentage of the income obtained from the marginal student (only possible where the maximum permitted enrolment has not been reached). Potentially this does meet the criteria for the model presented on page 114, derived from Woodhall (1987) and Carr (1994).

The combined cost functions provide a figure for the total cost of the course at the case study institution:
T_{sbc}+ T_{HEIB} = £796,320.67(appendix 4) from a calculated income of £1 111 434 leaving a surplus of £315 113 (28% of income or £707 per student).

The marginal cost of a student, teaching group or partnership school, in each of the year groups, can be represented by the cost functions:

$M_{Ci} = g+j + (d+e)V_i + bL_i + C_i + (R_t+d)(P_{ti}+L_{ti}) + x$ (student marginal costs for cohort i)

$M_{Gi} = (R_s+d)((B_i(1-B_{li}) + (P_i(1-P_{ti}) + (L_i-L_{ti})) + y$ (group marginal costs for cohort i)

M_{Pa}= ad+f+h (partnership school marginal costs)
(derivations shown in appendix 5) Substituting data contained in appendix 4 within the cost functions results in the marginal cost figures contained in Table 5.11 below:

Marginal Cost	Year One	Year Two	Year Three
Student marginal cost	£548.15	£625.85	£632.77
Student marginal cost as % of fees	22%	25%	25%
Teaching group marginal cost	£16,844.70	£26,594.70	£14,261.70
Teaching group marginal cost as % of fees	676%	1067%	572%
Partnership Schools marginal cost	£100.77		
Partnership Schools marginal cost as % of fees	4%		

Table 5.11 Student, teaching group and partnership school marginal costs

Whereas the marginal student has costs of roughly 25% of their fees along the 'normal' cost curve, if that student also results in the necessity of an extra teaching group, the marginal costs rise to between 6 and 11 times the fee income. From the alternative perspective it can be seen that the loss of a student (and their fee) will result in the loss of income four times that of the marginal cost savings made. The only point at which the loss of a student would result in a positive saving for the course would be where that student results in a reduction in the number of teaching groups and a consequential reduction in the number of academic staff employed.

The 'teaching group' effect only has a particularly marked impact where a significant proportion of teaching is delivered in 'group format'. The greater the use of whole cohort lectures, the less will be the effect of these step costs. If the proportion of teaching delivered through lectures were to be increased to 50% (an increase in the coefficients B_l and P_l, from Table 5.10, to 0.5) the effects would be two-fold:

- firstly a cost reduction of £85,328,equivalent to the fees income from over 34 students (appendix 6), and
- secondly that marginal teaching group costs (using M_{Gi} appendix 5)will be reduced to £10,842, £17,442, £10,302, for years 1 to 3 respectively, significantly less than in the original position .

The figure for the marginal partnership school is an underestimation of the probable actual cost of bringing a new partner 'online' brought about by the aggregation and averaging employed in the data collection process. Table 5.11 shows the cost to be £100 which, on closer inspection, is clearly an average rather than true marginal cost. The calculations, as presented, are a simplification of the situation that in reality would vary considerable depending upon the size and location of the school. If an activity-based approach were being employed, the activity of inducting and supporting a new partnership school would have to be included.

Sources of costs not included in the model

With 28% (final cell of appendix 4) of the income generated by the course still not fully accounted for through an aggregation of the known and traceable expenses of the course it leaves two possibilities. Either the course is highly profitable or we return once more to Palfreyman's comments about the inadequacies of the HEI sector's financial management systems. Clearly there are many cost elements that have not been included above that have been the focus of previous costing studies such as library costs (Goddard & Ooi, 1998) or the costs of pre-enrolment enquiries (Carr, 1994).

A particular issue worthy of consideration is the cost of staff development and academic research, an element that was included in the cost function developed by Snowdon and Daniel (1980:78). Given the number of staff teaching on the BA who are 'research active', involved in professional or academic development or attend conferences, it is clear that a proportion of the income generated by the students attending the course, is returned to those who teach on it. The extent to which this activity may "contribute to the programme objectives;" (Atkinson, cited in Thomas, 1990:50), is debatable and it may be argued that the course "may be efficient at doing the wrong things". After all, the funding agency is paying the institution to produce teachers. Although some costs will be accrued as a remission from teaching activities, as the tutor costs are based upon a 550 hour teaching year out of a 1435 hour 'working' year (41 35-hour weeks) some of these activities will take place in the time allocated to the BA. In terms of the case study costing exercise the difficulty arises in that the funding for these staff development activities related to the course is obtained through a bidding process from central funding, rather than entitlement related to the surplus of the course. Due to the time and effort involved in gaining access to this funding, those staff who are fully employed on the course, effectively generating the income, will have less time to allot to these other activities – a potential example of the 'lack of incentive' described by Lloyd et at (1988).

It is acknowledged that the lack of access to and availability of accurate central cost data has significant implications for the course management decision making processes if any additional surpluses produced will simply be absorbed into the HEI's central coffers. Even without such information, changes to the direct cost structure, which is included in the model presented here, can be justified and alterations to the sources of cost (from schools to tutors for example) can be argued for on a 'zero change' basis. An increase in tutor costs being balanced by an equivalent reduction in school costs.

A critique of comparative costing models reported in the survey

Direct comparison with other formulaic approaches, such as those of Birch et al (1977), Sharma (1986), Lloyd et al (1988), Jones (1989), is not possible due to the professional element within ITT courses. Similarly the data supplied by the TTA (1999), which can be transformed into a costing formula, does not include details of the HEI-based elements of an ITT course. So it is possible to compare *parts* of this model (the HEI or school-based elements) but not its complete form.

The comparison of the outcomes of different costing processes, which are currently being applied to various ITT courses, is a valid activity. Two distinct systems were identified through the responses to the questionnaire. The first of these is a simple model to assess the course viability (consistent with the purposes of both unit costing (Carr, 1994:27) and cost-effectiveness (Woodhall, 1987:399) containing only one cost factor – academic staffing. This factor has been identified by several studies, such as those by Ahumada (1992), and Ajayi (1988), as being the key determinant cost in any directly taught academic course, but clearly not the only one. The approach is expressed as:

(no. FTE tutors required to run course)(average tutor salary) < (income generated by course)/2

To calculate the number of tutor hours required to staff the course in the case study, the formulae used can be reduced to those elements which are multiples of d (hourly tutor pay).

School-based tutor costs = $d((\Sigma V_i S_i) + aP_a)$

Academic Salaries (teaching) $A= d\Sigma(B_i (B_{li} + G_i - G_iB_{li}) + P_{ti}S_i + (P_i - P_{ti})(P_{li} + G_i - G_iP_{li}) + L_{ti}S_i + G_i(L_i - L_{ti}))$

Academic Salaries (course administration) = d(625)

Substituting the data derived from the case study institution:

Tutor cost = d(1258 + 4672.5 + 625)) = £426,107.50

as compared to the income for the course of £1,111,434 (50% of which is £555,717),

giving the course a £129,610 margin (or 30% of academic staffing costs)

Applying this system presents the course as a highly 'profitable' one for the institution to operate but completely ignores costs of the transfer of funding to partner schools, £78,700 (ΣC_iS_i) and placement transport costs £49,147 ($e(\Sigma V_i S_i) + b(LiSi)$) (see Table 5.6) which no other undergraduate course would be required to bear. Further training and administrative costs due to school-based work bring the total to £151,226, a negative margin of £41,256. Although no positive

evidence is available, it is likely that all HEIs will have courses that they operate which, in these terms, are 'non-viable', but continue to be allowed to recruit for political, academic and financial reasons as 'loss leaders'. It was only after completing a costing exercise in their own institution that DeHayes & Lovrinic, (1994: 92) identified that "some of the graduate programmes were found to cost more than three times the value received from student fees". These courses that are found not to meet the course viability criteria should be allowed to continue and to make a contribution to fixed costs even though they may not be able to contribute their 'full share'. If such courses were to close they would only lead to a greater burden of the fixed costs being borne by a diminishing number of courses, thus leading to further viability problems – the Turney "death spiral" (1996:39).

The alternative system to emerge from the survey also relates to course viability but relies upon a larger number of cost factors.

$$T+A+R+P+F+S+D< 0.65I$$

T = no. tutor hours allocated to course multiplied by the wage rate
A = no. admin hrs multiplied by the wage rate
R = no. teaching room/hours multiplied by 'rental' rate
P = proportion of total phone, postage and printing costs by student numbers
F = funds transferred to schools
S = proportion of total staff/student travel expenses by student numbers
D = staff development costs associated with the course
I = income generated by the course

Substituting the data from the case study institution (either from the previous section or appendix 4) it is possible for all elements, except for the staff development costs associated with the course, which are not itemised and are simply subsumed within overheads, to be included.

£426,107.50 + £65,525 + £94,413 + £15,160 + £78,700 + £49,147 + D = £729,052
I = £1,111,434 so 0.65I = £722,432
Effectively, using this approach, even with no staff development costs, the course will not be deemed viable.

Both of these approaches focus on course viability and have little to offer the course leader beyond noting the course viability. Both systems depend upon the devolvement of funding to meet the costs of the course and both rely heavily on the number of staff required to teach on the course as a basis

for calculations. Beyond this basic need, all other funding appears, according to the interviewees, to depend upon various forms of bidding processes, which is inevitably a political process. Hans (1996) often found evidence of a political process through the manipulation of data within university budgets to arrive at the 'correct answer'.

An analysis of the unified model

The four purposes of a costing system identified above (derived from the work of Carr, 1994, and Woodhall, 1987) need to be used as a means of judging the success of this model. While it attempts to address all four:

Course viability

Alternative models of resource use

Future costs, and

The cost of the marginal student

It suffers from the inadequacies of the financial accounting system and the lack of transparency of central costs.

Although the model succeeds in adequately identifying the costs of key elements of the course through an ingredient approach, it is not possible to carry through the 'backflush accounting' (Innes and Mitchell, 1991) to account for all charges made against the income from the course. The system developed above is able to identify the costs due to the school-based elements of partnership and placement, the costs of teaching and direct administration of the course, but it does not adequately explain or account for the costs of attending a campus university. It would seem that the level of 'top slicing' is dependent upon the ability of the course to 'pay' – the more 'profitable' a course is, the greater the proportion of its fee income is retained centrally. This problem of the arbitrary nature of top slicing is one that Howson and Mitchell (1995) identified as the key factor that would reduce the effectiveness of an ABC approach.

In terms of meeting, in Ahumada's (1992:363) terms, a rationale for costing, the model described above does perform adequately. It does help "administrators understand the origins of costs ... and *decide* upon various resourse allocations and allocation strategies". By making changes to the cost coefficients alternative scenarios and teaching mixes can be compared. Although the cost function will help managers to find the optimal position for the balance of financial constrains and educational and professional goals, it will have little to say on the matter of sources of funds. The

transfer of cost from HEIs to students was addressed by Bacsich et al (1999) who identified an increasing tendency for this to happen as a matter of policy.

Without the financial information concerned with the central costs of a HEI, either through a lack of adequate access, or because of non-availability, the cost management of any HEI-based course will be subject to areas of doubt. Some of this may at least be isolated so that courses within an institution can be compared or the central 'top-slice' of different HEIs operating similar courses can be compared. An approach to this would be to simplify the costing system and view the output of the 'production', the BA(QTS) qualification, in terms of a limited number of collective activities (DeHayes and Lovrinic, 1994), an ABC approach.

The four activities might be described as:

1. gaining the 'QTS', in effect the school based element;
2. gaining the 'BA', the taught element;
3. attending an ITT course, the course administration costs;
4. attending a HEI, the central costs.

The costs included within this fourth element are not fully identified, other than in knowing that, when all the other costs are accounted for, this is the only place for the fees income to have gone. It is the lack of clarity and openness regarding the 'top-slice', a point revealed within the interviews, that brings the whole costing process into dispute. All four of these elements would have to be described in terms of the individual student, effectively marginal cost pricing, as this approach, ABC, would normally be used to attempt to identify a minimum price (cost plus) for a product for a particular range of a production run. This is an important aspect to consider, especially given the substantial step costs associated with the course.

Given the information obtained from the ingredient-costing approach used above, it is possible to arrive at a costing based upon these four activities. A significant assumption must be made in order to incorporate the HEI's central costs. There is no adequately explained relationship between the 'top slice' and the actual scale of HEI central costs. Course surpluses appear to be absorbed centrally and redistributed without acknowledgement of the source. The impulse is to equate the income derived from the course and retained centrally to the central costs of the course.. It is a big assumption to make and there is little evidence on which to base it. Clearly there is an expectation from the institutional management that courses, where they are able, should contribute towards

institution-wide initiatives and activities, which are not funded directly out of income from particular courses. It is very unlikely that all courses will be able to contribute to the same degree, either in aggregation or as a proportion of fees income.

So if the fees reflect the cost of those four distinct activities; QTS, BA, ITT and HE that combine to produce the product or experience that is the BA(QTS) ITT course within HE, then through substitution, HE central costs within the case study institution are revealed as:
Total cost (fees income) = QTS + BA + ITT + HE (using figures from appendix 4)

Total cost = T_{sbc} + (A+R+J) + M + ($K+HE_{central}$)

£1,111,434 = £227,706+ £413,735 + £141,500 + (£13,380 + HE_c) => HE_c = £315,113 (28%)
HE costs = £328,493 (30% of course income)

Any attempts to estimate the central costs of the case study institution, as they accrue in respect of undergraduate ITT course provision, would be little more than guess work. Such an attempt might only add validity to what is, in this context, an opaque process, lacking any clearly agreed level of 'service' in return for the withholding of income. The figure of £328,493 may only be referred to as a 'contribution towards the central costs' as it is unlikely to be a true reflection of the actual costs. The approach to costing recommended by the JCPSG (2000) is a deliberate attempt to address the laxity in the accounting procedures within HE which allow central cost to remain opaque.

The arbitrary nature of the top slicing, as identified by Howson & Mitchell (1995), is the key feature restricting the accuracy of any course costing activity. The fairness and equality of top slicing, either in absolute or proportional terms, in respect of student fees needs to be established, published and justified. Optimistic, but essential if external bodies, such as those wishing to place research grants (Goddard, 1999), are to have any confidence in the financial control exhibited by HEIs.

The elements that might be expected to be included within such central costs will vary according to the nature and structure of the HEI. Indeed the items that have been included, library and IT provision, are far from comprehensive and the level of accuracy must be in doubt. It is notable that the library costing study (Goddard and Ooi, 1998) discovered that equal apportioning of costs to departments by student numbers had seriously underestimated the cost of the use of the library by

education students when calculated by ABC. The cost of providing and maintaining shared areas (landscape and buildings) might be apportioned on a 'per student-day' basis to account for courses which include extended terms or off-campus placements. There needs to be some way of accounting for the level of corporate administration and management, such as finance, personnel, central registry, senior management and public relations/marketing activities. Some, like central registry, may relate well to individual student activities (admissions, examinations), or finance and personnel (via staff numbers). But others, like senior management, might have to be spread evenly across the student body or apportioned to courses or similar activities. Clearly, before these costs can be apportioned, they need to be accurately identified. This may very well be the point where an ABC approach acknowledges that not all costs can be apportioned on the basis of activity use and these remain as 'overheads'.

An analysis in respect of Ofsted inspection criteria of 'value for money'

An important element of all inspections of ITT provision within an institution, beyond the necessity that TTA regulations are being complied with and that standards are being met, is that the funding supplied by the TTA for ITT courses is being appropriately spent. The concept of value for money (or VFM) is one that schools, both through the Ofsted inspection procedures and the devolution of funding through LMS (local management of schools), have accepted as an educational reality. The necessity to publish guidance on the costs of partnership (TTA, 1999) clearly demonstrates a concern that TTA funding might not be being directed specifically at TTA funded courses within institutions. One of the key inspection points is that educational and course priorities should be reflected in the funding allocation directed towards them, and that the QTS courses should be cost effective and efficient. This drive for efficiency, least cost for a given quality of output, (Rumble, 1987) was one of the main reasons for the introduction of three-year undergraduate ITT courses (an immediate 25% cost saving on the previous four-year course). The ability of institutions to deliver the same quality of output with only 75% of the original resource is a significant indicator of efficiency – or viewed from an alternative perspective could indicate that current four-year courses are inefficient and significantly over resourced.

Given the ingredient-costing approach described above it is possible to determine the proportion of each student's fees that is directed towards particular priorities or ends. From the perspective of the inspection, the proportion of the fees spent on the school and the taught elements (20% and 36% respectively) should bear justification, as should the 8% spent on course administration. It is possible to present the details of the expenditure for these elements, particularly the school based

costs, for inspection. The 36% of the fees retained by the HEI for cost that cannot be directly attributed to the course are, perhaps, in need of further justification. It is possible, as part of an Ofsted inspection of the ITT provision, that an institution will need to present a more detailed account of how these costs are charged in order to demonstrate an equality between the TTA and non-TTA funded courses offered by the HEI.

The degree of variation of central costs between HEIs may be quite substantial. Pettifor (1974) noted that the number of sites, their nature (city or country campus) and the age of the buildings, had a significant effect on overall costs. The justification of the attribution of different levels of central costs being applied to courses of the same length on the same campus could be more difficult. Turney (1996) shows that some courses, where the fees are not covering the full costs, may continue to operate on the grounds that the fees are in excess of the marginal costs and therefore make a contribution towards the central fixed costs. Without such courses, there would be fewer students to bear the fixed central costs of the HEI resulting in yet more courses becoming 'uneconomic'.

In order for an Ofsted inspection team to be able to assess a particular provision in terms of VFM, considerably more information on the central costs of the HEI and the top slicing policy need to be made available. Without these, the inspection team will have little information on which to make a judgement, particularly to compare with other providers, except the overall inputs and outputs. Such an approach will reveal what Hans (1996) suggests is an "overwhelmingly political process" (p169), the university budget, to open scrutiny.

Summary

Much of this chapter has been devoted to the development of a formulaic approach to costing both school-based and HEI based elements of an undergraduate ITT course. One of the key issues to be addressed has been the conversion of the information gained from the case study HEI, presented in Chapter 4, into a format that can be employed for costing purposes. It has been very apparent that any funds that are transferred from the HEI to external bodies, such as partner schools or students, can be identified and tracked with relative ease but where funds are retained internally, this transparency is not evident – findings that are repeated across the sector according to survey responses. This lack of internal transparency, and corresponding lack of available information, has

resulted in an incomplete model of the entire course costing process, with central costs remaining 'hidden'. It is only once these hidden costs can be revealed that true unit cost (Carr, 1994) can be calculated and the cost-effectiveness of courses (Woodhall, 1987) be fully assessed.

The series of cost functions that have been produced, based on an ingredient approach using past expenditure, distinguish between the costs of activities concerned with school-based work, HEI-based teaching, course management and the centrally supplied services. However, without adequate information about previous cost positions, it is very difficult to demonstrate "that resources are being used efficiently as well as effectively" (Thomas, 1990:46). Each cost function is based upon a number of cost coefficients which maybe altered as either the cost structure changes, such as an increase in tutor salaries, or to examine the potential change in costs following a change in course structure (an increase in the number of days in school). The first derivatives of the cost functions are examined in respect of marginal students, partnership schools and teaching groups.

As most of the school-based elements of the courses are performed on the basis of individual student placements, these costs, as recognised by the marginal cost function, are responsive to changes in student numbers. Quality assurance issues, such as the number of tutor visits per student per placement, have a significant effect on the level of costs, due in part to the low initial levels and thus proportionally large changes. Although student numbers also have significant cost implications for teaching activities, it is the step costs (Lucey, 1996b:295; Pyke, 1998:79), due to marginal changes in the number of teaching groups, that has the most marked effect, up to ten times the fee of the student that necessitated the increase in the number of groups. Course management and the central costs (library and IT) that can be identified are much less obviously responsive to changes in student numbers, though Goddard & Ooi, (1998) suggest that such calculations are feasible. This feasibility is severely limited in the case study institution as these costs tend to be determined by rather arbitrary means, making their links to student numbers a political process, rather than costed on the basis of activity.

Unlike the school-based and taught elements of the course, where cost can be determined on the basis of tangible activities, the activities of the course management and central HEI services are less open to such processes. These conclusions are confirmed by survey responses from other HEIs.

Comparing this formulaic approach with other costing systems identified through the survey has revealed that decisions about course viability, one of the outcomes of unit costing (Carr, 1994) or

cost-effectiveness analysis (Woodhall, 1987), are clearly dependent upon the operational costing system employed. Each system takes account of different cost elements and compares with a different proportion of income derived from student fees, demonstrating most clearly that the accuracy of such approaches is entirely dependent upon the availability of appropriate data (Palfreyman, 1991). In essence, the case study formulaic approach has demonstrated that the more detailed the accounting for input costs, particularly in areas where the course leader or designer has influence, the more effective the approach becomes as a management tool, which supports the findings of the JCPSG (2000) of the HE sector as a whole.

Chapter 6 CONCLUSIONS

Introduction

Conclusions will be drawn on the basis of the analysis of evidence from both surveys and the case study in respect of the research questions presented within the introduction. Support for these conclusions will be offered through references to the literature on costing and previous research carried out in this field. Recommendations will suggest ways in which HEIs may wish to improve their financial management systems and accounting procedures to ensure that appropriate information is collected and collated for use by course managers.

The research questions:

- to what extent are ITT courses costed by HEIs?
- how are ITT courses costed?
- to what extent is costing information used by the course management?
- can a suitable, generic, costing system be developed?

will be responded to through a synthesis of the purposes of costing derived from the work of Carr (1994) and Woodhall (1987), as presented in Chapter 5 above. These will be used as a basis for drawing conclusions in respect of the nature of financial management. They are:

1. course viability
2. comparison of alternative resource allocations/modes of course delivery
3. prediction of future costs on the basis of changed parameters
4. estimating marginal costs (student).

Recommendations about the nature of the financial management of ITT courses and the increasing focus on the costs of provision can then be made. This chapter will also examine the wider perspective of costing ITT courses within HE, with particular reference to the demands for transparency expected of TTA funded and Ofsted inspected courses.

Conclusions will lead into the recommendations suggesting the steps that HEIs need to take to develop effective and efficient financial management systems in order to inform course management decisions.

Current Practice

The first three of the research questions can be answered together within the context of an examination of the nature of financial management in relationship to the planning and management of ITT courses. The survey evidence provides a basis on which to draw conclusions in respect of the extent, methodology and use of costing techniques.

The cost of provision

ITT courses are possibly some of the most highly regulated courses in British higher education. The content, structure, and quality threshold of courses; the student numbers for each course and institution, as well as the fees per student are all set, to a very substantial degree, at a national level. It is within these restrictions, that HEIs have to manage the resources for their undergraduate ITT provision in such a way as to offer a distinctive 'product'. Clearly the location of the HEI and the personnel that they employ will account for much of this 'distinctiveness' but within that the mode of course delivery and the allocation and organisation of resources will also be key factors. Whatever the decision, whatever the form that distinctiveness might take – partner schools fully integrated into the assessment process, availability of technological resources, internationally renowned teaching staff - there will be cost implications. Accurate costing systems will allow the course manager to construct a course to meet all the set criteria for student numbers and unit cost and then exceed the quality threshold, where resources allow, to attract students through distinctive provision.

In the case study institution, the degree of personal tutor support for the student to ensure their professional and academic progress was set at a level greater than was required by the threshold criteria. This action has considerable cost implications in terms of tutor time, the most expensive (per student) resources that institutions have to work with according to Jandhyala (1983), Ajayi (1988) and Ahumada (1992). The decisions that led to that particular allocation of resources need to be supported by adequate costing information if the cost-effectiveness of the chosen mode of delivery is to be determined rationally. Woodhall (1987:399) arguesthat such decisions concerning resource allocation may well, according to have a significant effect on the financial viability of the course.

Identifying costs and outputs

The responses from the questionnaire and interviews suggest that information is gathered within HEIs to assess course viability – costing does take place. However, little appropriate financial

information is available to the course manager on which to base course design decisions. In the majority of these cases, where rudimentary forms of costing do take place, a single cost-driver, namely the number of academic staff required to teach on the course, is used. In many respects, this can be seen as being consistent with the findings of Jandhyala (1983), Ajayi (1988) and Ahumada (1992), who found that academic staffing was the prime determinant in course costs. Identifying academic staffing as the only important factor leads to the conclusion that the only option, if savings are required, is to reduce the level of staffing or, in the short term, to explore other "acceptable ways of saving money" (Kedney and Davies, 1994: 443). Given that the case study institution applies a single cost driver approach to assessing course viability, the level of tutorial support planned for must be balanced against its apparent cost. It is interesting to note that, if the tutorials were to be provided by school-based rather than HEI-based staff, the cost would not be included in the viability calculations, highlighting the inadequacies of financial information systems identified by Palfreyman (1991).

It was apparent from the questionnaires, and in particular from the interviews, that there is a significant reliance by course leaders or managers, on being able to identify and manage the costs incurred by their courses intuitively. Most HEIs either lack the accounting structure - Palfreyman's (1991:26) "poorly developed management accounting systems" - to be able to provide a clear and detailed breakdown of costs or they are unwilling to provide their course leaders with that information. In doing so, they deprive course leaders of an essential management tool to assist in the delivery of an efficient and effective course. Coombs and Hallak (1987:191) simply state: "good educational cost analysts can literally be worth their weight in gold" to which Pyke (1998:79) adds "it is necessary to have a costing system which identifies where costs arise".

This is not to say that HEIs have been complacent in respect of the increasingly restrictive financial constraints being placed upon them by a real term reduction in the level of per-capita funding. It is just that the survey evidence points towards the conclusion that little of this information is reaching those who have a key management role in the design and implementation of these courses. To rephrase Kedney (1991) - provision is constantly in a state of flux, quality is continually being inspected and questioned, life is insecure, so costing is essential. For this reason, if not others, there are signs of initiatives being taken to improve the accuracy of cost accounting in HE, hence the work of Carr (1994), DeHayes and Lovrinic (1994), Howson & Mitchell, (1995), Hans (1996), Goddard & Ooi, (1998) and the importance of the JCPSG (2000).

The changes to the nature of many ITT courses as a result of the drive towards partnership following Circular14/93 (DFE, 1993) have resulted in a significant and, crucially, visible flow of funds from HE to schools. Previously, when all of the funding was retained, there appears to have been little awareness of the cost of school-based activities, but now it is all too apparent, particularly to the senior managers in HEIs, according to the interviewees. The cost of providing these school-based elements has also increased at the same time through extended periods in school, and increased quality assurance criteria and documentation, but it is the heightened visibility that is the key factor here. It might be argued that, if this heightened awareness of costs were to be extended across all elements of ITT courses, including those provided centrally as part of the 'top-slice', there might be a significant adjustment to attitudes to costing within the management of HEIs. JCPSG (2000, online) is clear that improved costing systems would lead to HEIs making better informed decisions concerning course pricing, resource allocation, strategic planning and public accountability.

The ingredient approach to costing (Gray, 1984, or 'full costing' as it is alternatively described by Pyke, 1998:80) employed within this study, was only able to justify the input costs directly attributable to the case study course. The relationship between the 'top-slice' and the proportion of student fees that it represents was not one that could be readily identified. Further research would be required to ascertain whether the proportion (or amount) of undergraduate ITT course fees retained centrally by a HEI is the same across a range of courses. The TTA, in particular, would be interested to discover if the courses that it funded within HE were subject to a greater top-slice than non-TTA funded courses (TTA, 1999).

Verry (1974, 1977), Verry and Davies (1976), and Laidlaw and Layard (1974) at the Open University and Hiromitsu Muta and Takahiro Saito (1984, 1989, 1994) for the University of the Air, Japan, and Snowden and Daniel (1980) at Athabasca University (Canada) and Bacsich et al (1999) focused on the cost-effectiveness of the mode of course delivery. Their studies were made possible due to the availability of financial information – a notable feature of many innovative approaches to educational provision. One of their prime concerns, the problem of defining and valuing the outputs (Thomas, 1990:52), to allow comparability with other modes of delivery, did prove to be enduringly problematic. In the case of ITT the TTA, by setting clearly defined exit criteria, has effectively offered a solution to this issue – for at least the QTS elements of the courses offered.

Financial management tools – developing a suitable costing system

Given the need for ITT courses to respond immediately to changes in the nature of the profession and the requirements of the course regulations, it is necessary for course managers to be able to fund curriculum development. From the evidence of both the case study and the survey it is clear that none of the course leaders or managers have this degree of control over their resources. The concept of 'development costs', in the model proposed by Bascich et al (1999), is not widely achnowledged. HEIs, it would appear, are not fully appreciative of the extent to which ITT provision needs to develop on an annual basis and the costs of these necessary innovations.

The survey findings specifically pointed towards the non-availability of financial information (Palfreyman, 1991), relevant to the course, as one of the key problems facing the course leader. Even in institutions where the management appeared willing to share the information with course leaders, in many cases the accuracy or collection of the relevant information was brought into question. Most course leaders, in the absence of appropriate financial management tools, relied upon an 'intuitive feel' for the nature and structure of costs, based upon an awareness of the key sources of cost. The 'cost-effectiveness' of various alternative actions or future requirements was performed but in a very informal and frequently ill-informed way. It cannot be easy to demonstrate "the cost-effectiveness of educational provision" (Thomas, 1990:46) to senior managers in the absence of adequate financial information. In most cases, particularly in those where the course leaders had a heightened awareness of costing or budgetary issues (often from recent employment within schools) there was a lack of confidence in the financial information that was available.

The survey found the degree of flexibility afforded to course managers was quite limited. Many were restricted to very marginal alterations which reduced their ability to effect efficiency improvements, whilst maintaining or enhancing quality. The usefulness of costing courses only became apparent, in the view of most HEIs, when overall course viability was being considered, and the judgements for this were usually based upon the narrowest of evidence sources – academic staffing (thus following the work of Jandhyala (1983), Ajayi (1988) and Ahumada (1992)). Most course leaders would welcome more extensive information on the nature and distribution of costs within their courses, alongside the ability to have a more active role in their management. The survey suggested that several course leaders were attempting to impress on the HEI management the nature of costs attached to their courses and the extent to which these differed from other, non-ITT, courses but lacked the financial information to do so with any degree of confidence or accuracy, agreeing with Palfreyman (1991).

It would appear that HEIs are also concerned by the change in structure of costs. Firstly that these school-related costs are so clearly apparent by their flow out of the institution and also that they represent a distinct change from the nature of costs of other undergraduate courses. The costing systems, which were able to accurately predict, in simple terms, the viability of undergraduate courses, are no longer appropriate for ITT courses that work in partnership with schools. This follows a key point expressed by many researchers in the area, particularly those using an ABC approach such as Hans (1996), DeHayes and Lovrinic (1994), and Goddard and Ooi (1998) .Where course leaders have offered the management of their HEI a more effective means of measuring ITT course viability, there are cases where these offers have been rejected because, it seems, they diverge from the existing institutionalised systems.

Most course leaders would value a means of accurately predicting the cost implications of changes to the structure or cost basis of their courses. In the absence of any appropriate tools being developed by individual institutions, one might question why the course leaders are not developing the necessary tools for themselves. Many lack basic sources of information about the scale of costs, a problem that increases the further these sources of cost are removed from the course. Others lack the necessary skills and expertise to be able to develop such a financial tool or to be able to use one, should one exist. All of these concerns have also been raised by the JCPSG (2000) as issues that senior managers within the HE sector need to address if they are to manage their institutions effectively. Clearly the purposes of costing, as defined by Carr (1994) and Woodhall (1987), are still particularly relevant to the needs of HE managers.

The model offered above is able to address some of these issues, although the impact of central costs does still require further investigation to reveal the relationships between output and input costs. The identification of the direct course costs for school-based and HEI-based student activity reveals the marginal cost structures of the course, allowing the manager access to information that will accurately inform decisions concerning absolute student numbers. The ability of the model to demonstrate the effect of changed parameters of current and future costs (see appendix 5) offers the managers the opportunity to examine various alternative forms of course delivery (within the scope of the model) to compare the costing implications. Course viability, in absolute terms, is more complex due to the flexibility of the contribution expected from the course income for centrally provided services

The costing of ITT courses in the wider perspective of Higher Education.

If, as institutions claimed during recent salary negotiations, present income is barely adequate to cover costs, then it follows, from the calculations offered above, that a significant proportion of costs must be the responsibility of centrally administered services rather than directly attributed to individual courses. Only 72% of the £2609 fee could be accounted for by direct course costs (and this includes many of the elements, such as the cost of teaching rooms, which are normally included in the 'top-slice') in the case study institution. Current 'transparency' issues being addressed by the JCPSG (2000) might do much to improve this situation.

The provision of central services

It is accepted that 'top slicing' of fees centrally is necessary for institutions to be able to operate as recognisable bodies. Institutional aims that are worked towards for the good of all require funding from all income generating units equitably, if not equally, and transparently – a key finding of Howson & Mitchell (1995). But beyond the basic 'taxation' needs, are other systems possible? The British National Health Service and Local Education Authorities have demonstrated another option - the 'internal market' and 'local management' respectively. In both cases a small proportion of funding is retained centrally and the rest is devolved to the point of use to enable services to be 'bought back', usually from the same body that devolved the fund to them in the first place. This may appear to be just a balance sheet exercise but it is the openness and exchange of information, and the heightened awareness of cost, that is at issue.

Whereas in the NHS (Pyke, 1998) and LEAs the share of the funds is calculated centrally, in HE the fees that institutions receive for courses is known and, in the case of ITT, readily identifiable. To simply devolve the fees obtained from students on a course (less an institution 'tax') and require all courses to pay for the academic staff, teaching accommodation, library services, and all of the other college services that they make use of, would make those who design and deliver courses and the institution's managers much more aware of costs. Goddard and Ooi (1998) attempted to make this a reality, at least in terms of the fair attribution of central library costs to departments.

This approach may have significant implications for some areas of academic activity, particularly internally funded research or doctoral studies. Would they now be funded only if they directly

supported the work of, or developments in particular courses? Or would they now be seen as 'non-pay' rewards for academic staff?

Whatever the approach finally taken, noting that Innes and Mitchell (1990) claim that ABC is the favoured approach of managers, it is clear that institutions must become more aware of the sources of costs. The degree of 'looseness', which currently permeates HEIs, may be politically desirable to the internal senior management, as it allows cross subsidisation without debate. It may not be so defensible from the position of the HEI being a body in receipt of public funding that is supplied to fund particular academic provision and activities, hence the points made by the JCPSG with particular regard to the public accountability of HE. This means that all courses, indeed all activities within an institution, will need to be carefully costed, though whether the cost of an extensive programme such as that of DeHayes & Lovrinic (1994) can be justified on economic grounds is open to further debate. It is only when these data are readily available, a key deficiency according to Palfreyman (1991), that decisions about funding and budget allocations can be made, relating fees to costs, from a position of strength.

Course and institutional viability

The HEI is more than a 'central supplies service', responding to the needs of courses and providing an infrastructure. In the same way that a school does not devolve its entire funding to the constituent departments for them to buy back services because there is a need for the school to ensure continuity and breadth of provision, nor can an HEI. From a purely economic viewpoint, it is necessity to provide courses that, while they do not meet their full cost of provision, at least contribute towards the central costs of the HEI (Turney, 1996: 39).

This institutionalised cross-subsidisation is a necessary part of the effective management of the HEI to ensure a broad and balanced provision of courses. The importance of making provision for development or 'start up' costs, for example, is recognised in the model outlined by Bascich et al (1999). It must be accepted as a necessary role of the HEI management, to ensure that all courses at least contribute towards these central costs and to spread the cost across as great a number of students (or other sources of income) as possible. The lack of openness about such procedures detracts from their usefulness and ultimate necessity to ensure that the HEI maintains viable student numbers.

It could be argued that, if course leaders were truly aware of the costs of their course in relation to the fees, they would be inclined to introduce additional elements to support their students to the point where costs and income were very close to each other. Some HEI managers might consider that it would encourage those courses that are currently very efficient and produce surpluses, to increase their expenditure on the course to a level closer to the income generated by it – unless there are suitable incentives to do otherwise. From the other perspective, though, those courses that do not cover full costs would be aware that they need to identify other sources of income or means of being able to offer the current course more efficiently, unless the HEI is willing to allow the subsidy to continue indefinitely. Both are clear arguements in favour of cost effectiveness analysis, as proposed by Woodhall (1987).

Whichever way the issue is viewed, the key point is that a more accurately costed course, where the sources of cost are identified and incorporated, will provide a much more accurate view of course viability. The methods of assessing course viability from the survey address some of the costing issues as long as the assumptions hold about the proportion of total costs that the cost driver accounts for. The use of simplified cost driver approaches, such as the number of academic staff required to run the course, must be continually reassessed to ensure that the assumptions continue to be appropriate. Such simplified approaches should only be used for a rough assessment of viability, with a more detailed system being employed to provide a final response.

Whereas the value of costing courses in HE can be appreciated by both senior managers, to address issues of course viability within a portfolio of courses, and by course managers, to inform decisions regarding the design and operation of courses, in most cases the information is not available. It would appear from the survey, that the majority of HEIs simply do not have the financial accounting systems in place to either collect or collate the necessary information, a point strongly supported by Palfreyman, 1991.

There would appear to be a need within HEIs to develop a more detailed approach to costing which would incorporate a greater range of cost factors and provide a greater range of financial management information. The recent publication of the Transparent Approach to Costing (TRAC) by JCPSG (2000) offers guidance and support for HEIs developing institution-wide costing systems. Even so, non-direct costs still pose a problem as 'contributions' to central costs are still emphasised over a true examination of what those costs are in relation to the unit output.

Developing a costing system for ITT

The greatest revelation from this study has been the lack of awareness of costs and costing systems demonstrated by course leaders. Most have acknowledged the value of being able to identify and manage the source of costs within their courses but few have been able to either to develop systems or even to extract the information (again, consistent with the findings of Palfreyman, 1991). In all cases it has been the move to transferring funds to partnership schools that has been the source of this interest in the costs of course provision, often driven by senior management becoming acutely aware of the scale of school-based costs.

The lack of sophistication demonstrated by existing systems revealed by the survey has resulted in complaints from course leaders that the costing approach employed by their institution does not adequately reflect the true cost profile of their course. The focus on academic staffing costs, fuelled by the findings of Jandhyala (1983), Ajayi (1988) and Ahumada (1992), has been taken to extremes by some HEIs relying upon academic staffing as their single cost determinant. In many cases, the ITT courses operated by HEIs have apparently become more cost efficient. This has been due to structural changes in the nature of the course resulting in fewer academic staff being used, though actual costs, through transfers to schools, may actually have risen. The change in TTA requirements (1993) has resulted in a reduced use of HEI based staff in favour of school based staff, which has had a significant effect on the cost structure, but one which these over simplified costing systems do not take into account.

The costing approach developed above, a number of interconnected cost functions, is an expenditure based one. It collects together the ingredients that combine to form the main costs that are identified with the course. Unfortunately the cost functions do not provide a complete explanation of the costs due to the activities involved in the operation of the course. As the survey showed the further the sources of these costs are removed from direct connection to the course, the more unreliable their identification becomes. A point is reached where neither the availability of data nor the connections to the course can be assured – a level of costs which relate more to the activities of the HEI as a whole than to the course in particular. Thirty-six percent of the fees derived from student enrolment in the case study institution, cannot be traced in any adequate way other than to say that they contribute to the central cost of the institution. This is one of the main

reasons why it is felt that an institution wide policy on top-slicing, similar to that suggested by Howson and Mitchell (1995), is required in line with the developments from JCPSG (2000).

This ingredient approach (Kedney, 1991 and Innes and Mitchell, 1991), provided by the model developed above, does allow the course leader to model the effect of organising teaching groups differently or altering the way that students are allocated to schools for example, by altering the parameters entered into a series of cost functions within a spreadsheet. What is most notable is the marginal effects of losing students (and their fees) as the marginal cost of an individual student within the linear range of the cost function is a relatively small fraction of the fee they attract. At the other extreme are the significant step costs (Lucey, 1996b:295; Pyke, 1998:79) of a student enrolment where that student results in the introduction of an extra teaching group. The availability of such information can make a significant difference to the ability of the course leader to design and deliver an effective and efficient course. Although the approaches suggested by the Joint Funding Council (1997) and JCPSG (2000) offer feasible means of calculating future costs, course viability and marginal costs, the accounting approach reduces the applicability for the course manager. Neither offer a sufficiently dynamic system to be able to inform resource and course delivery options at the course management level.

The model proposed above would appear to be sufficiently adaptable to take into account changed parameters involving the resource mix and deployment. Having designed a formulaic costing system to cope with the demands of a three-cohort course, the extension required to include a fourth year group for the case study institution would not be a difficulty. Similarly, a simplification to meet the needs of a one-year PGCE would only require the setting to zero of the parameters for cohorts 2 and 3 on the current model. Using the model beyond the case study institution would require a reassessment of the underlying parameters and assumptions. All fully costed approaches, such as those of DeHayes and Lovrinic (1994), or Goddard and Ooi (1998), require periodic review to ensure that cost drivers are still valid and that the input factors have not changed.

The reinterpretation of the model to an activity-based costing (ABC) form is an interesting one requiring several subjective decisions to be made. The determination of what represents an 'activity' is one that has no definitive answer. DeHayes and Lovrinic (1994) identify 250 separate tasks which combine to form the cost structure of a business studies degree. The suggestion that a BA(QTS) can be simplified to four activities:

1. gaining the 'QTS' - the school based element;

2. gaining the 'BA' - the taught element;
3. attending an ITT course - the course administration costs;
4. attending an HEI - the central costs

could be a useful means of comparing the cost of a QTS with a non-QTS course (ie one that does not have a professional element) within the same HEI. In course management terms, this approach is not likely to be much more useful than the single cost driver (academic staffing) used to inform course viability. This is because it still lacks the precision to offer the course leader specific information on the effects of particular courses of action to merit the praise of Coombs and Hallak (1987).

Although it would be possible to use many of the same features in the design of a costing system for an ITT course at another HEI, it is likely that several pieces of terminology would need to be altered to incorporate the underlying structures, consistent with the constant review of cost inputs suggested by DeHayes and Lovrinic (1994). Much of the model presented above was guided and directed on the basis of the availability of information, another consistent theme within studies of this nature such as Howson & Mitchell (1995). It is likely that the financial accounting systems of a different HEI will present a different structure, requiring that the model accept data in a different format. A key point may be that it is not the model itself but the act of developing the model, necessitating the interaction with the structure and costs of the course, that brings about a greater understanding of the ways in which cost factors interact.

Although the intuitive management of the costs attributable to ITT courses is acknowledged as being an effective means of management in most cases, the direct costing of a course will allow the identification of the sums involved in decisions. Clearly though, however good the system is, it must rely upon the accurate gathering and collation of information. Ultimately it is the manager who interprets and acts upon the information that is presented to them, and frequently the decisions that are taken are based upon a combination of factors of which cost is only one.

In many respects the model developed here is consistent with those identified by Bleau (1981) in that it would require the development of extensive data bases; would necessitate an institution wide commitment (preferably at board level); and that the inputs and outputs require simplification (p67-8). It also acknowledges the concerns expressed by the JCPSG (1998:2) and could be introduced through a process designed to overcome institutional inertia. The model does meet the requirements

for the purposes of costing (both cost-effectiveness and unit costing), as determined by Woodhall (1987) and Carr (1994), once the data collection deficiencies are allowed for.

Recommendations

For undergraduate ITT courses

The managers or leaders of ITT courses are working to meet the demands of four distinct bodies; their own HEI, their partner schools and the wider teaching profession, the requirements of the TTA and Ofsted and their students. Each places particular demands upon them which can be measured in resource (and ultimately financial) terms. Given that resources are limited, course leaders must manage their resources in such a way as to meet these, often conflicting, requirements. All too often they do not have the necessary information available to allow them to make the most efficient and effective decisions based upon educational, professional and economic demands. The purposes behind cost-effectiveness, in terms defined by Woodhall (1987) and Carr (1994), must drive this process.

As a result of this study it is recommended that:

- Course leaders have access to the financial information relevant to the operation of their course;
- Costing models be developed in order to predict the financial effect of changes to course structure or costs;
- A course budget be presented at both the validation (or re-validation) stage, and with annual course reviews, to demonstrate the sound financial management of the course;
- This budget should make allowance for initial and on-going development costs for the expected life of the course;
- This course budget be used with both internal and external quality review procedures to demonstrate 'value for money'.

For HEIs which provide ITT courses

Through the transfer of funds to partner schools, HEIs have become very aware of the costs of the professional elements of ITT courses. Procedures have needed to be developed in order to ensure that accurate and timely payment of these transfers is ensured. From anecdotal evidence from the interviews it would appear that HEIs have found it difficult to come to terms with reconciling these

payments to schools (for duties performed by teachers) with the reduction in the need for HEI staff who performed those duties in the past. The need to move funds from pay to non-pay budgets has identified flaws in the financial accounting or costing systems being employed within the case study institution, and others according to the interview responses.

A concern, identified through the interviews of the ITT course leaders, was the lack of coherent justification of central costs. Whereas courses, the income generating units, were required to justify their costs and explain requests or bids for extra funding, there did not appear to be, from the course leader's perspective, a similar requirement for 'top-slice' funding to be justified (developing the work of Goddard and Ooi, 1998). The implication was that there was an emphasis on the courses, and in particular the staffing of those courses, to accommodate any required reduction in costs. Course leaders felt that the balance needed to be redressed to place a much greater onus on the management of the HEI to justify the level of 'top-slice' and to place it on a unit-cost basis (Carr 1994).

It is recommended that HEIs, employing the guidance of JCPSG (2000):

- Introduce a costing system that not only meets the needs of central management to assess course viability, including those with a significant professional element, but also provides course leaders with relevant information on the costs of their course to inform design and planning decisions.
- Introduce financial accounting systems that ensures that data, necessary for costing procedures to take place, is collated and made available.
- Identify and publish policy and criteria for 'top-slicing' of fee income to provide course leaders a clearer view of the income that they are likely to derive from their course.
- Examine the feasibility of devolving a greater proportion of funding to the courses to allow central services to be 'bought back', thus making them more responsive to the changing needs of students and courses.

This will ensure that the financial information and accounting systems, that Palfreyman (1991) and this survey found were inadequate, will be put into place to allow effective costing to take place in sufficient detail to meet the purposes set out by Woodhall (1987) and Carr (1994).

For the TTA

As the funding body, the TTA needs to be much more aware of the internal funding issues facing ITT providers. A recent publication (TTA, 1999), examining the allocation of resources in partnership, did not fully investigate the cost implications of partnership funding issues as they related to costs internal to the HEI. To ensure that the TTA is receiving full value for money from the HEIs providing undergraduate ITT they should require all accredited providers to cost their courses so that the TTA can identify the sources and scale of costs when pricing the QTS qualification. This will be consistent with the approach being suggested for the entire HE sector by JCPSG (2000). A particular issue with the undergraduate ITT qualification is the differentiation between three- and four-year courses. No distinction is made between them in terms of entry requirements or exit quality thresholds. As the four-year course provides much the same outcome with a comparable qualification, but costs 33% more than the three-year variant, then the TTA needs to justify why it is willing to spend this extra funding for no apparent gain. Clearly the importance of a common measure of output needs to be clarified so that courses and institutional provision can be compared in terms of cost effectiveness (Woodhall, 1987:397).

The recommendations are that the TTA should:

- Require accredited providers to cost their ITT provision to demonstrate how funding will be allocated for a particular sized cohort.
- Use such information to identify a price (student fee) for each type of ITT course.
- Require that Ofsted inspections teams have access to audited accounts for ITT courses to ensure that
  - ♦ TTA funding is directed at ITT courses;
  - ♦ the funding is appropriately distributed between the HEI and partner schools;
  - ♦ priority issues (from development plans and TTA initiatives) are appropriately funded; and
  - ♦ the extra funding received by four year courses is justified in terms of the extra quality of outcome.
- Justify the extra expenditure on four-year undergraduate courses or move to a funding pattern based upon the qualification rather than length of course (define output and course effectiveness).

For the application of costing systems to ITT provision in HEIs

Costing is only possible where the data are available. In most HEIs, particularly in relation to the college-based elements, this information does not appear to be readily available. From the study

this would appear to be mainly due to the lack of procedures rather than because of some economic impossibility. HEIs need to recognise the importance of the information, particularly to the course management, and institute appropriate systems to gather and collate the data.

Each HEI needs to explore the different costing systems suggested by the JCPSG (2000) and decide which approach would be most appropriate in their case. They need to ensure that staff are properly trained in the application of the data to the system and are also aware of the information that it can provide and how this can be employed in the decision making processes. Higher education is a high cost activity, not just in terms of resources, but also in the opportunity cost of the highly qualified staff and students. A systematic approach to costing, which requires all sources to be identified and justified, goes a long way to ensuring that the provision is both efficient and effective. Above all, any costing system introduced will need to be consistent and compatible with initiatives in the HE sector in general.

Significance of the Study

The state of the literature prior to this study

The lack of previous research in this particular area – undergraduate courses that combine both academic study and professional experience as key and assessed elements of the course – was a particular driving force behind the production of this thesis. The review of literature identified several key areas of research related to the financial management of HEIs which were defined by the work on unit costing by Carr (1994) and cost effectiveness by Woodhall(1987). First of these was the mode of course delivery, which examined the financial merits of distance learning (Open University, University of the Air (Japan), Athabasca University (Canada)) and e-learning relative to more traditional means. These studies tended to focus on means of generating and analysing comparative data, particularly the concept of 'educational output'. Other studies focused on the cost viability of HEIs and individual courses (e.g. DeHayes and Lovrinic, 1994) or calculating the cost of the provision of particular services (library - Goddard & Ooi, 1998), or the course cost components (Ahumada, 1992), within the HEI. More recent British studies, as a result of financial transparency concerns, in particular JCPSG (1998, 2000), have offered processes by which institutional costing systems might be developed.

Although some studies had taken into account the particular demands of HE course which combined both academic and professional elements (Ahumada, 1992 and Throsby, 1986), none had attempted to produce a costing system sufficiently detailed to enable a course manager to use it as a basis of decision making for resource determination. Clearly the work of DeHayes and Lovrinic (1994) would allow such a level of decision making, but it was with a purely academic course.

With significant changes over the last decade to the structure, length, expectations, quality assurance inspections, qualifications and course fees of ITT provision within HE, the financial foundation of such courses was beginning to be doubted by colleagues working in the area. Such doubt could not be formally or adequately expressed due to the lack of coherent information. Officials of the TTA had also expressed their concerns to individuals working in the sector, particularly with regard to the practice of 'top-slicing'. These concerns ultimately resulted in the publication of "The Use of Resources in Partnership" (TTA, 1999). This work can now perhaps be taken further as a result of the growing need for the finances of HE to be more transparent to public scrutiny.

Insights developed as a result of this study

In attempting to collate and compare costing systems in use in different HEIs, the revelation has been the distinct lack of means by which course leaders can make informed decisions. This can be seen as a confirmation that the findings of Palfreyman (1991) are still valid today at a time when the funding of HE in Britain has become even more restricted. This study suggests that HEIs have systems in place to establish a rough estimate of viability based upon the notion supported by Jandhyala (1983), Ajayi (1988) and Ahumada (1992) that academic staff cost is the key determinant. Costing systems which would be of more direct use to course leaders either do not exist or are not in use. This study has produced a formulaic approach to costing that, with adaptation, could be applied more generally and more closely aligned with the ideals of Woodhall (1987) and Carr (1994).

This study has also suggested a way by which QTS and non-QTS might be compared. By identifying and offering means of costing four distinctive elements: QTS, BA, ITT course attendance, and HE attendance the possibility now exists of linking the additional fees attached to QTS as opposed to non-QTS courses to the provision of that element of the course.

In practical terms, the detailed costing system that was developed as part of this study will allow the case study HEI to take more informed decisions about the nature of their undergraduate ITT provision. Detailed comparisons will be possible with non-QTS courses within the HEI.
The research has also raised serious questions concerning the policy of the TTA with regard to the funding of three- and four-year undergraduate QTS courses. The extra cost of the four-year course needs to be carefully justified in quality terms as part of any cost-effectiveness analysis.

This study has further brought into question the policy of HEIs towards the 'top slicing' of income to fund centrally provided services and activities. The opaqueness of such processes is becoming increasingly difficult to justify, particular with increasingly vociferous demands that publicly funded bodies should be more open to scrutiny. This issue made front-page news in the Times Higher Educational Supplement (Goddard, 1999), just as this thesis was nearing completion, in respect of the research funding received by HEIs from the Department of Trade and Industry. Due to the lack of adequate financial information, both the DTI and the HEIs were able to claim that cross subsidisation was taking place. Naturally HEIs were claiming that income from teaching was being used to subsidise research and the DTI was claiming the exact reverse. A fully costed approach to activities within HE, as proposed here, would open such claims to public scrutiny.

This study has collated and reviewed the literature and research from a range of closely related areas within the field of costing academic activity in higher education. By carrying out a survey of course managers it has identified both an unsatisfied demand for financial management tools applicable and specific to this area and the extent to which those managers are concerned about the financial well-being of their courses.

By using the survey as justification for the development of a costing system with sufficient refinements to account for both HE and school-based elements of an undergraduate ITT course, this thesis has made a significant addition to the current body of knowledge. What is required now is for those in positions of influence within HEIs and the TTA to recognise the importance and necessity for such systems.

There now needs to be further research to identify or develop a costing system, that all HEIs will be able to adapt, to allow, on one level, for aggregate comparisons to be made, and on another for course leaders to be able to manage their courses effectively and efficiently. The work of Hans (1996) suggests that such financial management approaches are already well established in the

USA; it now requires further work on this side of the Atlantic to demonstrate their value within HEIs in Britain. Following the positions taken up by the DTI and the TTA, it is clear that the time is now ripe for HEIs to accept the need for more highly developed financial control systems than they currently have available.

Course managers, given the detailed costing system, would have a starting point on which to base their requests for further information on the financial make up of their courses. They should now be able to begin to examine the HEI based elements of their courses as well as the school-based costs.

Summary

The key problematic financial issues that ITT courses need to tackle, are the flow of funds from HEIs to schools and the need to constantly update and change courses. In both cases the costs are very visible within the institution. The transfer of funding because it results in a flow of funds from the HEI rather than a flow within. This makes it very difficult for HEI managements to ignore and, in many cases, they seem to perceive it as a loss to the institution - according to the interviews with course leaders. The constant rewriting of courses to comply with changing course regulations is identified within most HEIs through the course validation process, where changes to the content, structure or assessment procedures must be ratified. In this case the costs are not so immediately apparent, as they are retained within the institution, but the management cannot be entirely unaware of them due to annual review and validation processes.

Course leaders claim an intuitive awareness of the costs attached to their courses but frequently lack the means of tracking or controlling cost more effectively through formal structures or systems. Course leaders would welcome the availability of such systems but appear to be balked by the lack of information or access to that information which is collected. The survey suggests that there is a 'pent-up' demand for a means of managing costs more effectively at the course management level in order to inform design and resource allocation decisions.

Although the value of costing courses in HE can be appreciated by both senior managers, to address issues of course viability within a portfolio of courses, and by course managers, to inform decisions regarding the design and operation of courses, the information is not usually available. It would appear from the survey that the majority of HEIs simply do not have the financial accounting

systems in place to either collect or collate the necessary information, a point also supported by Palfreyman (1991).

The need within HEIs to develop a more detailed approach to costing which would incorporate a greater range of cost factors and provide a greater range of financial management information is currently being addressed at a national level by the JCPSG. This should only be regarded as being completely successful if it is able to satisfy the needs of the course leaders to have information on which to base organisational and operational decisions, the HEI management to make strategic decisions and the public funding agencies, who require assurances that the funds are being effectively and efficiently managed.

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Appendix 1

Course Costing Questionnaire

1. Please Identify:

The title of your post .....

Your relationship to the undergraduate initial teacher training (ITT) courses

.....

Are you willing to discuss your responses further with the researcher? Yes/No

If yes, please provide contact details

Name

Address

Phone/email

2 Costing Undergraduate ITT Courses

Is the course costed? Yes no don't know

If 'no', please go to question 5

If yes,..

Who is it costed by?.....

When is it costed?

On validation __

Annually __

Other __

3 Costing Systems

Which of these factors are used to cost your ITT course? (please tick all that apply)

Academic staffing __	Printing _
Teaching rooms _	Library _
IT _	Postage _
Admin staffing _	Funding transferred to schools _
Staff/student transport _	Other _ Don't Know _

Are School , Faculty , Institutional costs accounted for? (please tick if 'yes')

If yes,

How? .....

Is a School , Faculty , Institutional wide costing system used? (please tick if 'yes')

If yes,

Please describe .....

4 Uses of the Costing System

Who has access to this information? (please tick all that apply)

Course Leader Head of School/Faculty Directorate

School/Faculty Finance Officer Institution Finance Officer

Other Don't Know

How is the information used? (please tick all that apply)

Staff allocation Resource allocation Course viability

Student numbers Other

5 Influence of Costs

Do costs have a significant impact on the structure and operation of ITT courses at the following stages?

Design stage Annual planning Day-to-day Other

None of these

If appropriate, how do costs impact on your undergraduate ITT course(s)?

Are the costs of resources having an increased influence on the nature of your undergraduate ITT courses? Yes (please amplify below) No

Appendix 2

Calculation of School-based Costs

Student numbers (S)	162	148	136
Transfer of funding (C£)	200	175	150
Length of placement (L)	40	55	38
Number of tutor visits per student(V)	2	3	3
Training cost coefficient per school (a£)	0.55		
Transport cost per student(b£)	2.24		
Hourly tutor pay (d£)	65		
Tutor transport cost (e£)	4.1		
Communication cost per school (f£)	9.5		
Communication cost per student (g£)	6.5		
Admin cost per school (h£)	55.5		
Admin cost per student (j£)	12.35		
Number of partner schools (P_a)	149		

School-based Element

Partnership costs $P_a(ad+f+h)$	£ 15,011.75
Student costs $(g+j)(\Sigma S_i)$	£ 8,407.10
Tutor costs $(d+e)(\Sigma V_i S_i)$	£ 81,261.60
Student transport cost $b(\Sigma L_i S_i)$	£ 44,325.12
Transfer to partner schools $(\Sigma C_i S_i)$	£ 78,700.00
Total school-based costs (T_{sbc})	£227,705.57

Calculation of the marginal student school-based costs using the cost function:

$M_{sbci} = g+j + (d+e)V_i + bL_i + C_i$

Year 1	£	446.65
Year 2	£	524.35
Year 3	£	461.27

Calculation of the marginal partnership-school, school-based costs using the cost function:

$M_{Pa} = ad+f+h = £100.77$

Appendix 3

Calculation of HEI-based Costs

Student numbers (S)	162	148	136
Hourly tutor pay (d£)	65		
Subject contact Hrs (B)	130	160	110
Prof Studies Contact hrs (P)	50	40	40
Specialism contact hrs (L)	30	50	40
Groups per Cohort	6	6	6
Fraction Of SS taught in lectures (Bl)	0.1	0.1	0.1
Fraction of PS taught in lectures(Pl)	0.2	0.2	0.5
PS tutorials (Pt)	1	1	1
Spec tutorials (Lt)	0	0	1
Hire of tutor room (Rt)	5		
Hire of seminar room (Rs)	25		
Hire of Lecture theatre (Rl)	80		
Clerical and admin salaries (Cl)	48750		
Admin room use (in hours)	1960		
Tutor management time (in hours)	625		
Student consumable cost coef (x)	31.5		
Group consumable cost coef (y)	86.7		
HE Based Costs			
Academic Salaries (A)	£303,712.50		
Academic Room Costs (R)	£ 94,413.00		
Course Management costs (M)	£141,500.00		
Course Consumables (J)	£ 15,609.60		
Central costs (library, IT) (K)	£ 13,380.00		
Total HE-based Costs (T-HEIB)	**£568,615.10**		

Appendix 4

Calculation of Total Course Costs

	Yr 1/combined	Y2	Y3		Average	% of income
Income				£1,111,434.00	£2,492.00	
Cost Calculations						
Student numbers (S)	162	148	136			
Transfer of funding (C£)	200	175	150			
Length of placement (L)	40	55	38			
Number of tutor visits per student(V)	2	3	3			
Training cost per school (a£)	0.55					
Transport cost per student(b£)	2.24					
Hourly tutor pay (d£)	65					
Tutor transport cost (e£)	4.1					
Communication cost per school (f£)	9.5					
Communication cost per student (g£)	6.5					
Admin cost per school (h£)	55.5					
Admin cost per student (j£)	12.35					
Number of partner schools (P_a)	149					
Subject contact Hrs (B)	130	160	110			
Prof Studies Contact hrs (P)	50	40	40			
Specialism Contact hrs (L)	30	50	40			
Groups per Cohort	6	6	6			
Fraction Of SS taught in lectures (Bl)	0.1	0.1	0.1			
Fraction of PS taught in lectures(Pl)	0.2	0.2	0.5			
PS tutorials (Pt)	1	1	1			
Spec tutorials (Lt)	0	0	1			
Hire of tutor room (Rt)	5					
Hire of seminar room (Rs)	25					
Hire of Lecture theatre (Rl)	80					
Clerical and admin salaries (Cl)	48750					
Admin room use (in hours)	1960					
Tutor management time (in hours)	625					
Student consumable cost coef (x)	31.5					
Group consumable cost coef (y)	86.7					
School-based Element						
Partnership costs (P_a(a+f+h)	£ 15,011.75					
Student costs (g+j)(Si)	£ 8,407.10					
Tutor costs (d+e)(Vi Si)	£ 81,261.60					
Student transport cost b(L-iS-i)	£ 44,325.12					
Transfer to partner schools (C-iS-i)	£ 78,700.00					
Total school-based costs (T-sbc)	**£227,705.57**				£ 510.55	20%
HEI-based Element						
Academic Salaries (A)	£303,712.50				£ 680.97	27%
Academic Room Costs (R)	£ 94,413.00					
Course Management costs (M)	£141,500.00					
Course Consumables (J)	£ 15,609.60					
Central costs (library, IT)	£ 13,380.00					
Total HEI-based Costs (T-HEIB)	**£568,615.10**				£1,274.92	51%
Total direct course costs	**£796,320.67**				£1,785.47	72%

Appendix 5

Derivation and Calculation of Marginal Costs

Marginal cost functions for the school-based elements of the course have already been presented in appendix 2:

$M_{sbci} = g+j + (d+e)V_i + bL_i + C_i$ (student marginal school-based costs for cohort i)

And $M_{Pa}= ad+f+h$ (partnership school marginal costs)

From

$A= d\Sigma(B_i (B_{li} + G_i - G_iB_{li}) + P_{ti}S_i + (P_i - P_{ti})(P_{li} + G_i - G_iP_{li}) + L_{ti}S_i + G_i(L_i - L_{ti}))$ (academic salaries)

And $R= B_i (R_lB_{li} + R_s(G_i - G_iB_{li})) + R_tP_{ti}S_i + (P_i - P_{ti})(R_lP_{li} + R_s(G_i - G_iP_{li})) + R_tL_{ti}S_i + R_sG_i(L_i - L_{ti}))$ (academic room costs)

And $J = x\Sigma S_i + y\Sigma G_i$ (course consumables)

First derivatives with respect to the marginal student and marginal group can be produced:

$M_{HEIBCi} = (R_t+d)(P_{ti}+L_{ti}) + x$ which can be combined with M_{sbci} to produce:

$M_{Ci} = g+j + (d+e)V_i + bL_i + C_i + (R_t+d)(P_{ti}+L_{ti}) + x$ (student marginal costs for cohort i)

$M_{Gi} = (R_s+d)((B_i(1-B_{li}) + (P_i(1-P_{ti}) + (L_i-L_{ti})) + y$ (group marginal costs for cohort i)

Appendix 6

Cost change due to an increase in the proportion of teaching delivered through large lectures

(Compare with original calculations in appendix 4)

Income				£1,111,434.00	£2,492.00	
Cost Calculations						
Student numbers (S)	162	148	136			
Transfer of funding (C£)	200	175	150			
Length of placement (L)	40	55	38			
Number of tutor visits per student(V)	2	3	3			
Training cost per school (a£)	0.55					
Transport cost per student(b£)	2.24					
Hourly tutor pay (d£)	65					
Tutor transport cost (e£)	4.1					
Communication cost per school (f£)	9.5					
Communication cost per student (g£)	6.5					
Admin cost per school (h£)	55.5					
Admin cost per student (j£)	12.35					
Number of partner schools (Pa)	149					
Subject contact Hrs (B)	130	160	110			
Prof Studies Contct hrs (P)	50	40	40			
Specialism contct hrs (L)	30	50	40			
Groups per Cohort	6	6	6			
Fraction Of SS taught in lectures (Bl)	*0.5*	*0.5*	*0.5*			
Fraction of PS taught in lectures(Pl)	*0.5*	*0.5*	*0.5*			
PS tutorials (Pt)	1	1	1			
Spec tutorials (Lt)	0	0	1			
Hire of tut room (Rt)	5					
Hire of sem room (Rs)	25					
Hire of Lect theatre (Rl)	80			Marginal Cost Change		
Clerical and admin salaries (Cl)	48750			actual change	%	
Admin room use (in hours)	1960			-£ 85,328.00	-3424%	
Tutor management time (in hours)	625					
Student consumable cost coef (x)	31.5					
Group consumable cost coef (y)	86.7					
School-based Element						
Partnership costs (P(a+f+h)	£ 15,011.75					
Student costs (g+j)(Si)	£ 8,407.10					
Tutor costs (d+e)(Vi Si)	£ 81,261.60					
Student transport cost b(L-iS-i)	£ 44,325.12					
Transfer to partner schools (C-iS-i)	£ 78,700.00					
Total school-based costs (T-sbc)	**£227,705.57**				£ 510.55	20%
HEI-based Element						
Academic Salaries (A)	£231,432.50				£ 518.91	21%
Academic Room Costs (R)	£ 81,365.00					
Course Management costs (M)	£141,500.00					
Course Consumables (J)	£ 15,609.60					
Central costs (library, IT)	£ 13,380.00					
Total HE-based Costs (T-HEIB)	**£483,287.10**				£1,083.60	43%
Total direct course costs	**£710,992.67**				£1,594.15	64%