Teaching and Technology:

Managing the IT Resource in a teaching and learning environment.

This paper has been written by Kevin Harm of Managed Solutions Pty Ltd in response to questions raised by educators working to identify how to manage the increasing costs and maintenance issues associated with technology in their schools.

The intention of the paper is to stimulate thought and discussion regarding the implementation and maintenance of schools' networks.

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Kevin taught in Queensland schools for seventeen years and was an early implementer of computer technology putting his first computer in a school in 1979. He worked as a classroom teacher, Science Master and Deputy Principal and is now the Managing Director of Managed Solutions – a Queensland Company that provides IT and Communications support for numerous schools, businesses and Government.

Much discussion exists in the wider business community about the advantages and the pitfalls of outsourcing IT support functions for business. Many of the arguments for and against are equally applicable to the academic environment. This paper is intended to promote thought and discussion on the assessment (or re-assessment) of the use of contractors or internal staff in performing this very essential service.

Models exist from totally in-house to totally out-sourced solutions for the provision of Information Technology. In some cases, the in-house IT people have become a business unit in their own right and actually act as an out-source for the rest of the campus.

People from in-house support systems tend to promote that as the only real model for consideration while sales people from out-sourcing companies promote their services as the one and only way to effectively manage the resource and meet budgetary commitments.

But is there merit in an amalgam of the two systems? Do schools, or businesses for that matter, need to fall entirely in one category of the other? Is it possible for an organisation to use both to provide the balance of internal knowledge and the breadth of service and technical ability?

Many larger organisations work in exactly this way. Internal staff have a specific function in the design and overview of the network resource, its development and direction while contractors are then deployed to perform particular tasks. This provides the integrity of direction achieved with internal staff focussed on the overall purpose of the organisation and the best of ability skills from specialist out-sourced people to perform the mechanics of the implementation or maintenance.

For an educational setting , we believe the best solution is this part way between amalgam – where the curriculum people manage the teaching and learning processes and identify the direction and overview for the information technology and then the "mechanics" of the network are maintained by people skilled and trained in that area.

This is best considered in the context of the functional and operational requirements of the service. Basically, the Information Technology services required for schools and campuses are:

1. Setting the direction and future – the educational purpose of the resource
2. Budgeting and Planning – the day to day financial management of the resource
3. Monitoring and Maintenance – maintaining the resource and ensuring reliable operation

Each of these is intertwined with the others and complete separation is very difficult if not impossible. But, with effective communication, separation is not necessary nor is it desirable.

1. Setting the direction and future – the educational purpose of the resource

While it is a relatively easy task to identify the curriculum requirements of the IT Services within a school or campus community for the delivery of IT subjects and curriculum, it is more difficult to identify the areas of other curricula that may benefit by involvement of technology in delivering the content material, demonstrating concepts or modelling real world data.

This role is the role of the educators and curriculum designers as they look within their curriculum purpose and identify the areas that are best serviced or delivered with information technology.

This becomes more complex as many people will not be aware of software, delivery systems and appropriate hardware for their particular curriculum area and so must be supported and encouraged in that process.

It is important that good advice regarding possibilities is given to the people planning the curriculum implementation so that the best decisions can be made.

This role demands a broad general understanding of the possibilities of technology but not bound by the actual implementation in order for discussion and possibilities to stand above possible technical or implementation difficulties. This is a visionary role assisting other curriculum people in identifying ways to deliver their subject material.

But a dichotomy exists for this role if that “adviser” is also the designer of the teaching of information technology. The person must then be able to separate the needs of their department and the needs of other departments in the recommendations.

If this role is filled by the same person that needs to deliver the solution, it is quite possible that the recommendation will be even more tempered by the ability of that adviser to deliver the solution. This process should stand independent of the people charged with the actual implementation to avoid the situation where “I cannot do it therefore it is not possible”.

2. Budgeting and Planning – the preparation of the financial possibilities and management of the resource

This phase of the IT cycle is a design and review phase. Ideas created by the curriculum people are costed and assessed for the practical cost. This cost is both a financial cost in terms of new equipment or software and a network resource cost – the actual impact of the implementation on the current IT infrastructure in terms of load, space and other hardware and maintenance requirements.

This may be a negotiated process of back and forward with the "Setting the Direction" phase as concepts are costed, assessed and included or eliminated.

This phase requires coordination between the person(s) responsible for "Setting the Direction" and the IT implementation and maintenance people.

This phase must also acknowledge the cost of the administration systems of the facility. This essential part of the network may share resource with the curriculum network or may be isolated and separate. The maintenance and monitoring roles would most likely be linked.

3. Monitoring and Maintenance – implementing, monitoring and maintaining the resource and ensuring reliable operation

This is the engineering part of implementing both the curriculum and administration focussed aspects of the IT infrastructure and services. Significant savings can be made in sharing development and maintenance functions and this is further magnified if both aspects are considered in designing infrastructure.

This function requires dedicated and experienced network personnel who are isolated from other duties within the organisation. If the role is concurrent with other responsibilities, the response to outages and system difficulties is delayed while other commitments are managed. As Information Technology is an area of curriculum in its own right, the network and infrastructure are not an enhancement to the teaching and learning process but are fundamental to it.

Maintaining a network of the complexity now required in schools is a complex role and one that requires significant and regular up-skilling. The diversity of services offered and the distributed nature of much of the technology means that numerous areas of expertise are required. This is difficult to meet for one person and is well serviced by the use of an accessible team of reference people.

This team model also minimises the time taken to recover from an outage due to the ability of multiple people to address multiple issues simultaneously.

So what is the best model? Obviously one that suits the school's budget, staffing and IT needs. Each school is at differing points in developing their network and coordinating it into their curriculum.

The model that has been proposed here suggests the role of IT curriculum designer and teacher be separated from the role of day to day maintenance and management. This is to ensure the role of mechanic does not dilute the role of visionary.

The physical network requirements of the administration and curriculum need to be clearly articulated to the network maintainers so that clear performance objectives exist thus making it a simple task to assess if the network performance is satisfactory.

It is very important that the role of the curriculum designer and teacher is seen as a permanent role in the staff of the school as the vision for the network is not a one-day summary affair – it requires an intimate knowledge of the operation, purpose and direction of the curriculum and the school.

Once these are done, it is then a relatively simple task to establish if the maintenance of the network is an “in-house” or “out-sourced” option and the relative costs, availability and experience can be assessed.

It is important to realise the narrowness of skills and technical ability that may exist in the small team that would be needed to run a school network. This is easily enhanced in the use of an out-source model where the provider utilises the staff for other activities on other networks and provides regular training and skills enhancement.

Both training and experience can be costly commodities. The very real effect of not covering these is the time taken to rectify issues and failures on the network. The cost of downtime is expensive when the length of time of the outage is multiplied by the number of people affected.

In the out-sourced model, the provider of the maintenance services can provide these at a fixed cost and thus remove the risk associated with the use of in-house expertise and the possibility of requiring assistance from casual contractors to rectify problems that may arise particularly in the case of system failures or errors in deployment. The costs associated with pre-deployment testing are also carried by the service provider thus removing one of the hidden overheads of running an in-house service team.

Perhaps these are the real values and oft hidden benefits of out-sourced support?