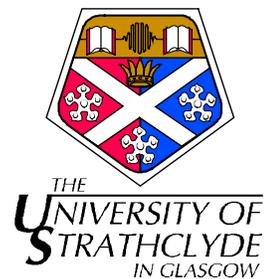


Practical Guidance For Implementing the Insight Model

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1 Introduction

1.1 This Document

This document aims to present a step by step guide to performing an ‘Insight’ evaluation. A full explanation of the concepts behind the Insight Model can be found in the document ‘INSIGHT : A Model for the Evaluation of the Costs and Benefits of ICT in Teaching and Learning’

1.2 The Insight Model

The Insight Model has been developed by the Insight Project Team at the University of Strathclyde to facilitate the evaluation of the costs and benefits of ICT investments in Higher Education. The evaluation is a relative, rather than an objective measure. One investment is compared with another to indicate which offers the best value for money. Over time, after conducting a number of evaluations, an institution may develop a view on what would constitute an acceptable benchmark value for ICT investments.

The model has been developed to be flexible enough to accommodate quite different organisational, financial and ICT structures in different institutions. Consequently the guidelines in this document should not be viewed as prescriptive . Each implementation of the Insight Model will require a certain degree of tailoring to local circumstances. Similarly we have not attempted to explain in detail the process of activity-based costing (abc) but have chosen to focus on the need to take a pragmatic approach to abc in the context of the Insight Model.

The Model takes a holistic approach to assessing ICT investment, i.e. the investment is assessed in the context of the value adding activity or activities which it supports.

The resources needed to conduct an Insight Evaluation will depend on the availability of information, the scope of the evaluation (e.g. the number of cost centres that are being investigated) and the level of experience of the staff conducting the investigation. Certain elements of the calculation need only be performed once and therefore subsequent evaluations may be quicker to perform than the first.

The simplified example in ‘Practical Guidance For Implementing the Insight Model’ might take the best part of a week to conduct. A more complex scenario (with more support services and value added activities) might take two or more weeks.

The availability of software to capture the necessary information and perform the calculations will considerably reduce the overhead for users of the model and, to this end, the University of Strathclyde are prototyping a software application to facilitate this.

To illustrate each of the steps in the model a worked example is included - [in blue text](#). The worked example is based on a scenario where the costs and benefits of teaching four classes are being assessed, with three of these classes relying on ICT for their delivery.

With four existing activities under assessment, the model for the costs for central ICT services will be the same for each. If we were evaluating four proposed, as opposed to existing, scenarios then the model for central ICT costs would vary with each proposal. The Insight model can accommodate this type of scenario but the calculation process is more complex.

1.3 Steps Involved in the Insight Model:

In order to use the Insight Model to evaluate a deployment of ICT, the following steps have to be taken:

- a) The institution must identify the activities or cost centres which it wants to evaluate. (Described in Section 2).
- b) The institution must define the costs that are to be considered as direct, indirect and overhead in relation to the Insight Model. (Described in Section 3)
- c) The institution must collect and analyse the costs of its ICT Support Services. (Described in Section 4)
- d) The institution must define the direct and indirect costs within the academic departments for each option. (Described in Section 5)
- e) The institution must apportion the central ICT Support Services Costs to the value-added activities under evaluation (Described in Section 6)
- f) The institution must determine the Total Cost of each activity under evaluation (Described in Section 7)
- g) The Institution must decide on its evaluation methodology and assign weightings to the benefits it aims to achieve from its IT investment. (Described in Section 8)
- h) Construct the Cost / Benefit Evaluation. (Described in Section 9)

2 Define the Cost Centres

2.1 Guidelines

The first step in conducting an Insight Evaluation is to define the ‘cost centres’ or activities that we are interested in evaluating. If the activities under evaluation are ‘like’ activities, for example the teaching of two classes, a relatively straightforward comparison can be made. If the cost centres under comparison are quite disparate (e.g. comparing the costs and benefits of teaching a class with the costs and benefits of running the institution’s finance function) the comparison become more tenuous as the cost behaviour is more markedly different and it may be difficult to agree a common set of objectives against which the activities may be assessed.

2.2 Example

[In order to illustrate the guidelines contained in this document we have constructed an example set in the \(fictional\) ‘West of Scotland’ University, an institution which, faced](#)

with limited resources, wishes to maximise the benefits it derives from its investment in IT.

In year 2002/03 it wishes to evaluate four alternative teaching methods, three of which use some form of ICT while the fourth is a traditional 'chalk and talk' class.

The four classes under evaluation described in detail below:

2.2.1 Class 101 in Physics 'The Laptop Project'

The West of Scotland University staff have changed their teaching methods in Class 101 (a first year physics class) and have integrated the use of laptop computers into the teaching of the class. This change facilitates additional group working, increased access to internet resources and greater use of e-mail for communication amongst the students and between staff and students.

The class involves 500 students who have purchased the laptops themselves. The University is responsible for configuring and maintaining them.

2.2.2 Class 202 in Chemistry 'The Virtual Learning Environment Project'

Class 202 in Chemistry is one of a number of classes in the West of Scotland University to use the facilities provided by a Virtual Learning Environment. Staff teaching the class have prepared on-line material which is accessed through a centrally-maintained portal. 400 students access the material through the portal.

2.2.3 Class 303 in Physiology 'Personal Response System Project'

This initiative involves the use of a Personal Response System (PRS) in Class 303 in the Department of Physiology. The PRS allows a class of 200 students to register their answers to multiple-choice questions on a central server. The department believes that by increasing the interactive nature of the learning experience, students will have a better understanding of the basic concepts of the course and will develop skills in group working and self-assessment.

2.2.4 Class 404 in Physiology – 'Traditional'

The 250 students who attend Class 404 in the department of Physiology find their lectures delivered in traditional 'chalk and talk' style. There is no significant involvement of ICT in the teaching of the class.

3 Define the Costing Framework

3.1 Guidelines

The Insight Model takes a pragmatic approach to activity based costing. Therefore, rather than analysing the whole general ledger of the institution and assigning all costs to activities through an iterative process, the Insight model focuses on the most relevant costs and analyses them in greatest detail.

This process starts with an examination of the most recent published accounts for the institution. We aggregate the income and expenditure headings from the Income and Expenditure Account into five categories:

1. Income which cannot be attributed to value-added activities
2. Income which can be attributed to value-added activities.
3. Expenditure which can be attributed directly to value-added activities.
4. Expenditure on ICT Support
5. Expenditure on Other Support Services

The expenditure under category 3 will be assigned directly to the activities under investigation in the model. The total for ICT Support Services (category 4) will be analysed in detail and then apportioned to the activities under investigation in our model.

In order to ensure that our costings within the model reflect the full cost of activities within the institution we have to choose a method by which the expenditure in category 5 can be attributed to value-adding activities (category 3) and to ICT support (category 4) .

In theory we should use a variety of different allocations to allocate components of the category 5 expenditure – reflecting their diversity (e.g. the expenditure on ‘Premises’ could be apportioned on the basis of space utilisation.). However, for simplicity and clarity, we will allocate all the category 5 expenditure – the ‘Central Overhead’ - on the basis of direct staff costs.

3.2 Example

The 2000/01 Income and Expenditure accounts for the ‘West of Scotland’ University (the most recent accounts available) contain the following information:

		£ 000	Category
Income	Funding Council Grants	63,754	1
	Academic Fees and Support Grants	34,320	2
	Research Fees and Contracts	20,731	2
	Other Services Rendered	5,813	2
	Other Operating Income : Residences and Catering	9,248	2
	Other	7,900	1
	Endowment Income	1,821	1
Total Income		143,587	

		£ 000	Category
Expenditure	Academic Depts		
	Academic Staff	34,492	3
	Other Staff	15,687	3
	Other Operating Expenses	14,404	3
	Academic Services		
	Academic Staff		
	Library	0	5
	Central IT	24	4
	Other	323	5
	Other Staff		
	Library	2,188	5
	Central IT	2,075	4
	Other	589	5
	Other Expenses		
	Library	1,314	5
	Central IT	723	4
	Other	434	5
	Admin and Central Services		
	Academic Staff		
	Central Admin	313	5
	General Educational Expenditure	2	5
	Staff & Student Facilities	0	5
	Other Staff		
	Central Admin	7,606	5
	General Educational Expenditure	407	5
	Staff & Student Facilities	1,086	5
	Other Expenses		
	Central Admin	1,127	5
	General Educational Expenditure	2,377	5
	Staff & Student Facilities	1,664	5
	Premises	13,266	5
	Residences and Catering : Staff Costs	2,723	3
	Other Costs	5331	3
	Research Grants & Contracts : Staff Costs	8,574	3
	Other Costs	8837	3
	Other Expenditure	12,898	5
Total Expenditure		138,464	

The totals for each of the categories are :

	£ K
Income which cannot be attributed to value-added activities (category 1)	73,475
Income which can be attributed to value-added activities. (category 2)	70,112
Total Income	143,587
Expenditure which can be attributed directly to value-added activities (category 3)	90,048
ICT Support expenditure (category 4)	2,822
Other Support Services expenditure (category 5)	45,594
Total Expenditure	138,464

The Support Services and Premises Overhead Absorption Rates can be calculated as follows:

Support Services Overhead Rate

The support services overhead figure - £45,594 K - will be allocated to value-added and IT activities on the basis of the direct staff costs.

From the Accounts we can identify the total cost of staff who will be charged directly to value-added or IT activities and who can therefore ‘absorb’ the overhead:

	£ K
Academic Departments – Academic Staff	34,492
Academic Departments – Other Staff	15,687
Academic Service – Academic IT Staff	24
Academic Service – Other IT Staff	2,075
Residences and Catering-Staff Costs	2,723
Research Grants and Contracts – Staff Costs	<u>8,574</u>
	<u>63,575</u>

Therefore the support services Overhead Absorption rate will be (£ 45,594 / £63, 575) = 71.72 % of the cost of direct salaries.

4 Collect and Analyse the IT Costs

4.1 Guidelines

The third stage of the Insight Evaluation Process is to analyse the expenditure on Information Technology. Traditional Activity Based Costing theory would advocate that the financial ledger should be re-analysed and apportioned to activities. The Insight Model proposes that the effort involved in this level of detail will not be justified by the output and therefore a more high-level, pragmatic approach is required. A reasonably accurate picture of the costs of IT service provision can be ascertained by following the steps below. The aim is develop a view of the current or expected costs of service provision within the Institution's IT department.

Note that we are building costs up from a variety of sources, rather than re-analysing the financial ledger. Consequently there is an onus on the user of the Insight Model to ensure that all relevant costs are included as there is no 'check total' with which to reconcile the total.

4.1.1 Identify the support services

The first step in this stage is to identify the services which are supported by the IT Department. As a rule of thumb they are likely to number in tens rather than hundreds. These services should be recurrent, reflecting supported services (i.e. not project costs which are dealt with separately).

For each service the 'cost driver' should also be identified (e.g. member of staff, student, PC device). This will be the factor that drives a change in the cost of this service, i.e. if the number of students using a particular service increases then the cost will rise correspondingly. The costs may exhibit variable cost behaviour, step cost behaviour or a more complex pattern in relation to changes in the cost driver. (NB Identifying the cost driver is only necessary if you intended to vary the scenarios you are assessing, i.e. will the number of users vary in the options or scenarios you are evaluating? If so then you have to understand the cost drivers and the impact this will have.)

4.1.2 Identify the processes

IT Staff might not spend their time directly supporting services but rather working on a process which in itself supports a service. The detail of these processes will vary from institution to institution but users of the Insight methodology should resist going into excessive detail. A rule of thumb might be to ignore any support activity that utilised less than 1% of the overall staff complement in any given year.

4.1.3 Allocate staff time

Staff time will initially be recorded against processes. Staff timesheets, annual plans or management estimates can be used to estimate the amount of time staff will spend on each process.

4.1.4 Assign a cost to staff time

Having assigned all staff time to 'processes' we now assign a financial value to the staff time. In theory the actual costs of the staff involved could be used to determine the cost however individual institutions may prefer to use average costs for grade or post.

4.1.5 Allocate processes costs to services

Having determined the cost of each process these costs must now be reassigned to services. The relationship between processes and services may vary. Some processes (e.g. the support of a software application) may relate solely to one service, whereas others (e.g. the maintenance of central servers) may support a number of services. Where there is a 'one to many' relationship the staff time recorded against a process must be reassigned using some appropriate pro-rata. For example the time spent supporting a cluster of central servers may be reassigned to the services which utilise that server cluster on the basis of the number of users of each service.

Staff time spent on processes which are directly in support of staff themselves (e.g. staff development, training, time spent on management of staff, absence, etc.) need not be assigned to services at this stage. This 'IT Overhead' will be dealt with later.

4.1.6 Add IT Overheads

Once all other process costs have been allocated to services, the amounts previously identified as 'IT Overhead' can now be allocated to services pro-rata on the basis of the staff costs allocated to services so far. In doing this we are assuming that the amount of IT overhead (management costs, training, etc.) will vary directly with the staff costs of that service.

4.1.7 Add Central Overheads

The 'Central Overhead' can also now be added to the staff costs. The Central Overhead Absorption rate was calculated in section 3.2.

4.1.8 Allocate the Revenue Costs

The recurrent revenue costs for the ICT Support Services can be ascertained from sources such as the annual budget or forecast. (The threshold for capitalisation of expenditure could be set at £ 10 K on any item or group of items).

Typical these costs will reflect items like office expenses, annual licences and maintenance agreements and an estimate for the average expenditure on non-capital equipment (e.g. ICT Support Services staff PCs).

Some revenue costs may be assigned directly to a service. Others will have to be apportioned across several services using an appropriate allocation methodology.

It may save time to group costs together based on the methodology by which they will be apportioned to services before carrying out the apportionment itself. For example the license and support costs relating to a group of database servers could be group together

before being apportioned to 'services' based on the number of staff who use each service which runs on this cluster of servers.

4.1.9 Allocate Capital Expenditure

A schedule should be drawn up of capitalised hardware and software showing cost, year of purchase, expected useful life and consequently, the amount that should be depreciated or 'charged' in the year under investigation. This charge should probably show a straight-line depreciation, reflecting the use of the capitalised asset rather than its resale value.

In a similar method to the Revenue Expenditure above, the Capital Expenditure can be grouped together and either assigned directly to services or apportioned using an appropriate allocation basis.

4.1.10 Allocate Project Costs

For 'sunk' or 'committed' project costs (e.g. development costs of software, implementation costs of infrastructure, etc.) we can use the same methodology that is used for capital expenditure. The project costs can be charged over the expected useful life of the project output. Again the project costs can be grouped together and either apportioned or assigned directly to services.

On-going project costs (i.e. for projects which have not yet been implemented) should be ignored in the Insight Model, only appearing as an annual charge against a service once that service is available. This would also apply where the project is an upgrade of an existing service.

If a project was to be written off (i.e. no useful output or service) the cost could be added to the 'IT Overhead', perhaps viewed as 'Research and Development Costs'.

4.1.11 Identify the Cost Drivers

Finally we have to determine the method by which the costs for each of the ICT Support Services can be charged out to the activities using that service. If possible the method for charging should equate to the cost driver i.e. as the cost increases so would the amount charged out.

4.2 Example

4.2.1 Identify the Support Services

For simplicity we will assume that ICT Support Services offers the seven services listed below.

1. Maintenance of Student PC Labs
2. Configuration, Issue and Support of Student Laptops (Students, for the most part, buy the laptops through the University).
3. Access to Student Record System (In-House development)
4. Access to the Virtual Learning Environment (Package software)
5. Access to the Internet
6. General Print and File Management
7. General IT Advice

4.2.2 Identify the Processes, Allocate Staff Time and Assign Costs

To support these services the following processes are undertaken in the IT Department; the grade of staff is shown along the top and the amount of time each year (in FTE) is shown in the intersection of the matrix.

The department has 9 members of staff. One of the members of staff is involved solely in project work while another spends 50% of their time on project work. Therefore the total allocation to of time to ‘support’ should equal 7.5 FTE. The cost is of each process is then calculated by multiplying the FTE for each grade by the average cost to the institution for that grade (including employers costs).

Process	Tech Grade F FTE	ALC Grade 2 FTE	ALC Grade 3 FTE	ALC Grade 5 FTE	Total FTE	Total Process Cost £ K
Support of the Student Record Application		0.5	0.5		1.0	34.0
Support of the Virtual Learning Environment Application		0.5	0.5		1.0	34.0
Support of the Database Server			1.0		1.0	37.0
Support of the Print and File Servers		0.25		0.25	0.5	19.8
Support of the Web Servers		0.25		0.25	0.5	19.8
Support of the Application Servers		0.5			0.5	15.5
Support of Student Labs	0.5				0.5	14.0
Running IT Help Desk	0.5	0.5			1.0	29.5
Configuration of Devices		0.5			0.5	15.5
User Account management		0.5			0.5	15.5
Admin, Training and Management				0.5	0.5	24.0
Total	1.0	3.5	2.0	1.0	7.5	258.6

4.2.3 Allocate Process Costs to Services

The total staff cost for each process can be allocated to services as follows. The basis for apportionment and the individual apportionment calculations are not shown, but these calculations could be based on number of users, usage statistics, etc. as appropriate.

Process	Service 1	Service 2	Service 3	Service 4	Service 5	Service 6	Service 7	Total Service Cost (Before O/h) £ k
Support of the Student Record Application			30.0	4.0				34.0
Support of the VLE Application				34.0				34.0
Support of the Database Server			30.0	7.0				37.0
Support of the Print and File Servers			1.0	1.0		17.8		19.8
Support of the Web Servers				7.8	12.0			19.8
Support of the Application Servers			8.0	7.5				15.5
Support of Student Labs	14.0							14.0
Configuration of devices	25.0	4.5						29.5
User Account Management		2.0	3.5			10.0		15.5
Running IT Help Desk	2.0	3.5	1.0	2.0	1.0	3.0	3.0	15.5
Total	41.0	10.0	73.5	63.3	13.0	30.8	3.0	234.5

Note that the cost of the process ‘Admin, Training and Management’ (the ‘IT Overhead’) of £ 24 K has not yet been assigned to a service or services.

4.2.4 Add Overheads

The IT Overhead of £ 24 K is now allocated pro-rata to the ‘Total Staff Costs’ determined above. (Column 2 below)

The central overhead of 71.7 % (see Section 3.2 above) is then added to the total. (Column 4 below).

Services	Total Staff Costs (Before O/h) £ K	IT O/h £ K	Total £ K	Central O/h £ K	Total Staff Costs (Incl. O/h) £ K
Maintenance of Student Labs	41.0	4.2	45.2	32.4	77.6
Configuration, Issue and Support of Student Laptops	10.0	1.0	11.0	7.9	18.9
Access to Student Record System	73.5	7.5	81.0	58.1	139.1
Access to Virtual Learning Environment	63.3	6.5	69.8	50.0	119.8
Access to Internet	13.0	1.3	14.3	10.3	24.6
General Print and File Management	30.8	3.2	34.0	24.3	58.3
General IT Advice	3.0	0.3	3.3	2.4	5.7
Total	234.6	24.0	258.6	185.4	444.0

4.2.5 Allocate the Revenue Cost

The typical annual revenue costs for the IT department have been estimated as follows. These costs do not necessarily relate to expenditure in a particular year but rather to the estimated average expenditure.

Cost Heading	£ K	Note
R1. Department Running Costs (e.g. Stationery, Telephones, Travel, Minor Equipment, etc)	20.0	1
R2. Annual Maintenance for Database Licences (for Student Record and VLE)	30.0	2
R3. Annual Maintenance for VLE software	20.0	2
R4. Maintenance for Central Database Servers	5.0	
R5. Maintenance for Application Servers	4.0	
R6. Maintenance for Web Servers	5.0	
R7. Maintenance for Print and Files Servers	10.0	
R8. General Infrastructure costs	25.0	1
R9. Acquisition / Replacement of non –capital equipment	30.0	
Total Revenue Costs	149.0	

These costs can be allocated to services either directly or using an apportionment methodology. For example:

Note 1:

These general costs could be allocated to services by taking the revenue costs for the process and multiplying them by an appropriate apportionment ratio (for example)

$$\frac{\text{the number of users of the service}}{\text{the total number of users of all services}} \times \text{the revenue cost (£20K + £25K)}$$

Note 2:

These costs, which relate to the provision of the Student Record and VLE services, could be apportioned as follows:

$$\frac{\text{the number of users of the service (VLE or Student Record)}}{\text{the total number of users of both services}} \times \text{the revenue cost (£39K)}$$

Note 3:

In a similar way the user of the Insight Model should allocate all the revenue costs using an appropriate basis for apportionment. Care should be taken to ensure that the apportionment basis represents a reasonable approximation of the actual cost scenario. In the above example using ‘number of users’ as a basis for apportionment may unduly bias the calculation if the student record systems is used by 10 staff and the VLE is used by 5,000 staff and students.

When all these apportionment calculations have been performed the revenue costs can be aggregated against services:

Service	Revenue Costs	R1 £K	R2 £K	R3 £K	R4 £K	R5 £K	R6 £K	R7 £K	R8 £K	R9 £K	Total £K
Maintenance of Student PC Labs		5.0							7.0	20.0	32.0
Configuration, Issue and Support of Student Laptops		3.0							3.0	2.0	8.0
Access to Student Record System		4.0	20.0		3.0	2.0			4.0	2.0	35.0
Access to Virtual Learning Environment		3.0	10.0	20.0	2.0	2.0	2.0		3.0	2.0	44.0
Access to Internet		2.0					3.0		3.0	2.0	10.0
General Print and File Management		2.0						10.0	5.0	2.0	19.0
General IT Advice		1.0									1.0
Total		20.0	30.0	20.0	5.0	4.0	5.0	10.0	25.0	30.0	149.0

4.2.6 Allocate Capital Expenditure and Project Costs

The charge in the current year for the capitalised equipment and amortised project costs can be calculated as follows:

Capital Expenditure	Cost £ K	Year of Implementation	Expected Useful Life (No Of Years)	Charge to Current Year (2002/03) £ K
C1. Purchase of VLE Software	30	1999/00	5	6
C2. Project Cost of Student Record Development	50	1995/96	10	5
C3. Purchase and Installation of Central Database Servers	100	1995/96	5	0
C4. Purchase and Installation of Application Servers	50	1995/96	5	0
C5. Purchase and Installation of for Web Servers	30	1998/99	5	6
C6. Purchase and Installation Print and Files Servers	20	1998/99	5	4
Total Charge				21

Note that the software that has been developed in-house has a longer expected life span than the purchased software, as it can be amended when required. The ‘Central Database Servers’ and the ‘Applications Servers’ have exceeded the original estimates of their life-span and (until they are replaced) are effectively ‘free of charge’. Local costing conventions may affect how users of the Insight Model wish to show these capital charges.

As with the Revenue Costs, the Capital Costs are now apportioned to services using a suitable basis of apportionment. (The basis for apportionment and the apportionment calculations are not shown here).

Service	Capital Costs						Total
	£K	£K	£K	£K	£K	£K	£K
Maintenance of Student PC Labs							0
Configuration, Issue and Support of Student Laptops							0
Access to Student Record System		5					5
Access to Virtual Learning Environment	6				2		8
Access to Internet					4		4
General Print and File Management						4	4
General IT Advice							0
Total	6	5	0	0	6	4	21

4.2.7 Define the Charging Basis

The Total Cost of each service can be now calculated by adding the Staff, Revenue and Capital Costs. Once a Cost Driver has been chosen, the based on which the costs of service will be ‘charged out’ can be identified. In this example we are comparing four classes therefore it may be appropriate to charge out services on the basis of student numbers.

We will also make the following assumptions about the West of Scotland University:

- The Entire Student Population is 5,200.
- Students with Laptops do not use the Student PC Labs.
- 2000 students have accounts for the Virtual Learning Environment

SERVICE	Staff Cost £ K	Revenue Cost £ K	Capital Cost £ K	Total Cost £ K	Charging Basis	Charge
Maintenance of Student PC Labs	77.6	32.0	0.0	109.6	Number of Students Using the Labs (4,700)	£23 per student
Configuration, Issue and Support of Student Laptops	18.9	8.0	0.0	26.9	Number of Student Laptops (500)	£ 54 per laptop per year
Access to Student Record System	139.1	35.0	5.0	179.1	Number of users (50)	£ 3,582 per user per year
Access to Virtual Learning Environment	119.8	44.0	8.0	171.8	Number of Users (2,000)	£ 86 per user per year
Access to Internet	24.6	10.0	4.0	38.6	Number of Users (7,000)	£6 per user per year
General Print and File Management	58.3	19.0	4.0	82.3	Number of Users (7,000)	£12 per user per year
General IT Advice	5.7	1.0	0.0	6.7	Number of Requests (100)	£67 per request
Total	444.0	149.0	21.0	614.0		

5 Academic Costs

5.1 Guidelines

5.1.1 Direct Costs

Having identified the ICT Support Services Costs we now turn our attention to the direct costs of providing value-added services. These can be collected under the appropriate 'cost centre'. For cost centres relating to the delivery of a class, costs are likely to include:

- Any staff time associated with delivery of the class (e.g. preparation, delivery, assessment, etc.)
- Any revenue expenditure directly attributable to the provision of the class
- Depreciation on any capital expenditure made specifically for the class. (See the methodology deployed in Section 4.2.6)

The direct staff costs must have the 71.72% Overhead Absorption rate applied to them.

5.1.2 Add Departmental Overheads

The model must also account for those costs that are incurred in the academic department but which are not attributable directly to a value-added cost centre. For example central, department expenditure like salaries for head of department and administrative staff, central office expenditure, etc. must be apportioned to each of the value-added activities which rely on these central department services.

5.2 Example

5.2.1 Direct Costs

We will assume the following costs for the three classes. (For expediency no detail is included on how the costs have been gathered but the methodology would be similar to the collection of costs for the ICT Support Services).

The direct staff costs must have the 71.72% Overhead Absorption rate applied to them

Class	Salary Costs £K	Central Overhead £K	Total Staff Cost £K
101	23.3	16.7	40.0
202	26.2	18.8	45.0
303	29.2	20.9	50.0
404	17.5	12.5	30.0

Class	Staff Costs	Revenue Costs	Capital Costs	Total Costs
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	£ K	£ K	£ K	£ K
101 – Laptop Students	40.0	15.0	42.0	97.0
202 – VLE	45.0	22.0	32.0	99.0
303 – PRS System	50.0	17.0	22.0	89.0
404 – Traditional	30.0	25.0	15.0	70.0

We could interpret the above figures as follows:

- The staff costs might reflect the degree of complexity in preparation and delivery of the course material using the different pedagogical methods.
- The revenue and capital costs reflect the amount of investment required **from the departments** (not ICT support services) to support the different pedagogical styles.

5.2.2 Add Departmental Overheads

The next step is to work out the proportion of the central departmental costs that should be attributed to each class. The central departmental costs for each of our three departments are shown below. (Physiology runs two of the classes in our example) Note that the 71.7% Overhead Absorption rate is applied to the staff costs.

Department	Dept's 'Central' Staff Costs £ K	Add 71.7% O/H on Staff Costs £ K	Total Staff Costs £ K
Physics	90.0	64.5	154.5
Chemistry	100.0	71.7	171.7
Physiology	70.0	50.2	120.2

Department	Dept's 'Central' Staff Costs £ K	Dept's 'Central' Revenue Costs £ K	Dept's 'Central' Capital Costs £ K	Total 'Central' Dept Costs £ K
Physics	154.5	20.0	25.5	200
Chemistry	171.7	35.0	13.3	220
Physiology	120.2	40.0	19.8	180

The Department's central costs are then apportioned to the individual cost centres in the department (in this example the classes) using the staff FTE as an apportionment basis.

Department / Class	Total Dept Central Costs	Total No of 'Non- Central'	Total No of 'Non- Central'	Department Overheads to be
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	£ K	Staff in Dept (FTE)	Staff teaching this class (FTE)	applied £ K
Physics / 101	200	18	0.5	5.6
Chemistry / 202	220	16	0.5	6.9
Physiology / 303	180	15	0.6	7.2
Physiology / 404	180	15	0.4	4.8

6 Apportion the ICT Support Services Costs

6.1 Guidelines

Each of the activities under evaluation should now be allocated an appropriate charge for their use of central ICT support services. This will be based on the charging basis defined in Section 4 above.

6.2 Example

In our example the charging basis for the allocation of ICT support service costs to value-added activities is as follows:

SERVICE	Charging Basis
Maintenance of Student PC Labs	£ 300 per device per year
Configuration, Issue and Support of Student Laptops	£ 134 per laptop per year
Access to Student Record System	£ 3,582 per user per year
Access to Virtual Learning Environment	£ 33 per user per year
Access to Internet	£6 per user per year
General Print and File Management	£12 per user per year
General IT Advice	£67 per request

6.2.1 Class 101 – The Laptop Project

We can work out the charge for class 101 based on the following assumptions:

- 500 Students with Laptops
- This class represents 50% of their full-time involvement. Therefore the class is charged for 250 FTE students.
- The laptop owning students do not use the PC Labs and therefore are not charged with the cost.

SERVICE	Charging Basis	No to be charged	Charge £ K
Maintenance of Student PC Labs	£ 23 per non-laptop student	0	0

	per year		
Configuration, Issue and Support of Student Laptops	£ 54 per laptop per year	250	13.5
Access to Student Record System	£ 3,582 per user per year	0	
Access to Virtual Learning Environment	£ 86 per user per year	250	21.5
Access to Internet	£6 per user per year	250	1.5
General Print and File Management	£12 per user per year	250	3.0
General IT Advice	£67 per request	100	6.7
Total Charge			46.2

6.2.2 Class 202 – The VLE Project

We can work out the charge for class 202 based on the following assumptions:

- There are 400 students in the class who access the VLE
- This class represents 50% of their full-time involvement. Therefore the class is charged for 200 FTE students.

SERVICE	Charging Basis	No to be charged	Charge £ K
Maintenance of Student PC Labs	£ 23 per non-laptop student per year	200	4.6
Configuration, Issue and Support of Student Laptops	£ 134 per laptop per year	0	0
Access to Student Record System	£ 3,582 per user per year	0	0
Access to Virtual Learning Environment	£ 86 per user per year	200	17.2
Access to Internet	£ 6 per user per year	200	1.2
General Print and File Management	£ 12 per user per year	200	2.4
General IT Advice	£ 67 per request	10	0.7
Total Charge			26.1

6.2.3 Class 303 – The Personal Response System

We can work out the charge for class 303 based on the following assumptions:

- 200 Students take the class.
- This class represents 50% of their full-time involvement. Therefore the class is charged for 100 FTE students.

- Students do not require access to VLE

SERVICE	Charging Basis	No to be charged	Charge £ K
Maintenance of Student PC Labs	£ 23 per non-laptop student per year	100	2.3
Configuration, Issue and Support of Student Laptops	£ 134 per laptop per year	0	0
Access to Student Record System	£ 3,582 per user per year	0	0
Access to Virtual Learning Environment	£ 86 per user per year	0	0.0
Access to Internet	£6 per user per year	100	0.6
General Print and File Management	£12 per user per year	100	1.2
General IT Advice	£67 per request	2	0.1
Total Charge			4.2

6.2.4 Class 404 – Traditional

- We can work out the charge for class 303 based on the following assumptions:
- 250 Students take this class
- We assume that there is no significant IT Usage and therefore no ICT support services costs

7 Total Costs

7.1 Guidelines

The Total Cost for the cost centres under consideration can now be computed by adding together the Direct Costs (Section 5.2.1), the Department Overheads (Section 5.2.2) and the central ICT Support Services costs (Section 6.2)

7.2 Example

Class	Direct Cost £ K	Dept. Overheads £ K	ICT Support Services Costs £ K	Total Costs £ K
Class 101 - Laptop Project	97.0	5.6	46.2	148.8
Class 202 – VLE	99.0	6.9	26.1	132.0
Class 303 - Personal Response System	89.0	7.2	4.2	100.4
Class 404 - Traditional	70.0	4.8	0.0	74.8

8 Define the Evaluation Framework

8.1 Guidelines

Although we have now determined the full cost of each of the classes, we have not put this in the context of the benefits that they deliver. As with the costs we have to take a holistic approach, looking not only at the ICT benefits associated with the class, but with all the benefits. In practice it will be almost impossible to extricate the 'ICT' benefits and costs from the more general benefits and costs, especially if the pedagogy and technology of a teaching situation are closely connected.

In order to complete a relative assessment of differing proposals or services, a common set of objectives or assessment criteria must be formulated. These objectives should be given a weighting to reflect their relative significance. Subsequently each of the activities under evaluation should be given a rating against each of the weighted assessment criteria. The sum of these weighted ratings reflects a quantitative assessment (or score) of the effectiveness with which that activity addresses the common objectives.

The ratings allocated to each proposal or service for each of the criteria could be made on a totally subjective basis, however the Insight Model will prove more robust and defensible if a degree of objectivity is introduced into the assessment. If assessment criteria or performance indicators are used to rate each of the services or proposals then it is important that they be applied consistently across all the areas under evaluation. For example, if student satisfaction were to be estimated by means of a questionnaire then the same questionnaire should be used for each activity.

8.2 Example

8.2.1 Define the Assessment Criteria

In order to evaluate the four methods of teaching, the West of Scotland University needs to identify the criteria against which it will assess the relative benefits of each option.

Strategically the West of Scotland University wishes to expand student numbers through innovative use of ICT. They plan to recoup initial capital investment by increasing student numbers in later years. Teaching innovation and student satisfaction are considered as key factors in achieving a long-term increase in student numbers, as is the ability to gain a competitive advantage by marketing the innovative teaching. The investments are to be assessed over a five year period.

Against this strategy the University has defined a number of benefits that it wishes to assess proposals against. Each benefit is given a weighting – the highest weightings being given to the benefits that are most likely to lead to the fulfilment of the institution's strategy.

Benefit Type	Weighting (in scale of 1-10)
Student Satisfaction	8
Better Understanding	7
Flexible Delivery of Courses	7
Increased Staff Satisfaction	5
Improve organisational efficiency	5
Innovation	9
Public Perception of the Institution	9

Each of the classes is assessed in turn against these weighted criteria:

8.2.2 Class 101 - Laptop Project

Benefit Type	Weighting to reflect priority (scale of 1-10)	Rating (scale of 1-10)	Weighted Score (scale of 1-100)
Student Satisfaction	8	9	72
Better Understanding	7	7	49
Flexible Delivery of Courses	7	7	49
Increased Staff Satisfaction	5	9	45
Improve organisational efficiency	5	6	30
Innovation	9	8	72
Public Perception of the Institution	9	8	72
			389

8.2.3 Class 202 – The Virtual Learning Environment

Benefit Type	Weighting to reflect priority (scale of 1-10)	Rating (scale of 1-10)	Weighted Score (scale of 1-100)
Student Satisfaction	8	9	72
Better Understanding	7	3	21
Flexible Delivery of Courses	7	3	21
Increased Staff Satisfaction	5	4	20
Improve organisational efficiency	5	6	30
Innovation	9	7	63
Public Perception of the Institution	9	2	18
			245

8.2.4 Class 303 – The Personal Response System

Benefit Type	Weighting to reflect priority (scale of 1-10)	Rating (scale of 1-10)	Weighted Score (scale of 1-100)
Student Satisfaction	8	9	72
Better Understanding	7	9	63
Flexible Delivery of Courses	7	7	49
Increased Staff Satisfaction	5	7	35
Improve organisational efficiency	5	5	25
Innovation	9	6	54
Public Perception of the Institution	9	4	36
			334

8.2.5 Class 404 – Traditional

Benefit Type	Weighting to reflect priority (scale of 1-10)	Rating (scale of 1-10)	Weighted Score (scale of 1-100)
Student Satisfaction	8	4	32
Better Understanding	7	5	35
Flexible Delivery of Courses	7	4	28
Increased Staff Satisfaction	5	5	25
Improve organisational efficiency	5	3	15
Innovation	9	2	18
Public Perception of the Institution	9	4	36
			189

9 Construct the Cost Effectiveness Evaluation

9.1 Guidelines

A relative cost / effectiveness comparison can now be made by dividing the effectiveness score (calculated in Section 8) by the total cost of the activity (calculate in Section 9). In practice several iterations of this may be required to refine the methodology and the weighting and rating scales.

Although this methodology introduces a systematic rigour into the evaluation of ICT investments, the structure still relies on a degree of subjective assessment and consequently its value is likely to increase over time as experience in its use is gained.

9.2 Example

We can now compare the costs and the effectiveness of each class; the effectiveness being assessed as the sum of the weighted benefits for each option. This comparison gives the following results:

Class	Annual Cost £ K	Effectiveness (000)	Effectiveness /Cost Ratio
Class 101 - Student Laptops	148.8	389	2.61
Class 202 - VLE	132.0	245	1.86
Class 303 - Personal Response System	100.4	334	3.33
Class 404 – Traditional	74.8	189	2.53

For this analysis we can see that Class 303 gives the most favourable ratio, followed by Class 101, Class 404 and finally Class 202. Although Class 101 is the most effective, its high cost weighs against it in the Cost / Effectiveness Study. Class 404 has a relatively low effectiveness (weighed against the defined objectives) but its low cost gives it a reasonable cost/effectiveness rating.

These results can be plotted on a graph (see Figure 1 below), with the “Expected Benefits” line showing an average level of benefit that one would expect to accrue per £ of expenditure. Options above and to the left of this line give a better than average effective return per £ of cost, whereas options to the right and below the line give a poorer than average return. Potentially, if enough data were accumulated about existing and proposed services, this “Expected Benefits” ratio could be used to judge the value of any project / service in isolation.

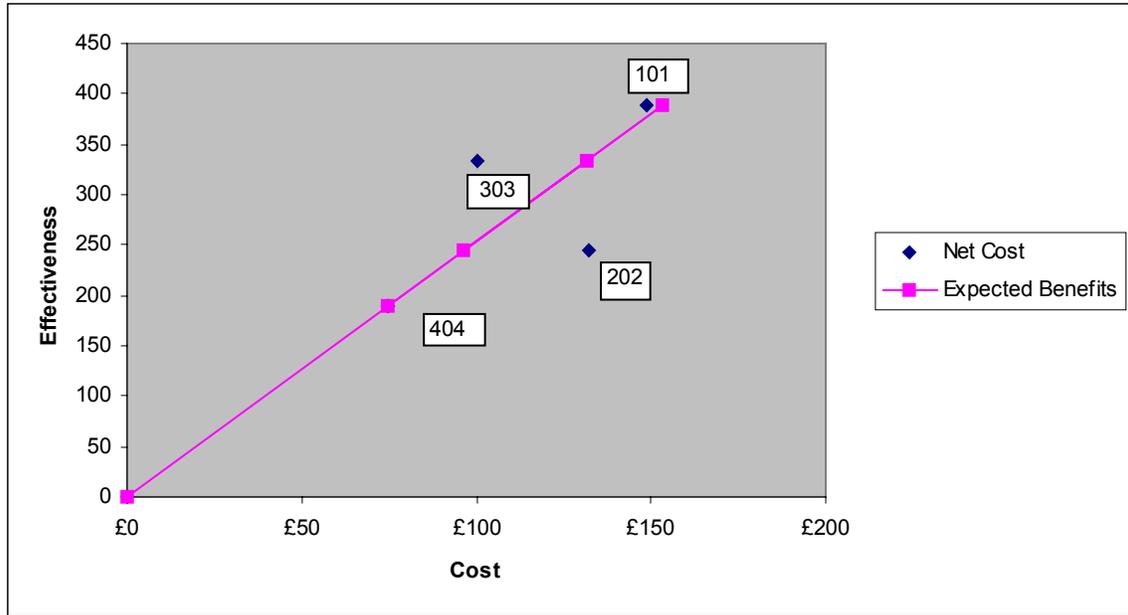


Figure 1

While Class 404 is exactly on the line and Class 101 is only slightly to the ‘favourable’ side, clearly Class 303 gives the best cost /effectiveness rating, while Class 202 has the poorest.

We can conclude that the West of Scotland University should choose to invest in the technology behind class 303 (the Personal Response System) which gives the best return on investment. If no cash constraints existed then Class101 (the student laptop class) has the highest overall effectiveness rating. Class 404 is the least effective (measured against the institution’s objectives) but is cheap.