University Costing Systems: A Case Study on Value Management

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Abstract
In recent years UK universities have faced financial pressures leading to a focus by various stakeholders on financial management information. Criticism has been made of inadequate financial systems inappropriate to assisting senior management in planning, control and decision-making. Sporadic attempts at the implementation of Activity Based Costing techniques has neither been met with outright commendation nor is it in widespread use across the sector. The recent Government initiative of Transparency Review aimed at improving the quality of the costing information is in its infancy but can be seen to be limited in its perspective.

This paper considers an alternative methodology of costing within education which can be used by the majority of the sector. This system attempts to cost institutions' activities down to the lowest apposite levels of activity e.g. by module or research project, collected both on a marginal costing and a full costing basis. Related income streams can then be applied to these activities in order to arrive at the "value added" by the activities. The paper describes the methodology via a case study in its application, and concludes with recommendations as to the usefulness of the methodology within educational institutions.

Introduction
Management accounting as a discipline has its origins in costing practices although these still remain as a core part of the services it provides. Whilst the focus for many years of management accounting was upon the manufacturing sector there has been significant study given to the service, and not-for-profit sectors in recent years. With increasing governmental pressure for greater efficiency, higher educational establishments have been forced to consider the costs of providing education to students on each type of course or programme. A number of academics and practitioners in the 20'th century have considered the development of financial management information in Higher Education establishments e.g. Stevens and Elliott (1925).

This paper seeks to consider the applicability within the higher education sector of a value based management system which breaks down institutional costs to a lower cost unit basis (modules and research projects) whilst linking these costs with income levels received. The paper will review the background of financial management in the education sector and then consider the methodology of the value-based system concluding with comments of its usefulness to the sector.

Background: Costing in HE
The importance of financial management information to Higher Education establishments has been with us for many years. The last decade has seen an increase in the financial pressures placed upon UK universities' performance as well as an increasing emphasis on accountability. In addition to this Sir Ron Dearing's Commission seeks to address the areas of the size, shape, structure, purpose and funding of post secondary education in the next twenty years. Financial management has thus come to the fore as an area of key importance.

The development of financial management systems within the HE sector has been somewhat cumbersome and fragmented. The original purpose of accounting systems was seen to be one of stewardship and financial reporting with management accounting information being a by-product of these systems (Pendlebury and Algaber, 1997). The "Jarrett Report" published in 1985 (CVCP, 1985) made a number of points regarding financial management concluding that "most management accounting systems are inadequate". The report drew attention to the need for improved management accounting systems, improved financial management information, a greater understanding and awareness of direct and indirect costs as well as the devolution of financial responsibility and control to cost centres. The Hanham Report (CVCP, 1988) recommended that universities adopt an approach to full costing "based on methodology consistent with principles accepted by industry and the government".

The Higher Education Funding Council (HEFC) published its "Costing Guidelines for Higher Education Institutions" (1997). Within the document Professor David Westbury states that "sound costing information to underpin decision-making in higher education institutions is vital, particularly as financial constraints become tighter". This is further underlined in a report by the Comptroller and Auditor General (National Audit Office, 1998) where adequate management of public funds was seen to require an understanding of cost recovery and net operating surplus/deficits on all courses and activities.

However despite the financial pressures placed on institutions and the development of financial management techniques applied elsewhere, the higher education sector has not been seen to implement robust systems over these years. Ahumada (1992) noted that despite the ongoing demand in higher education for analytically derived cost information, the use of costing for internal management purposes had up to that point been under utilised. Cropper and Cook (2000) noted as recently as 1998 that 83 per cent of respondents to a survey were dissatisfied with their costing system within the university sector.

A condition for the extra funding granted in the 1998 Comprehensive Spending Review was a requirement by the Government for institutions "to demonstrate the full costs of research and other publicly funded activities in order to improve public accountability" (Joint Costing and Pricing Steering Group (JCPSG), 2000). This has been the main driver for the recent "Transparency Review" (TR) initiative being implemented across universities in the UK. TR is a generic framework from which universities must provide information on the costs of the main types of activity (Teaching (publicly funded and non-publicly funded), Research (publicly funded and non-publicly funded) and Other) with the information being calculated both at a macro (university level) and a micro level (departmental). Indirect cost rates are also to be calculated at departmental level. Whilst there is a requirement for the above information to be prepared for each institution, TR is meant also to be a catalyst to providing costing and information systems for institutions' own management purposes.

In its search for a more effective information system, sections of the HE sector have considered and in a number of cases implemented Activity Based approaches to costing. ABC emerged in the late 1980s as a popular form of costing. Criticisms of more traditional costing methods such as absorption costing led to a search for a more accurate and logical methodology. ABC was propounded as being such a mechanism whereby the focus was on calculating the costs of activities using appropriate unit cost bases linked to causal effects of costs. Innes and Mitchell (1995) and Innes, Mitchell and Sinclair (2000) provide a brief overview of the criticisms of conventional approaches to costing, outlining the main uses of ABC whilst reviewing the limited uptake of the methodology. The process involves the identification of activities (activity mapping), the costing of the resources applied to the activities, the identification of appropriate cost drivers for each activity (the causal factor leading to the activity occurring) and finally the calculation of a cost driver rate.

The notion of applying ABC within higher education institutions is nothing new. Port and Burke (1989) applied ABC to the university sector arguing that attaching costs to activities raised awareness on costs and values. A number of case studies were published[1] as well as a number of cross sectional surveys[2] of the application of ABC within universities. Cropper and Cook (2000) considered the application of ABC over a 5-year period of time. In 1998 it was seen that only 9 per cent of respondents to their survey had introduced ABC, with 16 per cent intending to introduce it. Of those rejecting ABC 46 per cent had identified other priorities, whilst 23 per cent viewed it as merely another arbitrary allocation method. Other reasons given included a lack of resources and a lack of evidence of any tangible benefits from its implementation (a feature in common with the private sector).

1 Groves et al. (1994), Acton and Cotton (1997) and Goddard and Ooi (1998)

2 Cropper and Drury (1996), and Mitchell (1996)

Background to the Case Study

In 2001 the authors, in conjunction with a firm of management consultants, were remitted the task of reviewing the strategic positioning of an academic department. In the light of an existing Resource Allocation Model (RAM), questions had been raised regarding a number of academic units and the project sought to bring further light onto the initial findings provided by the RAM. The authors sought to develop a system whereby costs could be broken down not just to departmental level but also to appropriate cost objects. Cost objects can be defined as activities for which a separate measurement of costs is desired. Models were found to be in existence in the university being considered, whereby full costs were calculated for academic departments (where the departments were seen as being the cost objects).

The authors sought to develop a system with a different focus for the costs with the cost objects being the outputs achieved by the academic units (e.g. taught modules, research projects). This not only would give depth to the level of review but also could cut across departmental boundaries as the modules taught and research projects undertaken could be shared between departments. This approach adopted elements of ABC although activities were defined in terms of identifiable outputs. In addition to this an approach was adopted which sought to consider not only the costs of those outputs but also the income streams attached to those outputs. This linking of costs to incomes is in line with Value Based Management (VBM) thinking.

The concept of value has normally been applied to commercial business entities with the aim to maximise shareholder wealth. However this concept of managing value could also be applied to the not-for-profit sector especially those organisations where there is pressure from funding bodies (such as HEFCE) to generate surpluses either as an organisation as a whole or in relation to specific business units. Organisations need to consider the value they provide. The commercial and the not-for-profit sectors are required to review this in relation to those providing funding (shareholders and taxpayers respectively). The information collected can be built into strategic thinking by assessing the projected future added value to a business in relation to proposed strategies. Mills (1998) states that "whilst this may be undertaken at a consolidated level, the reality is that VBM needs to be exercised at least at business unit level". He then outlines steps to break down value below corporate level including:

- Defining the main business activities to be measured;
- Collecting data relevant to those activities;
- Valuing individual activities.

The valuation of the individual business activities, he suggests, can be calculated by considering the cash flows relating to each activity. However this would also involve the use of transfer pricing between activities as well as corporate centre costs in order that each activity can be viewed on a "stand alone basis". Thus there would be a requirement to charge for support service costs in order to arrive at full economic cost of activities.

Within this value-based model the pre-eminent difficulty will be in the valuation of the outputs from education. The value based model that will be considered will use the income streams as a surrogate figure for value. The levels of resource given by Government can be regarded as a statement of the value placed on the educational service provided, given the specific resources required to provide that service. However academics have wide variations in the approach to defining education and thus placing a value upon it. The placing of economic values onto such a subjective area as education is bound to raise heated debate.

Case Study: The construction of a Value Based Management Information System for an academic unit

A value-based model was constructed for an academic department using the accounting period ended 31/7/01 and using actual data. This provided 'hard' information regarding the department's total cost

and income streams, from which allocations to the various activities would provide further information for analysis. The model was constructed for the 2000/2001 academic year and its summary information showing surplus/deficit (economic value) by activity such as taught module can be found in Appendix A. This paper uses the methodology developed during this original exercise and applies the model developed in a simulated case study of a fictional university department, for reasons of confidentiality. However the case study simulated has been constructed using realistic parameters of the type of department often encountered, with a mix of workload dominated by teaching activities but also with significant research and other activities. In considering the model constructed the architecture would lend itself to the majority of academic departments with limited adjustments to contextualise to the differing environments. The model framework was constructed using the steps detailed below.

1. Identifying activities

At the commencement of the project appropriate key activities were identified for which costs and incomes would be collected. These activities were seen to be of a level of significance warranting separate attention regarding their value to the department. The activities selected were:

a) *Undergraduate teaching:* This would be presented in terms of individual modules as well as for each programme in total. The model broke the information down to its lowest apposite level (modules) which also allowed the information to be aggregated by programme if required (as shown in appendix A). It should be noted that inter-departmental teaching did not pose a problem as the costs and incomes were allocated to departments based on agreed workload sharing between departments. Thus if a module was taught 70 per cent by one department and 30 per cent by another then the Full Time Equivalent (FTEs), to which for example the income streams would be attached, would be split in these percentages. In this way the model was able to consider the modules in isolation but also to aggregate the modules to departmental or programme level.
b) *Research:* All research activity of the department was collected under one heading although the splitting up of research into individual significant projects and a separate "catch all" category for all other research could have been adopted.
c) *Other income generating activities:* All other activities not included in the above categories.

2. Allocating costs and incomes to activities

Once the activities were defined the next step was to allocate all costs and incomes relating to the department to those activities on as fair and defensible a basis as possible. The sources of costs and incomes and the method of allocating them to activities were as follows:

The Finance Department provided data of the income streams to the department, which included:

a) *Undergraduate tuition income:* Actual student numbers were combined with the relevant teaching grant rates and tuition fees. These income streams were then allocated to modules based on the full time equivalents (FTEs) relating to each module.
b) *Postgraduate tuition income:* Actual student numbers were combined with the relevant teaching grant rates and tuition fees. These income streams were then allocated to the research activities of the department.
c) *Research income:* The university's trial balance includes both an RAE account and an external fee income account (showing external grant transactions) within which both costs and incomes are recorded. This area provided a problem when constructing the value based model. Both RAE and grant income when received are spread over a number of years. The question posed was therefore whether to show in any one year the grant income that was secured or the income that was spent. The university's policy (as well as accounting convention) is to match the costs with the incomes in a period. Therefore, the income taken into the model was seen to match with the actual expenditures incurred in that year. The income figures that resulted were therefore allocated directly against the research activity of the department.

d) *Other income:* Two further sources of income were recognised:

- The department runs evening classes for which the income stream was identified via the number of students and the related teaching grants and tuition fees.
- The department also runs specialised courses and carries out consultancies for third parties. The incomes for these activities were identified from the trial balance on the external fee income account.

A separate activity was set up for each of these two activities and the income streams identified allocated directly to them.

Appendix D shows the allocated income calculations in total and by module.

3. Payroll costs (academic)

The payroll costs for the department for the 2000/2001 period were extracted from the departmental payroll data and agreed with the trial balance.

a) *Defining the working week*: Discussions were held regarding what constituted the number of hours that staff worked within a normal week, and also as to whether any excess time over that contracted should be taken into the model. It was obvious that, while some staff members worked within the contracted hours (32.5 hours per week), there was a significant number who worked well in excess of this time. It was noted that the transparency review model accepted by universities within the UK had adopted a model based on the total hours staff expend irrespective of whether it was outside of the employee's contract. Concern was raised that the model could penalise research activity (normally conducted outside of contractual hours) should the total work hours be used. There was a great deal of debate and uncertainty about which method of collection would give a fairer reflection of departmental activity. One argument raised was that work done outside university time could be regarded as a free good and could be ignored whereas another argument suggested that we compare all incomes with the total economic cost of the activities leading to the incomes. The payroll cost base was never in doubt here but rather the number of hours of activity that would be used to allocate those costs. It was therefore agreed that the model should be run using two different models and analysis be made of the two models before conclusions were reached. The two models were:

- A model based on 1,300 hours worked per annum (32.5 hours per week x 40 weeks);
- A model based on the total hours worked by each member of staff.

b) *Allocating staff time:* It was imperative to the model being robust that staff time be allocated with as much precision as was possible. It was agreed that academic staff time spent on undergraduate and evening tuition (a significant element in an academic department) be collected by reviewing each module which the department offered. A pro forma was used to detail by name all staff involved in each module, including lectures, seminars, tutorials, examination setting and marking, module leadership, etc. Obviously the method of collection of data was vital to the validity of the model as it could be left vulnerable to exaggeration, optimism or pessimism. Thus a number of cross checks were built into the system including the programme organisers detailing the teaching input rather than the lecturers as well as reasonableness checks by departmental timetablers and finally by the head of department. Once this was collected, agreed weightings were attached to the different modes of involvement, e.g. repeat lectures were initially weighted at 2.5 hours for each hour of actual lecture. The 2.5 hour weighting was an agreed allocation of the average hourly work undertaken for an average lecturing hour. It should be noted that the model was later easily adjusted with differing weighting to bring more realism to the model (e.g. new modules were given a weighting of 5). In addition to this, the head of department circulated a form such that staff could also identify their

research related activities (e.g. graduate supervision, post doctoral supervision, etc). Once this information was collected, the data was input into the two models (1,300 hours and total hours). This was worked out as follows:

The 1,300 Hour Model: A spreadsheet model showed the build up of each individual academic's time relating to undergraduate tuition, research and related activities. The model thus constructed allowed various configurations of staff time and cost. Appendix B shows the total hours per member of staff and their average cost per hour and Appendix C charges actual hours (weighted in relation to the type of work undertaken) to modules. Details of involvement in external examining and attending government and professional committees were summarised and included in Appendix B under "other academic related activities". The forms circulated by the head of department regarding research activities were summarised and the information included in Appendix B under "research related activities".

It should be noted that on occasions after the collection of staff time, to which appropriate weightings had been applied, a balancing figure was left for some staff members. This represented a surplus capacity of staff time and flagged up to management where staff were not being utilised effectively. In the model this "spare" time was appropriated to an activity named "other unallocated teaching/admin support" (refer to Appendix B) and later recharged against the taught modules as the staff members with the spare capacity were not research or consultancy active. This information provided management with details for the total cost effect of the spare time as well as the information relating to each individual. In addition the model was used to contrast the workload of certain staff who were over burdened (often the research active staff) with those with a lighter load. When the model was run again using total hours it again emerged that a number of staff still were seen to be under capacity (with the treatment of this spare capacity in the revised being the same as detailed above in the 1,300 Hour Model).

Table 1 is an example of a fictional member of staff and how their costs could be allocated to modules, and so on:

Table 1
The 1,300 hour model

Staff member: J Smith							
Module	**Lectures**	**Lectures** *x 2.5 hrs*	**Seminars**	**Seminars** *x 1.5 hrs*	**Tutorials**	**Marking**	**Total**
MOD 01	30	75	25	37.5	15	60	187.5
MOD 02	15	37.5	40	60	30	20	147.5
MOD 03	40	100	25	37.5	30	20	187.5
MOD 04	60	150	10	15	20	20	205
							727.5
Other teaching related							40
Departmental Admin							100
Research							300
Balance Other Unallocated teaching/admin support							132.5
							1300.0
J Smith's salary (gross)		£40,000					
Average hourly rate		£30.77	(£40,000/1,300)				
Charge to module MOD 01				£ 5,769.23	(187.5 hrs x £30.77)		
Charge to module MOD 02				£ 4,538.46	(147.5 hrs x £30.77)		
Charge to module MOD 03				£ 5,769.23	(187.5 hrs x £30.77)		
Charge to module MOD 04				£ 6,307.69	(205 hrs x £30.77)		
Other teaching related				£ 1,230.77	(40 hrs x £30.77)		
Departmental Admin				£ 3,076.92	(100 hrs x £30.77)		
Research				£ 9,230.76	(300 hrs x £30.77)		
Balance Other Unallocated teaching/admin support				£ 4,076.94	(132.5 hrs x £30.77)		
Total recharged				**£40,000.00**			

Under the *Total Hours Model,* the same approach as above was undertaken, such that a staff member's salary would be split over all of the hours they have worked (obviously resulting in a lower hourly rate where more than 1,300 hours were worked). An illustration in Table 2 of this would be as follows:

Table 2
Total hours model

Staff member: J Smith							
Module	**Lectures**	**Lectures**	**Seminars**	**Seminars**	**Tutorials**	**Marking**	**Total**
		x 2.5 hrs		*x 1.5 hrs*			
MOD 01	30	75	25	37.5	15	60	187.5
MOD 02	15	37.5	40	60	30	20	147.5
MOD 03	40	100	25	37.5	30	20	187.5
MOD 04	60	150	10	15	20	20	205
							727.5
Other teaching related							40
Departmental admin							100
Actual research							610
							1477.5
J Smith's salary (gross)		£40,000					
Average hourly rate		£27.07	(£40,000/1,477.5)				
Charge to module MOD 01		£ 5,076.14	(187.5 hrs x £27.07)				
Charge to module MOD 02		£ 3,993.23	(147.5 hrs x £27.07)				
Charge to module MOD 03		£ 5,076.14	(187.5 hrs x £27.07)				
Charge to module MOD 04		£ 5,549.92	(205 hrs x £27.07)				
Other teaching related		£ 1,082.91	(40 hrs x £27.07)				
Departmental admin		£ 2,707.28	(100 hrs x £27.07)				
Research		£ 16,514.38	(610 hrs x £27.07)				
Total recharged		**£40,000.00**					

Details of the modules on two undergraduate courses and their allocated staff hours are summarised on Appendix B columns two to 10. Column 10 on appendix B shows the total undergraduate teaching hours. Other hours for evening classes, departmental administration, research and research related activities are then added in the remaining columns giving total academic hours per year.

4. Payroll (support staff)
These costs were identified from the trial balance. In discussions with the department's management, the costs were apportioned in relation to their individual responsibilities

5. Direct costs (such as consumables)
These costs, applicable to each type of activity, were separately identifiable from the trial balance printouts. The undergraduate and evening class costs were, however, aggregated and split out to individual modules on the basis of the FTEs of each module (thus assuming that the more students involved in a module the greater the costs of consumables, and so on).

6. Overheads
The university's RAM model was adopted in order to charge the overheads to the model. The budgeted overhead figure was therefore selected for inclusion. This figure was then split down in relation to the differing elements of overhead cost making up the total. From this it was then possible to consider each cost element, and charge them to the different activities on as reasonable a basis as possible.

This process is split into two separate activities: charging the overheads to departments and then to activities within those departments. Firstly the central costs of the university were charged to the academic departments using nine cost drivers as shown in Table 3.

Table 3
Overhead cost drivers

Category of cost	Cost driver
Related to academic staff e.g. Quality audit office, Research unit	All full time academic members of staff (ACADSFT)
Related to all university staff e.g. Personnel	All full time equivalent staff members
Library book costs	Books
Related to student numbers e.g. Student refectories, Student services	Estimated Full Time Equivalent Students (ESFTE)
Related to the total volume of throughput of the department e.g. University Court, Information strategy unit	Total expenditure (EXP)
Related to non-academic members of staff e.g. % of information technology support	Full time equivalent non-academic members of staff (NASFTE)
Related to international students e.g. International office	Overseas full time equivalent students (OFTE)
Related to Print Design Services	Volume of print requirements
Space related costs e.g. Estates	Space

Once the central overheads have been allocated by department, the second task is to charge these costs to the different output activities within the academic department. To do this, each individual central cost recharged using the nine cost drivers was considered with regard to how they related to teaching activities, research activities and departmental administration. This was not an easy task as costs were seen to be spread across these different activities. However materiality was used as a guide as to the level of precision required. Where an item was significant then more time was devoted to recharging it fairly. However when the cost item was small then less time was taken on the decision. In addition, as the income generating activities were all teaching related, the teaching related overheads were considered together and would later be split to the different modules and income generation activities at the next stage. Table 4 illustrates how some of the significant overheads were allocated to the different department activities:

Table 4
Charging of departmental overheads to main types of activity

Central cost	Teaching (including non-degree teaching (income generating) activities)	Research	Departmental Administration
Student services	100 per cent	0 per cent	0 per cent
Faculty costs	Percentage charged to T and R based on staff time spent on these areas per step 3	0 per cent	
Estates	Percentage of departmental space related to T	Percentage of departmental space related to R	Percentage of departmental space related to A

Once the costs have been allocated between Teaching, Research and Departmental Administration these were then split down to specific areas within these categories. Thus the teaching overheads were split down to individual modules on the basis of the number of students. The research related overheads were allocated entirely to the research category whilst the administration overheads were allocated to the departmental administration function to be reallocated in step 7 below. In the case study itself the research costs were maintained under the one main category. However this could have been split to individual research projects using appropriate bases such as time spent on individual projects.

Appendix E shows how these costs were charged to the various activities with the overall overheads being allocated to each module in Appendix A.

It is important to recognise that the case study was developed within an institution with a resource allocation model that had been embedded for a number of years. It is expected that in the near future universities will have developed a number of cost drivers as required under Transparency Review enabling the allocation of overheads to Teaching, Research and Other activities by academic department. However the systems of allocation will differ from that shown in this paper. Thus the value based model would require adaptation to the overhead allocation systems adopted within each institution.

7. Departmental administration
Part of the allocation of costs and incomes to activities was an allocation of costs to departmental administration. As can be seen from Appendix A, this was then recharged to all of the other activities on the basis of total other expenditure to date.

8. Unallocated academic time
The final part of the allocation of costs to the activities relates to the recording of unallocated academic staff time as explained above. This was accomplished by allocating the costs based on the FTEs of the department's modules, as these staff were not involved in the research portfolio.

9. Surplus/deficits by activity
The final stage in the model is to calculate the surplus/deficit by activity as can be seen by the final column of the table in Appendix A. This table allows management to review the "economic value" to the department of each activity.

10. Assumptions
Costing models by their nature require assumptions to be made in order to allocate costs between activities. It is important to consider the areas where the assumptions have been made in order to recognise that the model does not offer complete precision, and also to see the potential impact of changes to these assumptions. The costing model described above has made a number of allocation assumptions:

a) The allocations of *academic staff* time: The recording of time by each individual module with reference to the module leader assisted in a healthy level of precision. However this was further corroborated by the head of department's existing estimates of staff time allocated to modules which was seen to reconcile in the main to the former method of data collection. A further test of reasonableness carried out with the head of department considered the individual staff member's workload and this greatly assisted in agreeing the times input into the final model.
b) The allocation of *non-academic* time has been apportioned on the basis of management's definition of their responsibilities. For many staff, their role related clearly to one activity. Other staff required their time to be allocated across activities on the fairest basis dependent on the definition of their role. For example, a member of staff who spent their time administering two

undergraduate programmes would have their time allocated based on the number of students undertaking each module.

c) *Direct costs* were normally charged directly to the activity to which they related. However, those costs relating to undergraduate programmes had to be split to individual modules and this was accomplished using the number of students as an indicator of the resources required by module.
d) The *overheads* were allocated on the fairest basis possible as per Appendix E. On a number of occasions, these overheads could be allocated entirely to one activity – for example, audio visual was charged solely to teaching related activities and split then to modules based on the number of students. However, other activities required a more sophisticated approach. It should be noted that the approaches adopted were in agreement with the methods used in the university's transparency review calculations which have been subject to internal audit.
e) The departmental *administration costs*, which were previously not allocated directly to activities, were later recharged in relation to the total costs accumulated by activity to that point in time. This was seen as being fair in that the figure of expenses related to the total departmental effort on those activities.

11. Results

The results of the costing model for 2000/1 are attached in Appendix A, calculated on the 1,300 Hour Model. In order to gain confidence in the output of the model, it was important that a number of checks were carried out. Throughout the model's construction, reasonableness tests were carried out with the management of the department. These assisted greatly in the model building and provided confidence in the findings.

In addition to these checks, the outcomes were also checked against three other sources: the university's RAM prediction for the department, the university's transparency review findings and a benchmarking exercise undertaken with a key provider of similar courses. For example the Transparency Review calculations for 1999/2000 showed that when considering all staff the percentage of staff costs relating to research was 31 per cent. When compared with the Total Hours Model (which is the same basis as transparency review), the value based model was seen to be close to this with a figure of 33.8 per cent.

Adjustments to the basic model

After the basic model construction was completed and reasonableness tests carried out, a number of adjustments were made to the model to check its reliability in relation to changes in the assumptions made. A number of adjustments could be made showing the versatility and flexibility of the model adopted as well as showing the onward impact of material changes to key factors.

An example of this can be shown regarding the alteration of the number of hours worked by academic staff. The initial model adopted considered the contracted hours only of the academic staff (32.5 hours per week, 1,300 hours per annum). However this could be considered to be an unfair picture of the work undertaken by staff as many work hours outwith that contracted. Therefore it was agreed to run the model on a second iteration using the actual hours worked by staff. It was felt that this would give a fairer reflection of the research work undertaken. This form of work may well have been understated in the earlier model as staff tend to undertake a large majority of research in their own time.

Appendix F shows the changes in costs due to the recalculation based on the actual case study data. Management were of the opinion that this alteration of the assumptions would significantly affect the final cost figures for the teaching and research categories. However the model shows a shift in costs of only £45,291, with the change showing research in a poorer light. This represents 3.4 per cent of the teaching related costs and 6.4 per cent of the research costs. Management were surprised by this as it did not significantly effect the initial model findings and showed that the significant assumptions made did not in fact materially affect the final outcomes of the model.

Reflections on the Value Based Management Model

The model constructed for the consultancy project as illustrated in the fictional case study, as summarised in Appendix A, provided information to management previously unavailable. The model itself was relatively straightforward in its logic although the existence of a robust means of charging overheads to the various activities assisted in its development. The flexibility encountered in the alteration of the assumptions underpinning the model in addition to the straightforward logic would suggest that the model could be adapted to many academic settings. It should be noted that the department involved in the actual case was not a straightforward academic department and involved laboratory and clinical facilities both in teaching and research. However the authors were able to apply the same framework to the Accounting and Finance Department within their own university with few alterations. The difficulties relating to the charging of indirect costs in institutions where no overhead charging exists at present could be eased by the required implementation of overhead charging per the Transparency Review costing models now required in Higher Education.

With regard to the potential benefits, the model does provide information to assist management processes. Managers may become aware of the total costs of running their academic unit where before they may only have had a limited perspective. Clearly the level of subsidy/surplus shown for each module can be reviewed. Whilst economic viability can be questioned this may lead to levels of strategic subsidy being sanctioned as a module/programme may be seen as strategically key to the portfolio of services offered (e.g. dissertation modules). However the position is now more transparent in that the level of subsidy is known whereas before it was merely intuitive. The information may also provide senior management with an awareness of the effects of its educational philosophy (e.g. eLearning). The effects of possible iterations of changes to modules can be predicted using sensitivity analysis by altering the original data input. This can be at a macro level where an entire module could be introduced or de-committed from or to changes in the teaching and learning strategies. Forecasting is also possible of future costs and incomes based on changing parameters.

Pricing and tendering processes may be enhanced as the true costs of providing services are known and can be compared with the current charging levels. For example Continuing Professional Development funding may be at an inappropriate level at present in relation to costs and could be altered to bring it in line with the true costs of provision given that the market will allow this adjustment. Similarly the full costs of research projects may assist in providing more accurate tender information. It may be that the academic department can make a case to the funding councils for greater funding for specific programmes, especially those courses which require specific costs which are not typical to general courses e.g. nursing degrees, based on the more accurate cost data becoming available. In addition to this, stronger cases may be brought forward regarding the under-funding commonly assumed for research activity within the sector.

The process of recharging central costs to academic units is not new and has been developed by a number of institutions using such techniques as resource allocation models. In the case study an existing robust allocation model was in existence and thus the recharge rates were available. The recharging of overheads allows departments to question those rates and the associated efficiency and effectiveness of those units providing the services. In a number of other organisations the recharging of central costs has led to a challenging of those rates and a quest for greater efficiency and accountability. For organisations not in possession of such a robust allocation process the above model provides a structure for recharging those costs.

The devolution of control can be assisted by such a model. However there needs to be a clear distinction made between costs incurred and incomes earned and a need for locating where the decisions are made which significantly impact on those transactions. Academic managers are likely to be disturbed when they are being held accountable for areas well outwith their control (e.g. central overhead charges). However there is a balance to be attained here in that managers do

control some elements of those overheads. For example the recharges for building costs are within the remit of the academic managers as they often influence the rooms that they utilise. A clear demarcation is required of the decision maker and the costs that should be held accountable to that person, linking decision makers with the effects of their decisions.

Before the information can be utilised however there is a fundamental need for a critical review of the accuracy of the costs and incomes shown by the model. The model does not presume to be one of precision especially in relation to the apportionment of central costs and the splitting of non-staff costs to modules. However the model attempts to prepare the information firstly on a contribution basis (where the costs and incomes are more likely to be accurate) and on a full cost basis. Should management not accept the means of apportioning the indirect costs there is still valuable information available at the contribution level (e.g. the level of subsidy required for research before indirect costs are charged). The model was adjusted for differing parameters (weightings given to teaching and the use of accommodation) to see the effect on the surplus and deficit figures and it was noted that the levels did not change significantly. There is ultimately a trade-off between accuracy and useful management information at a macro level. However the sensitivity analysis checks run would show that the usefulness of the macro figures provided outweighed the inaccuracies of the model. Management's attention should be drawn to the "glaring" figures of large deficits/surpluses which would need very significant changes in the model's assumptions in order to alter the perception given by the initial model.

Senior management reflected on the model as being an excellent tool and used the findings to inform their strategic plans. The findings were regarded as beneficial with the proviso that it was based on numerous assumptions and allocations. However the significance of the absolute figures in addition to the sensitivity analysis findings allowed senior managers to recognise that there would require to be significant alterations to the assumptions before the results would change significantly. The model was successful within this instance as management were concerned over a specific situation where a perceived problem was seen to exist as evidenced by macro-university information. The depth of analysis of the model allowed management to understand root causes and seek to make changes to correct the situation. Given that it is a time consuming process where the raw data has not been prepared for other purposes, the model could constructively be used and provide value in areas where management perceive that problems exist within a division (e.g. significant deficits).

The model adopts elements both of the ABC frameworks and also the Value Based Management structure. The model does not attempt to calculate activity costs in their truest ABC sense (such as cost per hour of lecture). Rather the focus has been on charging costs to cost objects that are most helpful to management, that is, in terms of modules, programmes and research projects. These then can be critically reviewed and managed operationally and strategically whereby outputs and inputs are compared using economic values. This is dangerous ground as using the incomes received for a service as a surrogate for the true "worth" of education is perilous if used irresponsibly. However on a pragmatic front the model can bring into question any imbalances that exist where levels of subsidy are unacceptable both economically and strategically. Financial constraints require that universities show prudence in how they expend their resources. The model may assist in showing academic managers both at a macro and micro level how best to manage their resources with one eye on financial awareness and the other on informed educational decisions regarding both the strategic implications educationally and their effects on the institution's budget.

References

Acton, D.D. and Cotton, W.D.J. (1997). Activity Based Costing in a University Setting, *Journal of Cost Management,* (March/April), pp 32-38.

Ahumada, M.A., (1992). U.S. Methods For Costing In Higher education: Taking The Technology Abroad, *Higher Education* Vol. 24

CVCP (1985). *Report of the Steering Committee for Efficiency Studies in Universities,* London, Committee of Vice Chancellors and Principals

CVCP (1988). *The Costing of Research Projects in Universities: A Report and Guidance for Universities.* London, Committee of Vice Chancellors and Principals.

Cropper, P. and Cook, R. (2000). Activity Based Costing in Universities-Five Years On. *Public Money and Management,* April-June, pp 61-68.

Goddard, A., and Ooi, K. (1998). Activity Based Costing and Central Overhead Allocation in Universities: a Case Study. *Public Money and Management* , Volume 18, No. 3, pp 31-38.

Groves, R.E.V., Pendlebury, M.W. and Newton, J. (1994). Management Accounting Information in Universities, a Cardiff Experiential Perspective, in Berry, R.H. (ed), *Management Accounting in Universities.* London, CIMA.

HEFC (1997). *Management Information for Decision Making: Costing Guidelines for Higher Education Institutions.* (HEFCE, HEFCW and SHEFC/ref.M13/97)

Innes, J., Mitchell, F. (1995). A Survey of Activity Based Costing in the U.K.'s Largest Companies. *Management Accounting Research,* vol 6, pp137-153.

Innes, J., Mitchell, F., Sinclair D. (2000). Activity Based Costing in the U.K.'s Largest Companies: A Comparison of 1994 and 1999 Survey Results. *Management Accounting Research,* vol 11, pp349-362

Joint Costing and Pricing Steering Group (JCPSG) (2000). *Transparent Approach to Costing: Volume 1,* Overview and Implementation Pack. London, HEFC

Mills, R.W. (1998). *Value Based Management,* Business Digest, January 1998, The Institute of Chartered Accountants of England and Wales, Issue 8

National Audit Office (1998). *Overseas Operations, Governance, and Management at Southampton Institute,* Report by the Comptroller and Auditor General. (HC13 Session 1994-5, 2 December)

Pendlebury, M. and Algaber, N. (1997). Accounting For The Cost of Central Support Services in UK Universities: A Note. *Financial Accountability and Management*, Volume 13, No. 3, pp 281-288

Port, J and Burke, J. (1989). Why Higher Education Must Learn Its ABC. *Public Finance and Accountancy* (September 1989)

Stevens, E.B. and Elliott, E.C. (1925). *Unit Costs of Higher Education*. Publications of the Education Finance Inquiry. New York, Macmillan.

Appendix A: A University Department - Summary of Staff Time - 1300 Hour Model

			Income	Academic Staff Costs	Administration Staff Costs	Direct Costs	Contribution	RAM Overheads	Recharge of Departmental Admin	Sub-Total	Recharge of Other Unallocated; Teaching/ Admin Support	Net Surplus/ (Loss)
			£	£	£	£	£	£	£	£	£	£
BSc/BSc(Hons) Course 1	Year 1	Module 1	47668.00	4486.15	1299.50	5062.18	36820.17	-20483.51	-4670.80	11665.86	-4467.62	7198.24
		Module 2	47668.00	5822.12	1299.50	5062.18	35484.20	-20483.51	-4670.80	10329.90	-4467.62	5862.28
		Module 3	47668.00	5041.23	1299.50	5062.18	36265.09	-20483.51	-4670.80	11110.78	-4467.62	6643.17
	Year 2	Module 1	44163.00	5479.67	1203.94	4689.97	32789.42	-18977.37	-4327.36	9484.70	-4139.11	5345.58
		Module 2	44163.00	4364.25	1203.94	4689.97	33904.84	-18977.37	-4327.36	10600.12	-4139.11	6461.00
		Module 3	44163.00	3867.69	1203.94	4689.97	34401.40	-18977.37	-4327.36	11096.68	-4139.11	6957.56
		Module 4	44163.00	3892.31	1203.94	4689.97	34376.78	-18977.37	-4327.36	11072.06	-4139.11	6932.94
		Module 5	44163.00	11615.57	1203.94	4689.97	26653.52	-18977.37	-4327.36	3348.80	-4139.11	-790.31
		Module 6	44163.00	5073.26	1203.94	4689.97	33195.83	-18977.37	-4327.36	9891.11	-4139.11	5751.99
	Year 3	Module 1	44864.00	3656.92	1223.05	4764.41	35219.61	-19278.59	-4396.05	11544.97	-4204.81	7340.16
		Module 2	44864.00	4212.18	1223.05	4764.41	34664.36	-19278.59	-4396.05	10989.72	-4204.81	6784.90
		Module 3	44864.00	4130.77	1223.05	4764.41	34745.77	-19278.59	-4396.05	11071.13	-4204.81	6866.31
		Module 4	44864.00	3496.25	1223.05	4764.41	35380.28	-19278.59	-4396.05	11705.64	-4204.81	7500.83
		Module 5	22432.00	7514.08	611.53	2382.20	11924.18	-9639.30	-2198.02	86.86	-2102.41	-2015.54
		Module 6	22432.00	2212.31	611.53	2382.20	17225.96	-9639.30	-2198.02	5388.64	-2102.41	3286.23
		Module 7	44864.00	6716.37	1223.05	4764.41	32160.17	-19278.59	-4396.05	8485.53	-4204.81	4280.71
	Year 4	Module 1	40658.00	4553.21	1108.39	4317.75	30678.65	-17471.23	-3983.92	9223.51	-3810.61	5412.90
		Module 2	40658.00	4286.92	1108.39	4317.75	30944.94	-17471.23	-3983.92	9489.80	-3810.61	5679.19
		Project/Dissertation	40658.00	19192.59	1108.39	4317.75	16039.27	-17471.23	-3983.92	-5415.87	-3810.61	-9226.49
		Module 4	40658.00	3515.09	1108.39	4317.75	31716.77	-17471.23	-3983.92	10261.63	-3810.61	6451.02
		Module 5	40658.00	4103.20	1108.39	4317.75	31128.66	-17471.23	-3983.92	9673.52	-3810.61	5862.91
		Module 6	20329.00	5395.58	554.20	2158.87	12220.35	-8735.61	-1991.96	1492.78	-1905.31	-412.52
		Module 7	20329.00	6272.30	554.20	2158.87	11343.63	-8735.61	-1991.96	616.06	-1905.31	-1289.24
	TOTAL		921114.00	128900.01	25110.85	97819.28	669283.87	-395813.64	-90256.32	183213.91	-86330.09	96883.81

Appendix A - continued: A University Department - Summary of Staff Time - 1300 Hour Model

			Income	Academic Staff Costs	Administration Staff Costs	Direct Costs	Contribution	RAM Overheads	Recharge of Departmental Admin	Sub-Total	Recharge of Other Unallocated; Teaching/ Admin Support	Net Surplus/ (Loss)
			£	£	£	£	£	£	£	£	£	£
BSc Course 2	Year 1	Module 1	19245.83	1495.62	477.76	1861.10	15411.36	-7530.70	-2187.38	5693.28	-1642.51	4050.77
		Module 2	19245.83	3465.39	477.76	1861.10	13441.59	-7530.70	-2187.38	3723.51	-1642.51	2081.00
		Module 3	6415.28	2993.85	159.25	620.37	2641.81	-2510.23	-729.13	-597.55	-547.50	-1145.05
		Module 4	19245.83	2958.15	477.76	1861.10	13948.83	-7530.70	-2187.38	4230.75	-1642.51	2588.24
	Year 2	Module 1	17706.17	2440.40	439.54	1712.21	13114.02	-6928.24	-2012.39	4173.38	-1511.11	2662.28
		Module 2	17706.17	2662.26	439.54	1712.21	12892.16	-6928.24	-2012.39	3951.53	-1511.11	2440.43
		Module 3	17706.17	4400.77	439.54	1712.21	11153.65	-6928.24	-2012.39	2213.02	-1511.11	701.91
		Module 4	17706.17	2778.46	439.54	1712.21	12775.96	-6928.24	-2012.39	3835.33	-1511.11	2324.22
		Module 5	17706.17	2692.31	439.54	1712.21	12862.11	-6928.24	-2012.39	3921.48	-1511.11	2410.38
	Year 3	Module 1	16936.33	4613.88	420.43	1637.77	10264.26	-6627.02	-1924.89	1712.35	-1445.40	266.94
		Module 2	16936.33	4380.00	420.43	1637.77	10498.14	-6627.02	-1924.89	1946.23	-1445.40	500.83
		Module 3	16936.33	4024.62	420.43	1637.77	10853.53	-6627.02	-1924.89	2301.62	-1445.40	856.21
		Module 4	16936.33	4208.06	420.43	1637.77	10670.08	-6627.02	-1924.89	2118.17	-1445.40	672.77
	TOTAL		220428.94	43113.77	5471.90	21315.77	150527.51	-86251.63	-25052.78	39223.10	-18812.16	20410.94
	Income Generating Activities	Evening Classes	26049.00	3367.63	1203.94	4689.97	16787.46	-18977.37	-3319.35	-5509.26	-4139.11	-9648.38
		Other Short Courses & Consultancy	123400.00	22000.00	429.98	8224.99	92745.03	-6777.63	-10986.79	74980.61	-1478.26	73502.36
	Overheads	Departmental Admin.		99566.02	73816.67	0.00	-173382.68	-79883.88	253266.57	0.00		0.00
		Research & Other Research	250260.00	182065.85	10966.67	70438.46	-13210.98	-123902.35	-94428.42	-231541.75		-231541.75
		Related Activities										
		Other-Unallocated		81536.73			-81536.73		-29222.90	-110759.63	110759.63	0.00
		Teaching/Admin Support										
		Totals	1541251.94	560550.00	117000.00	202488.46	661213.48	-711606.50	-0.00	-50393.02	0.00	-50393.02

Note 1: the total academic costs are made up of the total payroll costs £538,550 (as per appendix B) plus £22,000 of extra payroll costs (given above contracted salaries) regarding payments for involvement in consultancy type projects.

Appendix B: A University Department - Summary of Staff Time - 1300 Hour Model Teaching Staff (Full and Part-time) 2000/2001

Staff Position	Teaching Hours							Other Teaching Related Activities	TOTAL Teaching Hours	Evening Classes	Depart-mental Admin.	Other Academic related Activities	Research Related Activities	Other Teaching Support	Total Hours	Part-time Hour Payments £	Actual Cost £	Total Payroll Cost £	Average Rate £ per Hour
	BSc/BSc (Hons) Course 1				BSc Course 2														
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3												
HoD	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	20.0	0.0	975.0	0.00	305.5	0.0	1300.5		50000.00	50000.00	38.45
AHoD/Professor	26.5	30.0	120.0	30.0	0.0	0.0	0.0	152.0	358.5	0.0	200.0	0.00	742.0	0.0	1300.5		45000.00	45000.00	34.60
Professor	6.0	0.0	17.5	54.0	12.0	0.0	30.0	230.0	349.5	34.0	460.0	42.00	415.0	0.0	1300.5		44000.00	44000.00	33.83
Reader	0.0	60.0	25.0	87.5	0.0	0.0	0.0	230.0	402.5	0.0	200.0	50.00	100.0	547.5	1300.0		40000.00	40000.00	30.77
SL 1	32.0	48.0	12.5	0.0	16.0	0.0	96.0	251.0	455.5	0.0	56.0	70.00	575.0	143.5	1300.0	500.00	36000.00	36500.00	28.08
SL 2	0.0	144.0	0.0	53.0	0.0	0.0	81.0	289.0	567.0	0.0	50.0	0.00	683.5	0.0	1300.5		36000.00	36000.00	27.68
SL 3	0.0	45.5	152.5	0.0	0.0	66.0	48.0	201.0	513.0	0.0	0.0	0.00	650.0	137.0	1300.0		36000.00	36000.00	27.69
Lecturer 1	0.0	115.5	0.0	0.0	36.0	66.0	0.0	324.0	541.5	0.0	80.0	10.00	280.0	388.5	1300.0		28000.00	28000.00	21.54
Lecturer 2	20.0	54.0	122.0	53.5	0.0	0.0	48.0	175.0	472.5	0.0	350.0	10.00	130.0	337.5	1300.0		28000.00	28000.00	21.54
Lecturer 3	0.0	0.0	50.0	188.0	0.0	0.0	33.0	136.0	407.0	0.0	100.0	0.00	260.0	533.0	1300.0		28000.00	28000.00	21.54
Lecturer 4	75.5	0.0	36.0	92.0	20.0	30.0	54.0	149.0	456.5	0.0	120.0	0.00	635.0	88.5	1300.0		28000.00	28000.00	21.54
Lecturer 5	0.0	36.0	58.0	0.0	150.0	96.0	0.0	239.0	579.0	0.0	620.0	30.00	0.0	71.0	1300.0		28000.00	28000.00	21.54
Lecturer 6	0.0	132.0	0.0	0.0	0.0	0.0	0.0	105.0	237.0	80.0	90.0	0.00	265.0	628.0	1300.0	1000.00	28000.00	29000.00	22.31
Research Fellow A	12.5	0.0	36.0	82.5	0.0	18.0	0.0	29.0	178.0	25.0	65.0	0.00	390.0	642.0	1300.0	500.00	22000.00	22500.00	17.31
Research Assistant A	34.0	40.5	28.5	29.5	10.0	0.0	0.0	83.0	225.5	0.0	0.0	0.00	1000.0	74.5	1300.0		20000.00	20000.00	15.38
Research Assistant B	132.0	54.0	135.5	0.0	24.8	0.0	0.0	150.6	496.9	0.0	0.0	0.00	800.0	3.2	1300.0		20000.00	20000.00	15.38
Research Student A	85.0	0.0	135.0	0.0	0.0	0.0	0.0	124.0	344.0	0.0	0.0	0.00	0.0	0.0	344.0	5000.00		5000.00	14.53
Research Student B	24.0	36.0	16.5	54.0	132.0	96.0	0.0	110.0	468.5	0.0	0.0	0.00	0.0	0.0	468.5	6500.00		6500.00	13.87
Research Student C	0.0	54.0	36.0	0.0	0.0	60.0	0.0	12.0	162.0	0.0	0.0	0.00	0.0	0.0	162.0	2400.00		2400.00	14.81
Part-time Lecturer 1	36.0	0.0	0.0	54.0	0.0	36.0	0.0	72.0	198.0	0.0	0.0	0.00	0.0	0.0	198.0	3200.00		3200.00	16.16
Part-time Lecturer 2	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0	0.0	0.0	0.00	0.0	0.0	36.0	600.00		600.00	16.67
Part-time Lecturer 3	18.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	28.0	0.0	0.0	0.00	0.0	0.0	28.0	450.00		450.00	16.07
Part-time Lecturer 4	0.0	0.0	72.0	0.0	0.0	0.0	0.0	0.0	72.0	0.0	0.0	0.00	0.0	0.0	72.0	1000.00		1000.00	13.89
Part-time Lecturer 5	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	0.0	0.00	0.0	0.0	30.0	400.00		400.00	13.33
Totals	501.5	915.5	1053.0	798.0	400.8	468.0	390.0	3071.6	7598.4	139.0	3366.0	212.0	7231.0	3594.2	22140.5	21550.0	517000.0	538550.0	

Other Teaching Related	Exam setting and marking; module administration
Other Academic Related	Attending professional committees and external examining
Research Related Activities	Own research; writing and presentation of research papers; supervision of research students and preparation of research grant applications
Departmental Administration	Timetable allowance for administration duties including HoD; Post Graduate Director; Year Co-ordinator; Timetabler; Programme Organiser etc.
Other Teaching Support	Balancing figure

Appendic C: BSc/BSc (Hons) Course 1 - Year 1

Staff	Module 1									Module 2									Module 3									Total Hours (to summary sheet)			BSc/BSc (Hons) Course 1 - Year 1
	Lectures		Seminars / Tutorials		Labs		Other Teaching	Admin	Cost	Lectures		Seminars / Tutorials		Labs		Other Teaching	Admin	Cost	Lectures		Seminars / Tutorials		Labs		Other Teaching	Admin	Cost	Teaching	Other Teaching	Admin	Year 1 Total Cost
	Actual	Weighted	Actual	Weighted	Actual	Weighted	Exam Marking/ Setting	Module Admin		Actual	Weighted	Actual	Weighted	Actual	Weighted	Exam Marking/ Setting	Module Admin		Actual	Weighted	Actual	Weighted	Actual	Weighted	Exam Marking/ Setting	Module Admin					
HoD		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
AHoD/Professor		0		0		0			0.00		0		0		0			0.00	7	17.5		0	6	9	6		1124.57	26.5	6	0	1124.57
Professor		0		0		0			0.00	1	6		0		0	1		236.83		0		0		0			0.00	6	1	0	236.83
Reader		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
SL 1		0		0		0			0.00	8	32		0		0	50	10	2583.08		0		0		0			0.00	32	50	10	2583.08
SL 2		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
SL 3		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Lecturer 1		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Lecturer 2		0		0		0			0.00		0		0		0			0.00	8	20		0		0	6		560.00	20	6	0	560.00
Lecturer 3		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Lecturer 4		0		0	32	48	32		1723.08	11	27.5		0		0	20		1023.08		0		0		0			0.00	75.5	52	0	2746.15
Lecturer 5		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Lecturer 6		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Research Fellow A		0		0		0			0.00		0		0		0			0.00	5	12.5		0		0	6		320.19	12.5	6	0	320.19
Research Assistant A		0		0		0			0.00	4	10		0	16	24	25		907.69		0		0		0			0.00	34	25	0	907.69
Research Assistant B	24	84		0		0	85.6	10	2763.08		0	32	48		0			738.46		0		0		0			0.00	132	85.6	10	3501.54
Research Student A		0		0		0			0.00		0		0		0			0.00	16	40		0	30	45	34	10	1875.00	85	34	10	1875.00
Research Student B		0		0		0			0.00		0		0	16	24			332.98		0		0		0			0.00	24	0	0	332.98
Research Student C		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Part-time Lecturer 1		0		0		0			0.00		0		0		0			0.00		0		0	24	36	12		775.76	36	12	0	775.76
Part-time Lecturer 2		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Part-time Lecturer 3		0		0		0			0.00		0		0		0			0.00		0		0	12	18	6		385.71	18	6	0	385.71
Part-time Lecturer 4		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
Part-time Lecturer 5		0		0		0			0.00		0		0		0			0.00		0		0		0			0.00	0	0	0	0.00
TOTALS	24	84	0	0	32	48	117.6	10	4486.15	24	75.5	32	48	32	48	96	10	5822.12	36	90	0	0	72	108	70	10	5041.23	501.5	283.6	30	15349.50

Appendic D: Income

A University Department										
2000/2001	Earned FTE	Rate	Teaching Grant	Rate	Post Grad Tuition Grant	Rate	Tuition Fees	Rate	W/D Fees	Total £
BSc (HONS) Course 1	219.00	3070.00	672330.00			1120.00	245280.00	16.00	3504.00	921114.00
BSc Course 2	47.72	3300.00	157483.33			1300.00	62038.89	19.00	906.72	220428.94
FT Research Student	10.00	1100.00	11000.00			580.00	5800.00	8.00	80.00	16880.00
PT Research assistant	2.00	1280.00	2560.00	525.00	1050.00	380.00	760.00	5.00	10.00	4380.00
Evening Class 1	3.00	730.00	2190.00	500.00	1500.00	1950.00	5850.00	28.00	84.00	9624.00
Evening Class 2	7.50	1280.00	9600.00	525.00	3937.50	380.00	2850.00	5.00	37.50	16425.00
Total	289.22		855163.33		6487.50		322578.89		4622.22	1188851.94
Research income	Research		External	Consultancies		Total Income				
Per external accounts	projects	RAE	courses			FTE's	1188852			
		110000				Consultancies	75000			
		32000				Research	87000			
	87000	142000	48400	75000		RAE	142000			
						Courses	48400			
BSc/BSc(Hons) Course 1						Total		1541252		
Year 1			£							
Module 1	0.05		47668.0							
Module 2	0.05		47668.0							
Module 3	0.05		47668.0							
Year 2										
Module 1	0.05		44163.0							
Module 2	0.05		44163.0							
Module 3	0.05		44163.0							
Module 4	0.05		44163.0							
Module 5	0.05		44163.0							
Module 6	0.05		44163.0							
Year 3										
Module 1	0.05		44864.0							
Module 2	0.05		44864.0							
Module 3	0.05		44864.0							
Module 4	0.05		44864.0							
Module 5	0.02		22432.0							
Module 6	0.02		22432.0							
Module 7	0.05		44864.0							
Year 4										
Module 1	0.04		40658.0							
Module 2	0.04		40658.0							
Project/Dissertation	0.04		40658.0							
Module 4	0.04		40658.0							
Module 5	0.04		40658.0							
Module 6	0.02		20329.0							
Module 7	0.02		20329.0							
TOTALS	0.87			921114.0						
BSc Course 2										
Year 1										
Module 1	0.09		19245.8							
Module 2	0.09		19245.8							
Module 3	0.03		6415.3							
Module 4	0.09		19245.8							
Year 2										
Module 1	0.08		17706.2							
Module 2	0.08		17706.2							
Module 3	0.08		17706.2							
Module 4	0.08		17706.2							
Module 5	0.08		17706.2							
Year 3										
Module 1	0.08		16936.3							
Module 2	0.08		16936.3							
Module 3	0.08		16936.3							
Module 4	0.08		16936.3							
TOTALS	0.13			220428.9						
	1.00									

Appendix E: RAM 2000

	Cost Driver See table 3	Dept. Driver	Driver Unit Cost (£)	Costs (£)	Bases		Teaching	Research	Dept. Admin	Total
Learning/educational development: 80%	ACADSFT	13	1504.154	19554	100% T	19554	19554			
Quality audit office	ACADSFT	13	190.923	2482	100%T	2482	2482			
Research/commercial development	ACADSFT	13	614.538	3995	100% R	3995		3995		
Research Unit	ACADSFT	13	45.231	588	100% R	588		588		
			2354.846							
City refectory	ALLSFTE	18	67.889	1222	100% T	1222	1222			
Finance office: 30%	ALLSFTE	18	450.000	8100	Staff %'s to T, and R	8100	2803	3966	1331	8100
Marketing and public relations	ALLSFTE	18	2058.500	37053	100% T	37053	37053			
Other expenditure	ALLSFTE	18	131.722	2371	Staff %'s to T, and R	2371	820	1161	390	2371
Park refectory	ALLSFTE	18	361.333	6504	Staff %'s to T, and R	6504	2251	3185	1068	6504
Personnel department	ALLSFTE	18	1298.611	23375	Staff %'s to T, and R	23375	8089	11445	3841	23375
Sports and recreation: 80%	ALLSFTE	18	617.611	11117	Staff %'s to T, and R	11117	3847	5443	1827	11117
			4985.667							
Library : 20%	Book	16000	0.938	15000	T:14 and R:1 (per TR)	15000	14000	1000		
Academic administration	ESFTE	310	102.958	31917	100%T	31917	31917			
Audio visual	ESFTE	310	39.032	12100	100%T	12100	12100			
Caledonian Court residences	ESFTE	310	-44.387	-13760	100%T	-13760	-13760			
Finance office: 30%	ESFTE	310	26.129	8100	100%T	8100	8100			
Gibson hall residences	ESFTE	310	-23.800	-7378	100%T	-7378	-7378			
Information technology support: 70%	ESFTE	310	43.658	13534	100%T	13534	13534			
Leased student accomodation	ESFTE	310	-4.484	-1390	100%T	-1390	-1390			
Library: 80%	ESFTE	310	219.310	67986	100%T	67986	67986			
Managed fees	ESFTE	310	110.181	34156	100%T	34156	34156			
Sports and recreation: 20%	ESFTE	310	8.965	2779	100%T	2779	2779			
Student services	ESFTE	310	173.168	53682	100%T	53682	53682			
Students association	ESFTE	310	43.658	13534	100%T	13534	13534			
			694.387							
Contingencies	EXP	1200000	0.020	24205	Staff %'s to T, and R	24205	8376	11852	3977	24205
Court office	EXP	1200000	0.003	3609	Staff %'s to T, and R	3609	1249	1767	593	3609
Faculty of Health	EXP	1200000	0.088	105495	Staff %'s to T, and R	105495	36507	51654	17334	105495
Finance office: 40%	EXP	1200000	0.009	10802	Staff %'s to T, and R	10802	3738	5289	1775	10802
Information strategy unit	EXP	1200000	0.002	2813	Staff %'s to T, and R	2813	973	1377	463	2813
Non-attributable income	EXP	1200000	-0.056	-67398	Staff %'s to T, and R	-67398	-23323	-33000	-11075	-67398
Occupational health and safety	EXP	1200000	0.000	32	Staff %'s to T, and R	32	11	16	5	32
Principals group	EXP	1200000	0.023	27783	Staff %'s to T, and R	27783	9614	13603	4566	27783
			0.089							
Information technology support: 30%	NASFTE	15	386.733	5801	Staff %'s to T, and R	5801	2007	2840	954	5801
Learning/educational development: 20%	NASFTE	15	325.867	4888	Staff %'s to T, and R	4888	1691	2394	803	4888
			712.600							
International office	OFTE	10.1	360.990	3646	100% T	3646	3646			
Print design services	PDS	7000	2.325	16276	100% T	16276	16276			
Central services	Space	1065.57	84.989	90562	Per space spreadsheet	90562	56063	14020	20479	90562
Depreciation	Space	1065.57	33.024	35189	Per space spreadsheet	35189	21559	5494	8136	35189
Estates	Space	1065.57	69.255	73796	Per space spreadsheet	73796	45212	11522	17062	73796
Financing charges	Space	1065.57	23.588	25135	Per space spreadsheet	25135	15400	3924	5811	25135
Accomodation	Space	1065.57	2.207	2352	Per space spreadsheet	2352	1441	367	544	2352
			213.063	711607			507821	123902	79884	

Appendix F: Revised model based on total academic hours worked; based on actual consultancy project data

			Change from 1300 hours to Total Hours Model			
			1300 Hours Total Cost	Total Hours Total Cost	Change in Cost (+ is a cost reduction / - is cost increase)	% Change on Original
			£	£	£	
BSc/BSc(Hons) Degree 1	Year 1	Module 1	-39108	-37182	1926	-4.9%
		Module 2	-39015	-38073	942	-2.4%
		Module 3	-36313	-35433	880	-2.4%
	Year 2	Module 1	-35178	-34633	545	-1.5%
		Module 2	-35283	-33584	1698	-4.8%
		Module 3	-39511	-37031	2480	-6.3%
		Module 4	-54870	-53168	1702	-3.1%
		Module 5	-39748	-39000	748	-1.9%
		Module 6	-51279	-49428	1851	-3.6%
	Year 3	Module 1	-33224	-32485	739	-2.2%
		Module 2	-33687	-33123	563	-1.7%
		Module 3	-35021	-34458	563	-1.6%
		Module 4	-103280	-99789	3490	-3.4%
		Module 5	-35270	-33530	1740	-4.9%
		Module 6	-16116	-15709	407	-2.5%
		Module 7	-42938	-40976	1962	-4.6%
	Year 4	Module 1	-198951	-190946	8005	-4.0%
		Module 2	-56610	-54995	1615	-2.9%
		Module 3	-50663	-48359	2304	-4.5%
		Module 4	-28664	-27777	886	-3.1%
		Module 5	-28522	-27376	1146	-4.0%
		Module 6	-29832	-29338	495	-1.7%
		Module 7	-13453	-13082	371	-2.8%
	TOTAL	-1076536	-1039475	37060	-3.4%	
BSc Degree 2	Year 1	Module 1	-15357	-14599	758	-4.9%
		Module 2	-18411	-17833	578	-3.1%
		Module 3	-5460	-5257	203	-3.7%
		Module 4	-16034	-15646	388	-2.4%
	Year 2	Module 1	-12768	-12538	231	-1.8%
		Module 2	-15362	-15054	308	-2.0%
		Module 3	-35882	-34245	1637	-4.6%
		Module 4	-14984	-13716	1269	-8.5%
		Module 5	-25911	-24907	1004	-3.9%
	Year 3	Module 1	0	0	0	0.0%
		Module 2	0	0	0	0.0%
		Module 3	0	0	0	0.0%
		Module 4	0	0	0	0.0%
	TOTAL	-160170	-153795	6375	-4.0%	
Income Generating Activities	Evening Classes		-47317	-46036	1281	-2.7%
	Other Short Courses & Consultancy		-40715	-40140	574	-1.4%
Research & Other Research Related Activities			-702241	-747532	-45291	6.4%
		Totals	-2026979	-2026979	0	0.0%