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Learning to Elearn Case Study 12

The Telehealth Tasmania Network

by Marcus Bowles*

1. Summary

Established under a Federal Government initiative in Australia, the Telehealth Tasmania Network (TTN) was from its inception chartered with far more than providing videoconferencing technology to improve access to healthcare services for rural and isolated communities. It was also tasked with improving social advantage through online communities and communications. In effect the TTN sought to remove the 'tyranny of distance' and improve interaction between patients and clients, primary healthcare workers, care providers and specialists. In the five years to 2003 the TTN not only has improved delivery of healthcare services and the sharing of information and technology, it also exemplifies how enhanced and converging technology and communications infrastructure capacity can support elearning and other activities within remote communities.

In undertaking this journey the TTN has reflected social awareness within its network of regions, government agencies and users to ensure that the project leverages new information and communication technologies (ICT); these are strategic elements for enhancing not just healthcare, but also community development. The primary area of investigation is how the TTN has utilised its infrastructure and converging technologies to advance from provision of tele-education to elearning and thus accelerated the capacity of the healthcare system to deliver more sophisticated 'ehealth' services into remote and isolated communities.†

2. Introduction to the Telehealth Tasmania Network

With an initial $5.596AUD million from the social bonus funds within the Commonwealth Government's Networking the Nation Program (Regional Technology Infrastructural Funding)‡ and the State Government, the Telehealth Tasmania Network (TTN) commenced operations in November 1998, within the Tasmanian Government's current Department of Health and Human Services. By 2003, more than 25 telehealth studios (suites where videoconferences are

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* When quoting this case study, use as reference: Marcus Bowles. (July 2003). *Telehealth Tasmania Network: Learning to Elearn Case Study 12*. Hobart, Australia: Unitas Company Ltd.

† For readers examining this case study and its implications for a national approach that incorporates means to address regional infrastructure development Case Studies 8 and 9 on Norway and New Zealand are recommended for review. Equally, those interested in using elearning to enable ehealth and sector development may be interested in Case Study 5 on the Health Informatics Collaboratory and Case Study 7 on the Transport Academy's Training Information Gateway.

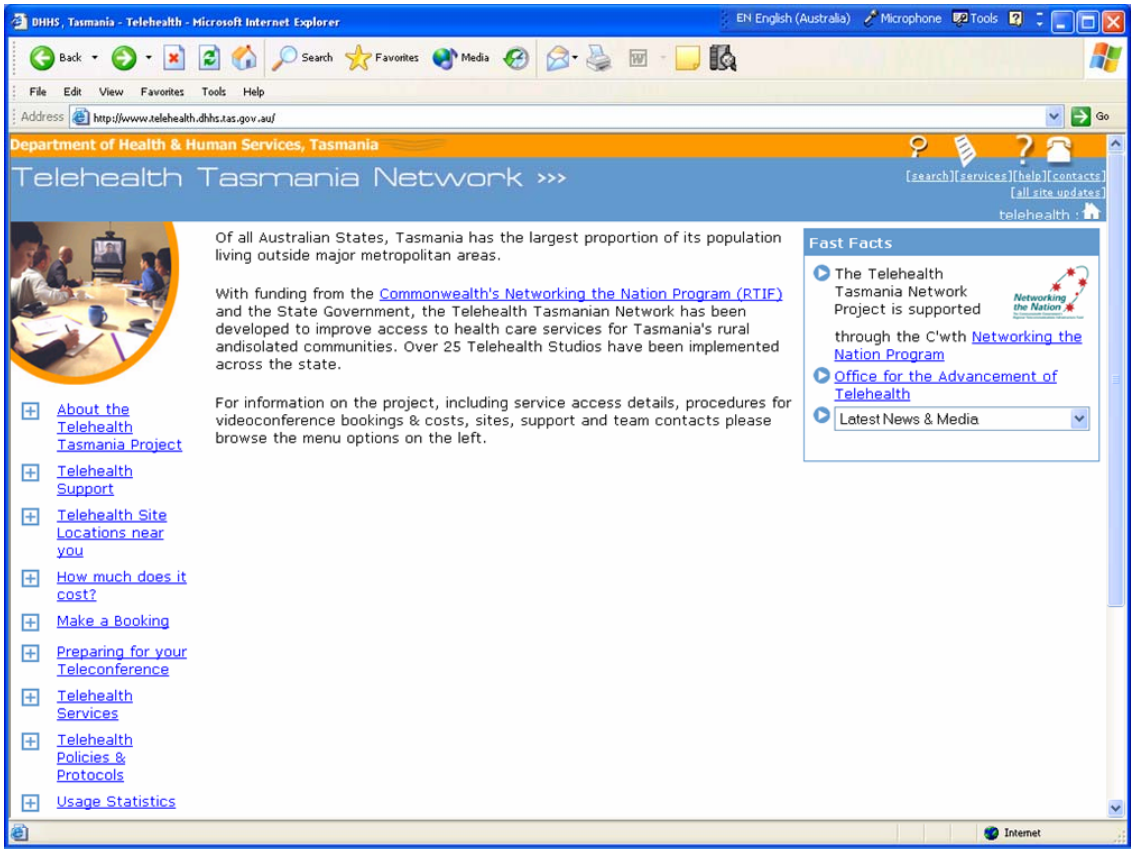
‡ See http://www.dcita.gov.au/Article/0,,0_1-2_1-3_461-4_106337,00.html

conducted) have been implemented across Tasmania and the project has become a reference site for other similar projects in Australia and locations across the globe.

The primary aim of the TTN is to bring specialist services into rural and remote communities across Tasmania, Australia. To do this the TTN aimed to create a statewide network of telehealth facilities that would provide Tasmanians with:

- Access to specialist services;
- A wider choice of health services and providers;
- Enhanced links between rural and remote general practitioners (GPs) and their patients; and
- An integrated network for active management and participation in the health of the community.

Figure 1 — Main page of the Telehealth Tasmania Network website



The implementation of the TTN occurred across three phases.

Phase	Telehealth Objectives
Phase 1 **November 1998 to March 2000** ($500,000)	• Community needs analysis • Infrastructure planning and acquisition • Twenty-six telehealth facilities • Virtual access to a wide range of services • Collection of basic utilisation data • Commissioning of an independent evaluation • Specifications for two statewide client management applications:

Phase	Telehealth Objectives
	○ Statewide Client Registration System (SCRS) ○ Community Client Health Profile Application (CCHP)
Phase 2 **April to November 2000** ($900,000)	• Implementation of telehealth evaluation recommendations to increase: ○ Consolidation of network operations ○ Co-ordination of service providers ○ Collaboration between sites and services • Strategic plan for Information Technology and Telecommunications Infrastructure for Community and Rural Health • Specification of Requirements — Statewide Client Registration System and Community Client Health Profile Application • Development of a business plan for Phase 3 • Consolidation of Phase 1 sites and services
Phase 3 **December 2000 to March 2002** ($4,198,000)	• Extension beyond the TTN to health informatics (information resources) • Provision of an electronic service delivery infrastructure for the Division of Community & Rural Health • Facilitation of communication between health service providers and across service disciplines • Provision of a longitudinal information resource for C&RH (CCHP) and a strategic plan to support future IT/IRM investments • Development of new telehealth hub or spoke sites • Development of new telehealth services and professional support • New access to centres of excellence • Alternative electronic service delivery initiatives to enhance services and support for rural communities

The term telehealth encompasses the technology, applications, tools and processes used to deliver health and health-related care services and information to individuals and communities that are separated from the care provider by time, location or both. The Telehealth Tasmania Network (TTN) is used for three major telehealth service applications (see definitions on page 12):

- Tele-education, which is the provision of learning across the Telehealth network for professional and patient education and research. Tele-education is an element of both elearning and, on an even wider level, distance education;
- Telemedicine, which encompasses the delivery of medical services by a physician to distant patients using telecommunications technology (i.e. to complete an examination or supervise a procedure); and
- Health informatics, which covers the collection, storage, extraction, sharing and optimal delivery of data, information and knowledge (i.e. health records, reporting data or electronic information) or sharing systems capacity (i.e. databases, knowledge repositories) between institutions or health networks at a distance.

3. The Elearning Challenge

As with many initiatives involving social and health outcomes, once mixed with information and communication technologies, the challenges become quite complex. The TTN has a primary

focus on improving not just healthcare, but also the social conditions that affect the health and well-being of a community. The elearning challenges fell into three distinct categories:

- Improving the elearning content and services to maximise the transfer of knowledge and learning in the TTN education activities;
- Utilising elearning to accelerate the adoption and use of the network by rural health professionals and the wider community to enhance not just its implementation, but also local ownership; and
- Delivering professional development and learning services for client groups using the videoconferencing capabilities.

The first challenge for the TTN project was to overcome an absence of content or curriculum that was designed to maximise the levels of interactivity and types of learning that both users and the TTN sponsors wished to access.

The second challenge relates to the wider needs that emerged from dual imperatives:

- The source of funding from the RTIF (Regional Technology Infrastructural Funding) heavily emphasised the need for the TTN to address regional infrastructural needs; and
- Many of the healthcare issues within rural and isolated communities were social issues that the advanced information and communication technology (ICT) could address.

As stated by the project leader Ros Hill:

> ***The success of the Telehealth rollout has been to consider the people and service delivery issues first. Through a coordinated and inclusive process we can then develop collaborative partnerships for enhancing services and then, and only then, implement the technology and support network. In this way the Telehealth demand that underpinned initial infrastructure development is quickly augmented by other uses demanded by the local community. This not only defrays operational costs for the network, but also improves the overall sustainability of the project and the infrastructure.***

The initial elearning challenges in the project quickly expanded beyond utilisation of the TTN capacity and infrastructure to deliver professional development for rural health professionals, particularly general practitioners (GPs).

Some of the critical social challenges confronting the TTN were also obstacles in the elearning design and development. Major considerations influencing provision of electronic services included:

- Of all Australian States, Tasmania has the largest proportion of its population living outside major metropolitan areas;
- Tasmania has the poorest health status of any state in Australia — excluding Aboriginal Australia;
- Tasmania possesses high unemployment and high adolescent health and well-being needs, particularly in regional areas;
- Tasmania has the highest dependency level of any state in Australia;

- A needs analysis undertaken in several rural and remote communities identified a range of health and human services where access was no longer available locally;
- There is an increasing cost and complexity in delivering health services regionally; and
- Face-to-face services (healthcare, educations, etc.) were not being followed up because of isolation (often requiring a four- to eight-hour return trip), the cost of providing visiting specialist services on a regular basis and ancillary support services, and the lack of appropriately skilled personnel available locally as compared to more populated urban areas.

The role of elearning in not only confronting provision of healthcare, but also adjusting social equity issues is evidenced by the following example. The lack of local healthcare services was affected by rural health professionals (particularly GPs) lacking the means to gain remote access to training and professional development on the latest clinical procedures, health initiatives or new medical equipment. Further, this lack of professional development made it increasingly difficult to retain or attract health professionals to these rural and isolated communities.

4. Analysis of Elearning Strategies and Actions

Facilitation of learning community formation

The value of the TTN is not just in delivering elearning, but also in providing the integrated communication capability that disparate professionals and stakeholders can use to more effectively plan, design, implement and evaluate learning programs.

The development and implementation of a dementia education program in Tasmania is an example of how the TTN supported education programs and enhanced implementation through elearning conducted across its network. The Dementia Education Reference Group sought to establish a distributive learning approach for a successful and sustainable long-term Education Framework in dementia. Driven by the University of Tasmania's Department of Rural Health, the TTN was used to provide a consortium of members with a collective mechanism that went well beyond a single consultant or single organisation approach. A consortium approach was preferred because it was believed that true collaboration and partnership among all players throughout the process of planning, reviewing and implementation would sustain better mental health and well-being education frameworks.

The TTN provided the means not just to implement the education program across all required locations and stakeholders, but also for the Dementia Education Reference Group to consult, plan and monitor implementation. The consortium's approach to learning across electronic networks, in the form of a learning community, was reported to be more effective because it (Department of Rural Health, 2003:1):

1. Invests a wide range of people and organisations with ownership of the plan and therefore impacts on its chances of success and its sustainability;
2. Creates a well networked foundation for the program and reduces potential gaps;
3. Broadens and deepens the skills, knowledge and access to resources and ideas available to the Framework's development, making effective use of a limited budget;
4. Encourages a balanced approach to planning through inclusion of key areas such as:
    - Inter-professional clinical specialists (medical, nursing, pharmacy, allied health, non-registered health workers, volunteers);

- Educational service providers/specialists (curriculum development, materials design/implementation and evaluation, development and matching of flexible delivery modes, QA);
- Policy and management professionals;
- Technologists;
- Research and evaluation specialists, and
- Consumers and carers;

5. Enables the allocation of discrete or specialised tasks to people or organisations best suited to achieving them; and
6. Has the flexibility to adjust to personnel and organisational changes over time.

Program implementation

Because the intended stakeholders were involved in the development process and often used the TTN technologies, by the point of implementation the organising committee had fully considered not just content issues, but also regional delivery issues such as when, where and how the audience wished to participate.

As an example of effective implementation, at a two-hour session the North Western Tasmanian GPs were able to access an On-line Dementia Education Program. Topics covered included those most requested from the GPs; needs analysis completed in the On-line Report [sic] and planning stage. The program delivered critical insights into the assessment tools and medication. Information on each was respectively furnished by Professor Brodaty, University of NSW, and Dr Laurence Herst, psychiatrist for the elderly on medications for dementia. The session was delivered across Launceston, Burnie, King Island and NSW at a total cost of $1,260. To transport all participants to a central location, if this had been feasible, would have cost more than 20 times more.

The approach to education and training for the adoption of telehealth is very much action-based with a heavy emphasis on induction of new users. As the team of TTN staff includes only one manager and at best two support personnel, running intensive training programs was considered inefficient. The facilitated classroom-based approach also proved ineffective. Small group coaching (two to three people) prior to actual use of the technology and then direct support during the first few attempts to use the technology for ‘live’ broadcasts proved very effective. Once a local technical ‘coach’ was competent they could then train their colleagues within their regional, professional or project group.

The most pressing training concern is consistency of available technology in the telehealth studios. While this has very clear technical and maintenance issues, the real concern relates to the training of health professionals. The more standardised the technology, the easier it is to train users. With standardised systems and set-ups, users feel comfortable using any facility and do not require retraining. Further, as there is no 24-hour help desk and studios across the state are likely to be used from 7 a.m. to 10 p.m., it is easier for the support staff to provide FAQ support than personal intervention.

Technology and networks

The TTN is currently at the very low end of the evolutionary scale in terms of available technology and infrastructure. The network manager for the TTN, Steven Suli, makes a very strong case for building sustainable use before advancing the technologies:

> ***We recognised early that adoption of the network was contingent on the available computing skills of the audience. At present we estimate some 65% of community health personnel in the regions and with GPs and health professions predominantly being over 50 years of age — the younger GPs leave the state to progress professionally and the older ones tend to return for lifestyle reasons — the network has to be as easy to use as a remote control for the TV. While we are now rapidly increasing use, especially by new users, the desire to introduce computer applications and interfaces into the network would only mean more training requirements we cannot support. New technologies without adequate training support would only increase anxiety for most users.***

However, Steven Suli also notes that as support increases the available technology is limiting capacity on the network and actually forcing some users, especially commercial users in the regions, to be turned away as the TTN does permit remote computers to link in or currently support wide area networks (WAN) using Internet Protocol or Transmission Control Protocol (TCP/IP are languages or protocols used to communicate on the Internet. They also are able to be used for a private network that may include an intranet or an extranet).

The TTN uses an Integrated Services Digital Network (ISDN) for its videoconferencing. When the RTIF became available in 1998 the 'great hope' for regional communication was the use of ISDN. Unlike normal copper cable terrestrial telephony solutions that could provide standard dial-up Internet connection at up to a maximum of 56.6 kilobits-per-second (kbps) download and 33.6 kbps upload, the ISDN digital network could move data at rates of 64 kbps and up to 128 kbps (128,000 bps) over a regular phone line at approximately the same cost as a normal phone call. With three 128 kbps lines, a connection could extend to a maximum available symmetrical rate of 384 kbps (i.e. the same connection speed both ways).

The ISDN solution available to TTN, however, does not permit combined carriage for video, data and voice. Separate voice and data services are required at all sites. This has proved a major restriction on the evolution of the network and affects the associated costs. Costs include not just the connection, but the increased expenses associated with using ISDN for combined carriage service. These costs included the need to deploy manual switching of the ISDN from video and data services where rural staff do not have the technical capacity to manage.

While videoconferencing vendors modified their technologies almost exclusively to operate across ISDN during the late 1990s, from commencement TTN ensured their acquisition of videoconferencing technologies had both ISDN and IP compatibility.

All sites on TTN (including rural sites) have 384 kbps symmetrical capacity for point-to-point connectivity. A reduction in line speed is required to support multi-point conferences, whereby the hub sites (e.g. those at the main regional hospitals such as Launceston General Hospital) are utilising their 512 kbps capacity for all calls. All clinical consultations and eduction programs are run at the 384 kbps capacity across all sites in a point-to-point conference.

By late 2002 it was apparent to the TTN team that the ISDN system was not evolving to enable maximum advantage available through alternative broadband combined carriage communication technologies (i.e. high-speed connections permitting data, voice and video transmission over the same connection). Due to the ISDN's lack of combined carriage capability and the costs associated with utilising the existing telecommunication carrier company's bridging services ($600 per session per hour), TTN is developing its own 'IP bridge' (IP node or network gateway). While TTN has invested in two systems with bridging capacity these are limited to four site conferences where one site acts as the base site (hub). With the acquisition of the IP

video gateway and Multipoint Control Unit (MCU) this restriction will be eliminated. A multipoint call with up to eight site connections can be made from any location. This will be deployed by late 2003. If required, the MCU can be scaled up to enable all TTN sites to be connected during a conference.

Figure 2 — Evolution of the Telehealth Tasmania Network Model

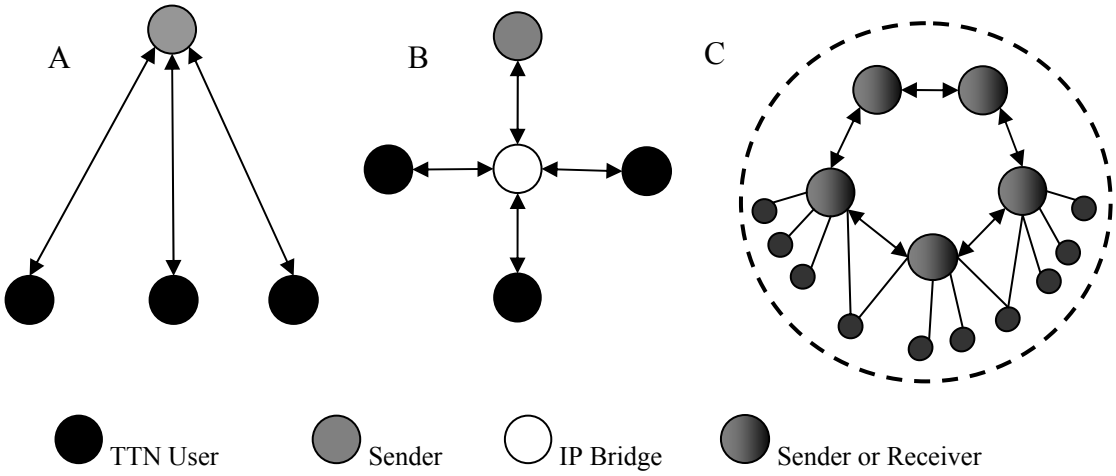


Figure 2 illustrates the evolution of the TTN network. The network is currently using model A. This point-to-point model allows every site wishing to connect to engage in a broadcast with an individual connection with the sender. For instance a Royal Australian College of Physicians (RACP) professional development elearning program with 120 lectures will require the three main studios in Royal Hobart Hospital, Launceston General Hospital and North West General Hospital each to make an individual connection with the sender located at Melbourne University. This currently costs $40 per hour, per site, for a 128 kbps connection. Model B is a point-to-multipoint model whereby all three regional sites can ring to a central IP bridge and then share a connection to the sender; in the case for the RACP program this would mean a saving of one-third for call connections over the 120 lectures.

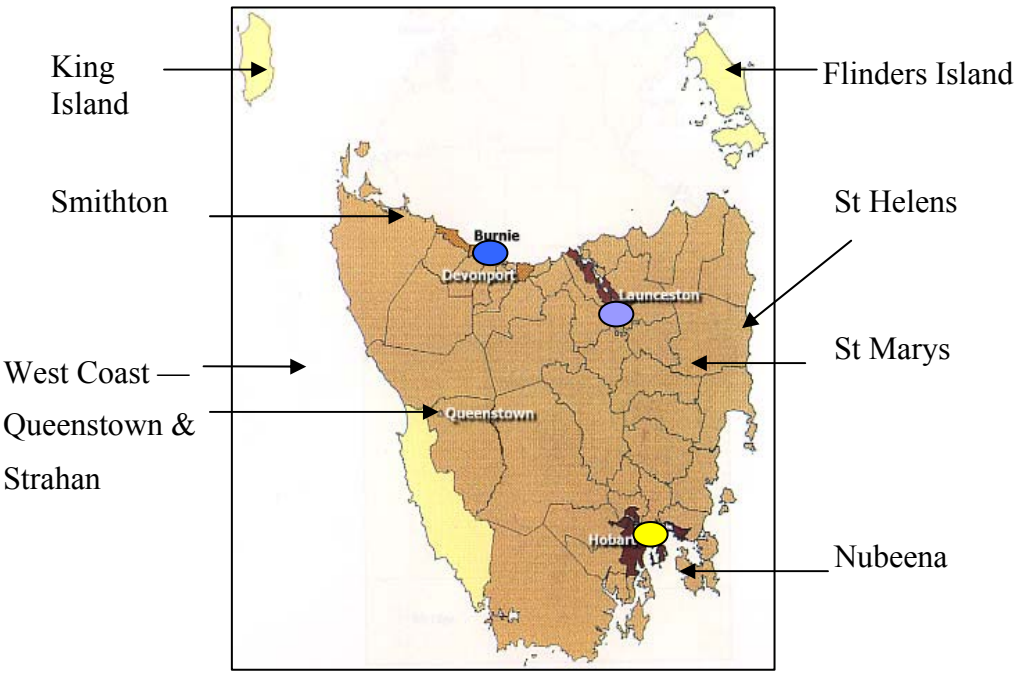
The IP bridge will permit the ISDN-connected sites to connect to a central site and the bridge then connects with another location (in this case Melbourne) using IP applications. The advantage of this interim solution is the ability to connect using IP and not having to retrain staff at each site, or upgrade the existing onsite technologies. This model also permits greater interactivity between the three sites. In model A, interactivity between different sites is low or impossible. In model B, it is possible.

Model C is the natural evolution of the TTN. With this multicast or multipoint network model, the IP capability replaces more restricted ISDN applications. Not only is interaction between all sites promoted, but also the capacity of the system can be moved out beyond the main TTN sites over local communication networks to community users. The main advantage of IP over ISDN is that it permits transmission and access using multiple options from terrestrial telephony (i.e. ISDN, ADSL, PSDN), fibre optics, satellite wireless and so on. Technologies able to access these communications networks can therefore be used anywhere in Tasmania, or around the globe, to access the TTN. Using IP means anyone can access the capacity of the network while ensuring the connection and bandwidth limitations of the ISDN network are removed. While on the IP network, all sites are ‘equal’ and anyone can interact with anyone else on the network.

Elearning to access the network

As Tasmania has extremely rugged terrain, vast amounts of which are covered with wilderness, the location of the TTN sites had to not only promote delivery of health services, but also be easily accessible by health professionals and patients seeking to use the network. Sustaining such a widely dispersed service delivery network was heavily reliant on local experts championing the service while also gaining access to the skills to use and maintain the technology and infrastructure.

Figure 3 — Telehealth Site Network



Multiple Hub Sites: Launceston Hobart Burnie

The managers of TTN are conscious that providing elearning to enable individuals to use the network coupled with ease of access will promote wider adoption and use of the services. Pharmacy, paediatrics and oncology professional services stand as good examples of how the network can organically evolve. For instance, a weekly Oncology Review Conference has been conducted to enhance and streamline services and procedures across the state. This session was initiated by key professionals who then linked in all the regions. The session has now evolved into a multidisciplinary professional development forum that seeks to create consistent practices and increase the independence of regional health professionals. This not only is seen as operationally very beneficial, but also reduces travel time and the sense of professional isolation. Particularly where the topics include direct patient care (i.e. follow-up for bone marrow transplant patients), the social and family well-being impact has been enormous.

Patterns of use

In the second half of 2001 TTN use averaged 85 sessions per month, each involving an average of 700 participants. By the first half of 2003 the monthly average had risen to around 90 sessions each involving 1700 participants. With the introduction of the IP bridge it is anticipated that the average number of sessions for the second half of 2003 will be around 180 to 200 per month each involving some 2000 individuals.

While access has been promoted, the capacity of the system now has to rapidly evolve to deal with expanded demand. Commercial users in particular want access to solutions that include IP linkages. By June 2003, community and commercial use constituted some 10% of all TTN business. Private and public-sector organisations using the network include the Australian Tax Office, Centrelink, ABC, Department of Justice, many education and software companies, Woolworths and others. In the six months to June 2003, it is estimated that some 25% of applicants seeking to use the TTN statewide had to be declined because the capacity was simply not available on the network (i.e. a site was booked or the required bandwidth was not available). This percentage was kept low only because scheduling and management systems had also been evolving to deal with the expected demand. However, growth in network utilisation (in the last half of 2002 utilisation was growing at 20% and from February 2003 it has experienced growth at approximately 50%) is expected to necessitate TTN adopting new booking and service management applications.

The Telehealth Tasmania Network currently collects data in order to report to departmental and funding sources. Data collected can:

- Provide information on the usage of the network; and
- Demonstrate the costs and productivity hours saved by DHHS staff by using the network as opposed to travelling to participate in service delivery.

Figure 4 illustrates some of the critical data for the reporting period to the end of June 2003.

Figure 4 — Comparative numbers of TTN participants half year to June 2002 and to June 2003

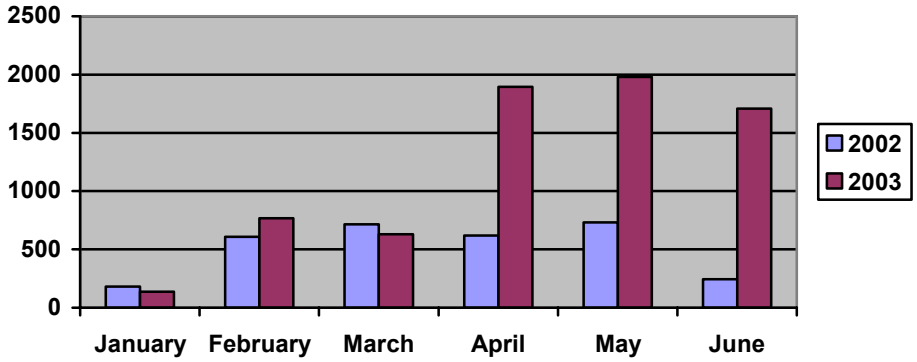
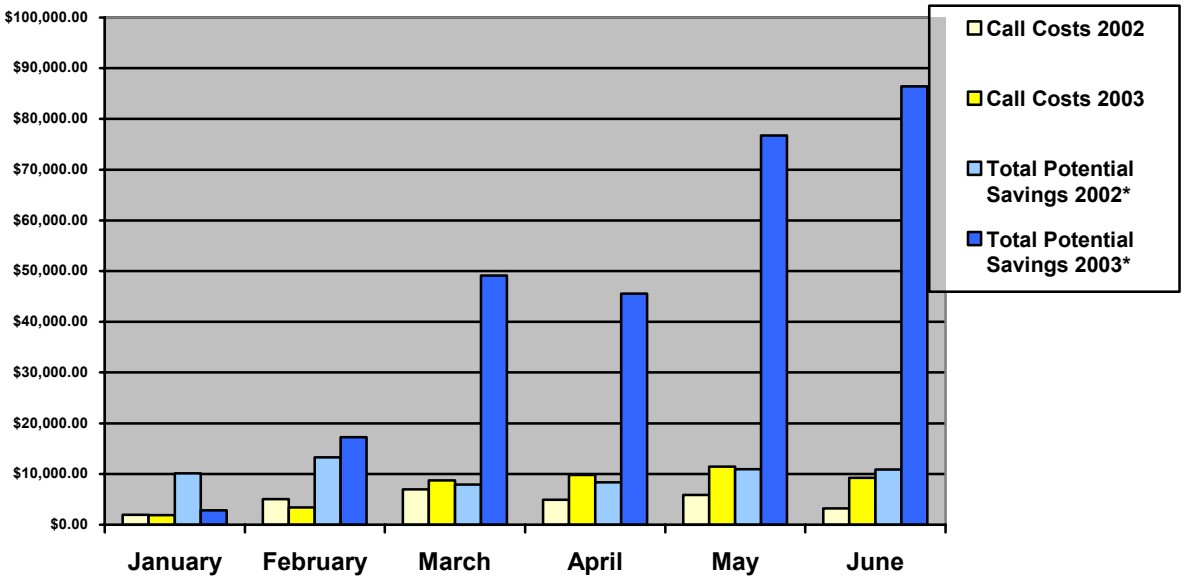


Figure 4 shows the rapid escalation of the numbers of participants using the network. Figure 5 illustrates that small increases in the number of sessions (calls) have produced a very real ‘total potential saving’ to the Department of Health and Human Services. The potential saving is determined by a simple formula whereby the cost of travel and accommodation plus the salaried hours avoided is deducted from the total cost of the calls.

Figure 5 — TTN call costs and total potential savings comparative half year to June 2002 and 2003

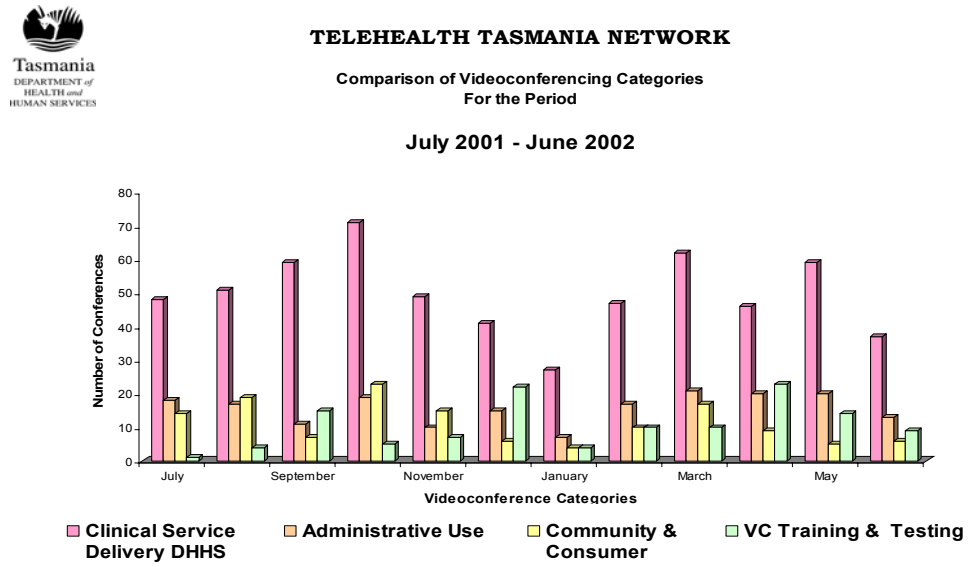


* Total potential savings has a very simple ROI calculation based on the sum of wages and time, accommodation and travel costs saved minus cost of call.

Figure 6 indicates those using the network. In the period July 2002 to June 2003 community use and professional development are expected to have increased their total percentage of network utilisation by some 15 per cent[§]. There is also expected to be an overall growth of 50 to 58 per cent in the number of conferences.

[§] Overall network utilisation for 2003 to 2004 is expected to be at least 50% higher than for 2002 to 2003.

Figure 6 — TTN videoconferencing activity by type of use June 2001 to June 2002



The future: from telehealth and distance education to ehealth and elearning

By building a strong ownership for the network and using elearning over the network, the TTN has maximised community ownership and sustainability. As the RTIF obligations are acquitted the evolution of the technology and infrastructure to deliver new and improved services will be essential. The introduction of health informatics services such as that undertaken when implementing Phases 2 and 3 of the RTIF project (especially the Statewide Client Registration System and Community Client Health Profile Application) has indicated the importance of using elearning applications to 'pave the way' for information collection, sharing, analysis and storage over the same networks. In undertaking this evolution the telehealth application is evolving not just to encompass elearning, but also to enable ehealth services.

By definition, telehealth has been very focused on regional telecommunications technology enablement. The technologies involved include the use of two-way interactive telecommunications to complete videoconferencing, data exchanges and transfer of digital graphics. The connection of computers to networks — including LANs, WANs and the Internet or intranets and the facilitation of information exchange using mobile telephony networks — is all continuing to evolve.

Both ehealth and telehealth represent the convergence of technological advances, research, academic fields of endeavour and processes in a number of fields, including medicine, healthcare, telecommunications, informatics, information systems, computer engineering, education, artificial intelligence, materials science and perceptual psychology. While the boundaries are often blurred, ehealth has been used to denote a wider emphasis on information and communications technologies (ICT). The 'tele' prefix is considered by many to be too narrow to encompass the emerging electronic communication and information technology deployed in the health sector. By building a base of ownership and competent users, the telehealth network in Tasmania has clearly made possible the evolution and further convergence of ICT in ways that will advance the electronic delivery of many other health and community services in Tasmania.

5. Implications for Elearning

This case study highlights the need for elearning systems and architecture to support not just content delivery but also the processes of learning design, delivery, assessment, and the evaluation and reporting systems (Unitas Elearning Principle #8 *Elearning systems and architecture must support both the content delivery and the design, learning, evaluation and reporting processes for elearning*). The Telehealth Tasmania Network (TTN) has deliberately undertaken a collaborative process forging understanding of not only the ehealth needs in regional communities, but also how these needs can be fulfilled in a manner that adds value to the community. This means healthcare is not just a process of dealing with episodes or immediate education needs; it is also about reinforcing the social conditions and wider issues that affect the health of individuals within the community. The technology and infrastructure is then implemented to deliver improved healthcare and as a sustainable capability imported into the region.

The initial elearning programs were targeted to ensure that the capabilities existed in both the health professionals and the community to use the TTN or to train others to use it. With this capability and understanding has emerged wider acceptance of not just the ehealth implication for the TTN, but how the network can provide a service to many users. This acceptance reinforces the concept that elearning infrastructure and processes need to create sustainable relationships where mutual advantage exists to complete the transaction. Repeated use occurs where those building solutions are cognisant of elearning, and indeed ehealth, as electronic transactions that require adherence to the fundamental principles of user needs (Unitas Elearning Principle #7 *Elearning is an activity that inherently involves service exchanges between humans moderated by technology in an electronic context*).

The TTN project has recognised that elearning is not an end in itself. In this case elearning was a component of the wider telehealth activities. However, many of the advantages derived from implementing telehealth programs were triggered by effective tele-education and elearning interventions. The technology and infrastructure itself were ultimately only components that enabled both telehealth and the elearning experiences to be completed. To maximise outcomes the TTN team recognised that participative processes that instil local ownership and shared commitment to outcomes would not only enhance the ability to fill service capability ‘gaps’, but also encourage a search for other meaningful uses for the TTN capability. This strongly reinforces the need to recognise that elearning is more than the transfer of knowledge in a ‘course’. Elearning may be a process that can occur during the learning exchange to enhance collaboration, and the process can be harnessed to actually enhance how people work together in learning communities and plan implementation (Unitas Elearning Principle #6 *Elearning is both a process of learning and a means for achieving knowledge transfer*).

The ability of Internet and the World Wide Web protocols to further enhance and integrate ‘tele’ health services from different organisations is transforming how current ehealth and elearning activities and practice are conducted across the telehealth network. Effective exploitation of new IP services and sharing of data beyond elearning into health informatics solutions is propelling the evolution of the TTN model. This study demonstrates that this evolution is occurring; the ability to evolve and further promote integration across multiple aspects of ehealth delivery has become a major benefit. TTN is a factor in delivering elearning and ehealth; it is also a mechanism for building sustainable approaches based on meaningful relationships between suppliers, partners, patients, professional groups, university representatives and community members to ensure that the technology becomes a viable means to deliver the required outcomes. The technology has never been an end in itself (Unitas Elearning Principle #2 *Effective elearning occurs when technology and processes are built to enable improved*

individual learning. This includes responding to the changing interaction between the type of learning and knowledge, the situated outcomes sought and the individual's needs and preferences, including the designer, facilitator and user).

6. Contact Information

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