

The Total Cost of IT Ownership

Introduction

The Total Cost of Ownership (TCO) is defined as the costs involved in the purchase, installation, management, support and use of the IT infrastructure within an organisation. The TCO attempts to quantify the financial impact of deploying information technology.

For Further Education, the true cost of IT ownership is a growing concern. There are a number of key reasons for this:

1. The sector's need to demonstrate efficiency gains and to achieve better 'value for money' from all its resources - of which IT is a significant element.
2. The central role of IT to the implementation of Government initiatives, notably the University for Industry (Ufi).
3. The essential requirement to equip students with IT skills to enable them to be successful in the workplace and for staff to have IT skills to deliver new modes of learning.

"As the Ufi will demonstrate, one of the best ways to overcome some of the barriers to learning will be to use new broadcasting and other technologies".

(The Learning Age, p. 22, section 1.22)

The FE sector has a very important role to play in training people for work, and will also be looked upon to support the Government's pledge to increase participation in Further Education by an extra 700,000 people by 2002.

The challenge

The challenge for colleges, therefore, is to manage widening participation by harnessing the opportunities presented by IT. However, these opportunities can bring a large cost, and so TCO must be understood, and strategies implemented to control it.

The FEFC report - 'The Use of Technology to Support Learning in Colleges' also highlighted the need for colleges to produce accurate management information on the use and cost of their IT:

"Good management information for improving cost efficiency is not generally available. As the annual spend on learning technology can exceed 5% of the college budget, savings could be significant".

This strategic briefing will explore the issue of TCO in detail, and share some of the key findings from the benchmarking study undertaken by RM Consulting in the FE sector. It will also discuss different ways in which colleges can manage cost of ownership in the long-term, and propose a recommended next step.

Calculating the Total Cost of Ownership

The first authoritative report on the subject was issued by the US based Gartner Group in February 1996, and has been followed by many others. Gartner estimated the TCO of a PC in a US corporation to be between \$8,000 and \$12,000 per annum, of which only \$6,000 is budgeted. The largest component of this cost, about 46% according to the Gartner Group's model, is that of end user operations i.e., applications development, casual learning,

file management, peer support and time wasted playing with configuration and optional settings on the system. Capital costs (purchase, rental or lease of hardware, software and infrastructure) comprised only 21%.

The Gartner Group model is based on information and data from medium-sized US companies with about 2,500 PCs, located in a single campus environment. As such, this model is not appropriate for the UK FE sector where, typically there are fewer PCs, often spread over more sites and involving different types of staff costs. RM Consulting has been working closely with the FE sector to understand the TCO of

IT and the key drivers that can affect it.

This model is based on data received from approximately 10% of UK colleges.

For the purpose of our analysis, we have taken a simple measure - the total annualised costs of all elements of the IT service and infrastructure, divided by the number of academic stations (PCs) provided. The unit of measure is thus, £s per PC per annum.

The components included within this model form the hierarchy defined in Figure 1 below. These categories represent the different areas in which costs are incurred at a typical FE establishment.

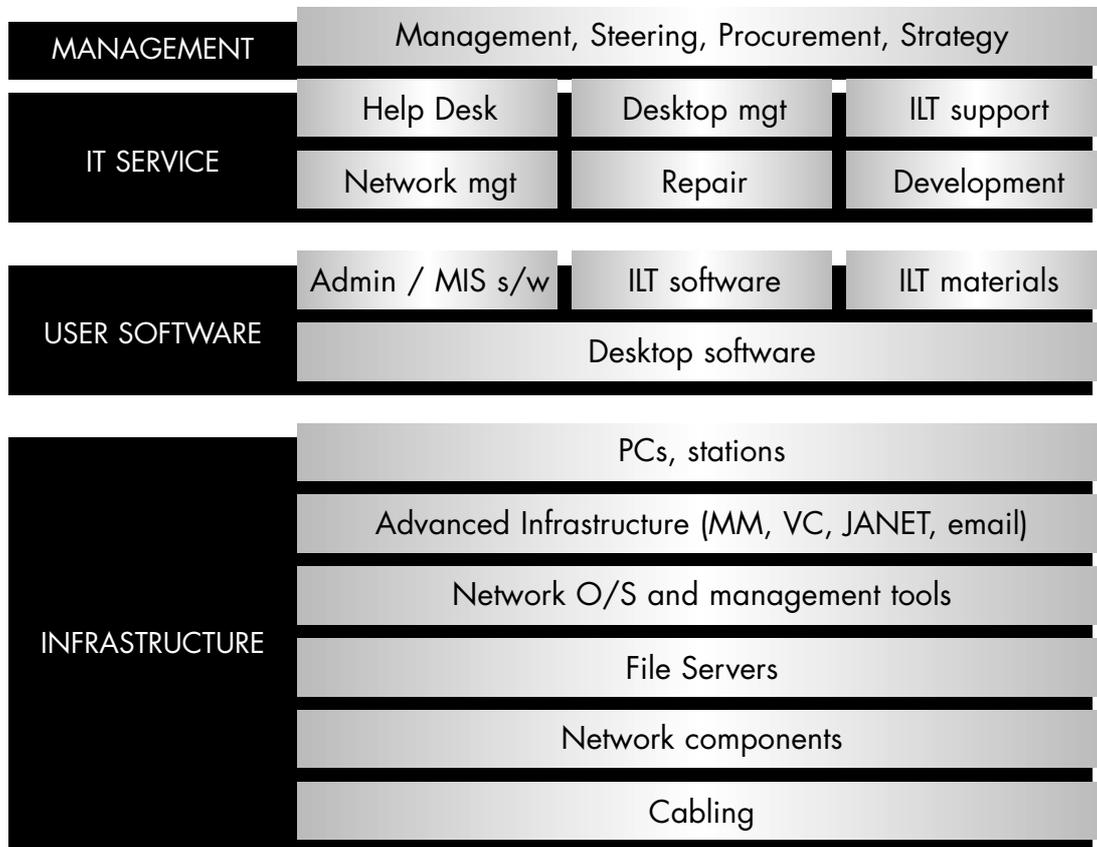


Figure 1: Components of Total Cost of Ownership.

However, for this exercise it is more appropriate to categorise the costs in line with the way the money is spent, e.g. staff costs, capital expenditure and revenue expenditure. The following table (Figure 2) allows us to capture all of the costs for a given establishment. (It is important to note that capital expenditure is *annualised* - in other words, it reflects the write-down period of the asset, which will vary by asset type.)

Component	Items included	
1. Staff Costs	Senior Management Time (Directors etc.) IT Manager / Computer Services Manager Network Manager Network Technician(s) IT Co-ordinator Training Officer Calculated using formula : (Annual Salary + 'on-costs') x proportion of time spent on IT related issues 'On-costs' are typically between 20 - 50%	
2. Capital Costs	Hardware: Servers Stations Switches/routers/bridges Cabling infrastructure Cabinets Peripherals * printers * scanners * plotters	Software: Network operating systems Network management tools Client operating systems 'Standard' application software Specialist application software
3. Maintenance Costs	Hardware maintenance contracts: * servers * active network components (switches, routers etc.) * stations Spare Parts (if broken out separately from recurrent spend)	
4. Support Costs	Support Contracts Professional services (consultancy, etc.) Training courses	
5. Recurrent Spend	Consumables (printer cartridges, floppy disks, etc.) Spare parts (unless covered under maintenance contract) Internet Charges (ISP connection, JANET, etc.) Communications costs (leased line rental , ISDN connection, etc.) Call charges	

Figure 2. Breakdown of Cost Components.

Exclusions to the model

To enable meaningful comparisons and benchmarks to be drawn, any model must tightly define what is included and excluded. In defining the TCO, the following costs have been specifically excluded:

1. **Accommodation costs.**
2. **Training of students.**
3. **Wasted time.**

The Gartner Group referred to time spent tinkering with document formats, screen savers, fonts and colours etc as “the Futz Factor” and this can be viewed as a large hidden cost of IT ownership. However, our premise is that this is not a component of TCO for education, as student time does not belong to the establishment, but to the student. Whether the same argument can be applied to staff time is a different issue but this is difficult, if not impossible to quantify. (This should not be confused with the time spent by IT staff in restoring systems after tampering - which is a fundamental component of the TCO.)

4. **The ‘fuzzy boundaries’.**

More difficult to assess are the costs surrounding the use of IT in the learning process. For example, learning assistants in the Library whose main role is learning support, but who also provide ad hoc IT support. This model excludes these costs simply because they tend to be marginal, and do not detract from the staff’s mainstream roles.

Analysis of costs

Based on an analysis of data received from a sample of approximately 10% of UK colleges in 1998, the following conclusions and observations may be drawn.

1. The total annualised cost of purchasing, maintaining, supporting and operating a networked PC in the FE sector was approximately £1,100 per year. This ranged between about £800 and £1,400 per annum, depending on the scale and complexity of the network, and type of institution.
2. Smaller establishments such as sixth form colleges had a lower TCO (less than £1,000 per PC per annum) than the larger FE institutions. The reasons appear to be that these networks tend to be relatively simple LANs based on a single site, and many of the staff costs were hidden through the use of

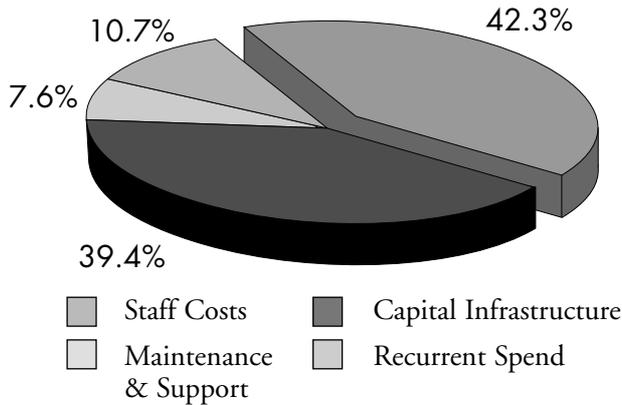
teaching staff to support the networks on a part-time basis. The larger institutions were typically spread across more sites and offered a greater level of functionality (video conferencing, networked multimedia, intranet, etc.) and employed dedicated IT support teams to maintain and support the provision.

3. The average level of investment in IT was about 4.7% of turnover for most colleges, although this varied significantly with a range of 3.3% and 7.8%.
4. For colleges in England, the scale of the IT provision was in the order of one PC for every 1,000 learning units.
5. Staff costs typically comprise 42% of the TCO.

Colleges should consider the following means of minimising these costs:

- Ensure they are using appropriately skilled staff to deliver support services efficiently - i.e. not using under- or over-skilled staff.
 - Developing efficient processes for the operation of the support and management function.
 - Providing management tools to reduce the time spent on routine operational tasks.
6. Capital costs typically comprise 39% of the total annualised cost. Paying an extra 10% for quality hardware increases the TCO by 1.5%, but will reduce support and maintenance costs elsewhere, as well as delivering an improved level of service.
 7. The capital cost of the desktop PC represents around 20% of the TCO. Therefore, saving 20% on the cost of PCs by purchasing low specification / obsolete PCs or those of indeterminate quality only reduces TCO by about 4%. However, the resulting increase in support and maintenance costs is likely to exceed savings made, and the loss of functionality leads us to question the wisdom of this decision.
 8. Spend on maintenance and support contracts averaged around 7.5%, although many smaller institutions did not have these.

This breakdown of costs in the TCO model is represented diagrammatically below:



Key components of the Total Cost of Ownership

Lifetime of elements of the IT infrastructure

An analysis of the above model indicates just how significant the life-span of elements of the IT infrastructure can be on the TCO. This reinforces the view that investment in technology should have a primary objective of being 'future proof'. The difference between a write-down period of three or six years for network servers, or five or ten years for the cabling infrastructure, can be significant.

This brings into question the decisions some establishments have taken to be at the 'leading edge' of technology. The risks of technological blind alleys, unexpectedly early obsolescence, incompatibility, and premium support costs for non-mainstream technologies and products are significant, hence the expression, 'bleeding edge rather than leading edge'.

Asset management

Another facet of the lifetime of IT is the whole concept of 'working one's assets' to squeeze maximum life-span from them. In some colleges, there are departments discarding early 486's whilst elsewhere in the establishment, 386's are being upgraded with extra (proprietary and expensive) memory. Facilities management and outsourcing specialists have traditionally made profits from their ability to make an organisation's assets work harder than the organisation did themselves - and there should be ample scope within education to achieve the same. The challenges in achieving this are having tools which provide real and accurate management information, and breaking down

departmental barriers to make it possible to move and reuse assets flexibly across the establishment.

Extending the useful life, and therefore write-down period of all assets by 25%, will reduce the annualised capital cost by 25%, and therefore the TCO by 10-12%. Compare this to the savings of 1.5% gained by procurement of the cheapest possible PCs.

Achieving True Low Cost of Ownership

Unfortunately, the data about TCO does not identify an instant panacea - there is no single item that can be removed to dramatically reduce the TCO. We have already looked at some of the recommendations for asset management, procurement and staffing, but there are a number of other areas we should also address.

Thick and thin clients (Net PCs et al)

The concept of moving much of the flexibility and processing power from the desktop PC to the network and servers has been suggested as a potential solution to reducing TCO, since this should lead to savings in the capital cost of PCs. However, the model indicates that this is only a relatively small part (<20%) of the total cost. More importantly, savings should also be achievable on the administration and management of end user stations. It is worth remembering that solutions such as Net PCs are almost completely unproven, particularly in an educational environment. Furthermore they offer limited application support, which would potentially inhibit the development of a content-rich ILT platform. Therefore, an individual establishment should consider carefully whether it wants to be an 'early adopter' here, and whether it has sufficient quality information about current TCO to be able to measure gains from this new model.

It should also be recognised that this will lead to increased costs for network servers and probably the network bandwidth. It may also result in an increase in centralised support, as users lose the ability to fix their own problems, and a loss of 'benefits', as users have a more restricted set of functionality available.

Reduced functionality at the desktop

Some establishments are considering the introduction of word processing 'data capture' engines in place of PCs. This would yield savings in capital PC purchase costs and potentially in administration and management costs. However, there is a risk of a much reduced life-span, as demand for the Internet/intranet and multimedia access grows.

Making somebody else pay

Students providing their own PCs is one obvious manifestation here, taking the responsibility away from the college. Another is printing costs - more and more colleges are now seeking to pass some or all of the costs of printing onto students. Providing the right tools are in place to administer this, then it should be a viable option.

Network management tools

Breaking down the costs of the time spent on network management, administration and more specialist areas such as email management and user administration, can be a significant task in itself. Good management tools will provide savings on network and user management, administration, licence infringement / over purchase, software repair and software installation. Additionally, less tangible benefits include; consistency, fault tolerant self repair, and ease of maintaining the integrity of the network. It is important, however, that management tools which are designed to address the specific needs of education are employed.

Just in time

1. Just enough functionality

A fundamental truism of IT is that the widget you need today will be cheaper tomorrow. The implementation of MANs, where simple email is the only mode of use foreseeable for two years, or multimedia capable PCs used for word-processing, or of standard teaching rooms of 20 PCs when the actual student attendance never exceeds 16, are all examples of investing too soon. A more gradual approach would have reduced the TCO in a number of ways - not least of which would have been the reduced risk of buying into established technology.

2. Just enough service

Some further analysis RM Consulting has completed suggests that the cost premium of

providing a 'high quality' rather than 'minimal' quality of IT service is about 20-25%. There are a number of caveats and assumptions underlying this, but it does indicate that there is a significant cost associated with a good service - as is to be expected. However, it also suggests that colleges should question the level of service provided, and ensure that it is appropriate for its 'customers'. Providing two minute turnaround for problems might be an appropriate target for 3.00pm - but is it necessary at 3.00am?

Summary

RM hopes to have raised a number of important questions about total cost of ownership in this strategic briefing, and provided information about the benefits and issues associated with different solutions. In summary, our advice would be for the college to undertake a detailed review of its IT provision, looking at measures such as service levels, the extent and type of IT usage and the support and management problems encountered. From this, more objective and strategic decisions can be made to better control total cost of IT ownership.

The next step

To discuss the needs of your college further, please contact the RM Further Education Account Team on 0870 908 6464 or at fesales@rmpc.net



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RM has endeavoured to ensure that all the information in this briefing is accurate and complete but reserves the right to change details as necessary.

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