Creating Cooperatively with all Stakeholders an Advanced and Highly Secure ICT Learning Network for all Inmates within Existing Cultural Prison Practices.

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Presented at: ACEA/Reintegration Puzzle

Perth WA Australia

31 August – 2 September 2009

Abstract

Prison presents an opportunity for inmates to improve on their education. The majority of prisoners in Tasmania have never completed a senior secondary education. Learning outcomes might be increased if students have access to a variety of learning resources and learning styles. The Tasmania Prison Service in partnership with the Tasmanian Polytechnic has developed a highly secure terminal ICT network to facilitate flexible learning platforms. We will describe the design and implementation of the ICT network. In this essay we present a provocative case study about achieving innovation and collaborative partnerships within a prison environment through the understanding and management of institutional cultural practices.

Introduction

Approximately half of Tasmania's prisoners cannot write competently and the majority have never started or completed senior secondary education (see Table 1 on page 4). Prison presents an opportunity for these men and women to improve their education. However, students experience difficulties achieving educational outcomes while attempting courses of study in prison. Although the lack of educational engagement and outcomes might be associated with the students' personal circumstances and their belief in the value of education, the restricted prison environment and the lack of access to teachers and digital resources are also limiting factors.

The Tasmania Prison Service in partnership with the Tasmanian Polytechnic has developed a highly secure terminal ICT network. Using e-learning software, this network allows secure communication between teachers in the Polytechnic and students in the prison. Although students are unable to access the Internet, the network enables the teachers to provide students with digital copies of approved sites. This platform can also be used by other service providers.

In this paper we describe the design and implementation of this network. Understanding and managing the institutional cultural practices of the prison proved essential for the successful implementation of this network. It required an approach that is different to traditional project management practices. We will present a provocative case study for achieving innovation and collaborative partnerships within prison environments.

Background and History – How It All Began

The Education Act of Tasmania (1994) makes provisions for any Tasmanian who has not completed senior-secondary education to complete year 11 and 12 education. In 1997 the senior-secondary Tasmanian state colleges (years 11 and 12) implemented an Open Learning Programme for students who were unable to attend classes or for those adults who had not completed senior-secondary education. High quality education and training associated with increased work opportunities are also one of the visions and goals of Tasmania Together 2020 (2008). All the Open Learning Educational resources are text-based lessons and activities. More than 80% of inmates have not completed a post-secondary education (see Table 1 on page 4) and from its inception Open Learning's text based courses provided a possible solution for those prisoners who wanted to complete their secondary studies.

Table 1

Prisoners' Education Background – Primary and Secondary Completion Rates

Grade Completed	Numbers	%
Did not attend	4	0.8
4	2	0.4
5	2	0.8
6	14	2.8
7	17	3.4
8	85	17.0
9	103	20.6
10	184	36.8
Post Secondary	87	17.4
Total	500	100.0

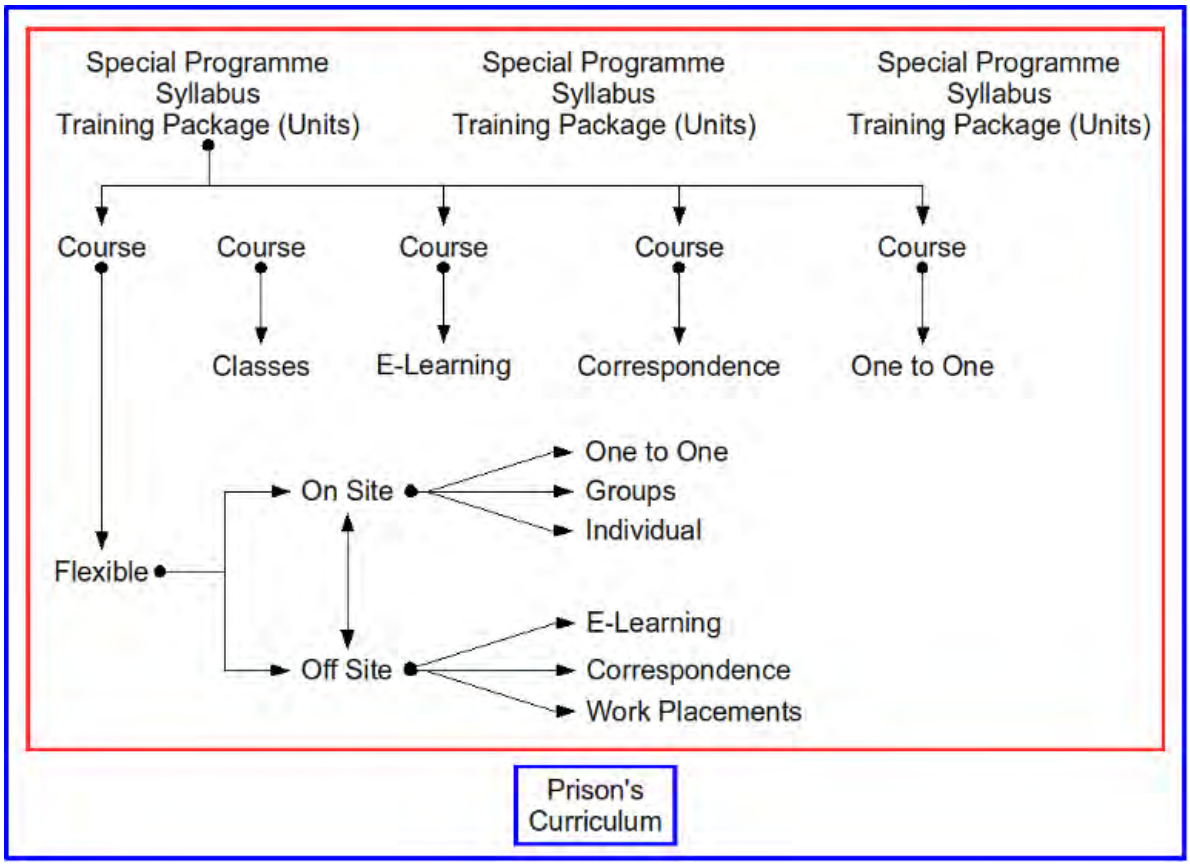
Caveats

This paper is not about an investigative study on the benefits of completing secondary education and of education in a prison environment. An in-depth study on this topic is beyond the scope of this paper and research studies, such as those by Joseph Graffam, Allison Sinkfield and Lesley Hardcastle (2007), by Stephen Stuerer and Linda Smith (2003) and by Hui Wei (2007) are but a sample of the literature on these topics.

To avoid ambiguity, the diagram in Figure 1 on page 5 gives our interpretation on the educational concepts of syllabi, courses and curricula used in this paper. In the context of this paper we consider a syllabus, a special programme document or a training package each as a broad guidline on the content and assessment. Courses to be taught are specially designed in response to every guidline and take into account the learning environments and the student audience. It is thus possible that many courses could be designed in response to such guidelines. A curriculum is considered as all the courses articulated to all the syllabi, training packages and special programmes on offer in a prison environment thus allowing a more integrated and holistic approach to prisoner education.

Figure 1

Dynamic Relation between Syllabi, Courses and Curricula



The third caveat is that we are not making any claim in relation to the use of ICT and learning outcomes. Dirk Koudstaal and Roy Pugh (2005) found that most students have very poor ICT literacy skills and we might well have ICT literacy confused with ICT consumerism. However, access to digital educational resources through a secure network might provide a more flexible learning environment for students in a prison.

The Partnership's First Steps

We have mentioned before that the Tasmanian Education Act (1994) allows Tasmanians to access post-compulsory education if they have not completed year 11 and 12. Provisions are made for those Tasmanians to enrol in any of the State's three post-compulsory educational institutions – the Polytechnic, the Academy or the Skills Institute. We, as government employed public educator and servants, were and still are of the opinion that Tasmanian

prisoners who have not completed their secondary education are entitled to access such education. Also a report on crime prevention by the Australian Attorney-General's Department clearly shows a link between a reduction in recidivism and engagement in continued education or training after release from prison (Attorney-General's Department, 2005).

Table 2

Course Enrolments and Completion at Risdon Prison during 2007

Course Enrolments	Enrolment Numbers	Completed
Open Learning text based courses	188	20 (11%)
Vocational Education and Training (VET) courses	126	8 (6%)
Hobart College VET IT Cert 1 & 2 (classrooms conducted at prison one day per week supplemented with digital resources)	48	23 (48%)

Table 3

Literacy Levels (Australian Core Skills Framework) of Risdon Prisoners (2008)

Reading Level	No.	%	Writing Level	No.	%
0	22	4.4	0	41	8.2
1	42	8.4	1	145	29.0
2	141	28.2	2	234	46.8
3	153	30.6	3	62	12.4
4	107	21.4	4	18	3.6
5	35	7.0	5	0	0.0
Total	500	100.0	Total	500	100.0

Although the enrolment rate in Open Learning, text based year 11 and 12 courses, at Risdon Prison is very high, completion rates of such courses are disappointingly very low (see Table 2 on page 6). Such results might be due to inmates' poor writing skills. Using the

skills levels as set out in the Australian Cores Skills Framework about 80% of the prisoners scored a writing skill level of 2 or less, needing high level support and intervention (see Table 3 on page 6). When we combined face to face classes with students' access to digital as well as text-based resources, course completion rates improved dramatically.

Computer ownership and the use of the Internet in Australia have sharply increased over the years. In 2008, 67% of households had home Internet access and 75% of households had access to a computer (ABS, 2008). The classical view of the digital divide, people not having access to hardware due to financial circumstances, has been re-conceptualised (van Dijk, J. & Hacker, K., 2003) as a lack of IT skills and knowledge due to low education levels and poor social articulation with ICT (Warshauer, 2002). Effective and productive use of Information Technologies for tasks such as further studies, banking, job search, professional information access and communications are considered essential skills today and ought to be desirable, if not imperative, for prisoners to have such skills upon release.

In the past attempts were made to provide hardware in the Risdon Prison to inmates by means of laptops and stand-alone computers. Serious digital security breaches occurred on a regular basis and most custodial staff felt unable to deal with the highly complex and specialised security issues surrounding computers and laptops. Not all students had access to laptops and desktop computers as the number of prisoners engaged in education outstripped the numbers of available computers causing serious equity issues. The laptops were managed with a sledge-hammer approach – whenever a digital security breach occurred hard drives were wiped clean. This management approach was very disruptive to the students and work was lost on a regular basis. USB ports and CD drives enabled on computers and laptops encouraged traffic in USB sticks and CDs containing digital information and communication – hard to control for custodial staff.

After numerous discussions with custodial staff, teachers at the Prison Education and Training Unit and IT professionals, a vision of a secure computer network as an infrastructure for learning, library and information resources was prepared for the Department of Education and the Department of Justice (Koudstaal, 2007). The concept of an ICT Learning Network was loosely based on the Huon LINC[1]:

> Huon LINC brings together a number of government and community organisations such as the Library + Online Access Centre, Centrelink, Service Tasmania, Business

1 The Huon LINC (Learning and Information Network Centre) is a collaborative Community Resource Centre in the Huon Valley, Tasmania, Australia http://www.huonlinc.education.tas.gov.au/

Enterprise Centre and the Magistrates Court under the one roof.
(http://www.huonlinc.education.tas.gov.au/)

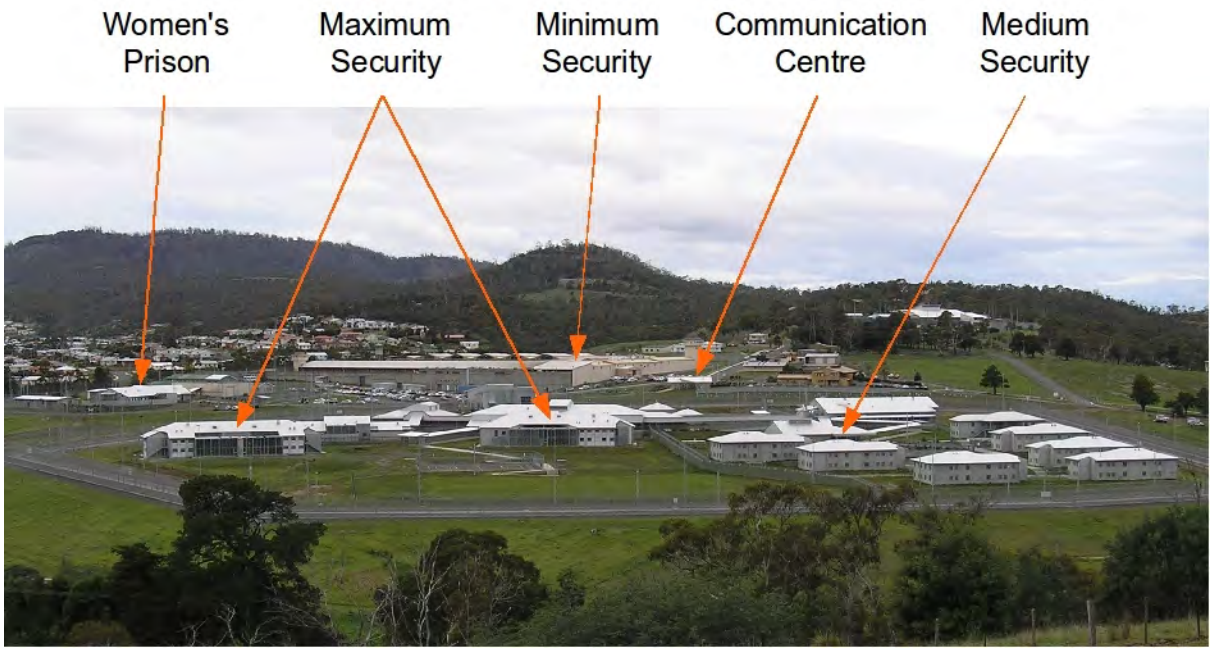
Implementation

We were asked in 2007 to give a presentation on the submission (Koudstaal, 2007) for a Risdon LINC (Learning and Information Network Centre) and the associated computer network to the Minister of Education and the Minister of Correctional Services. Surprisingly, after the presentation we were given funding for the pilot implementation of a secure computer network for the delivery of education and digital resources in the Minimum Security Prison.

Design Criteria

Figure 2

Risdon Prison Precinct



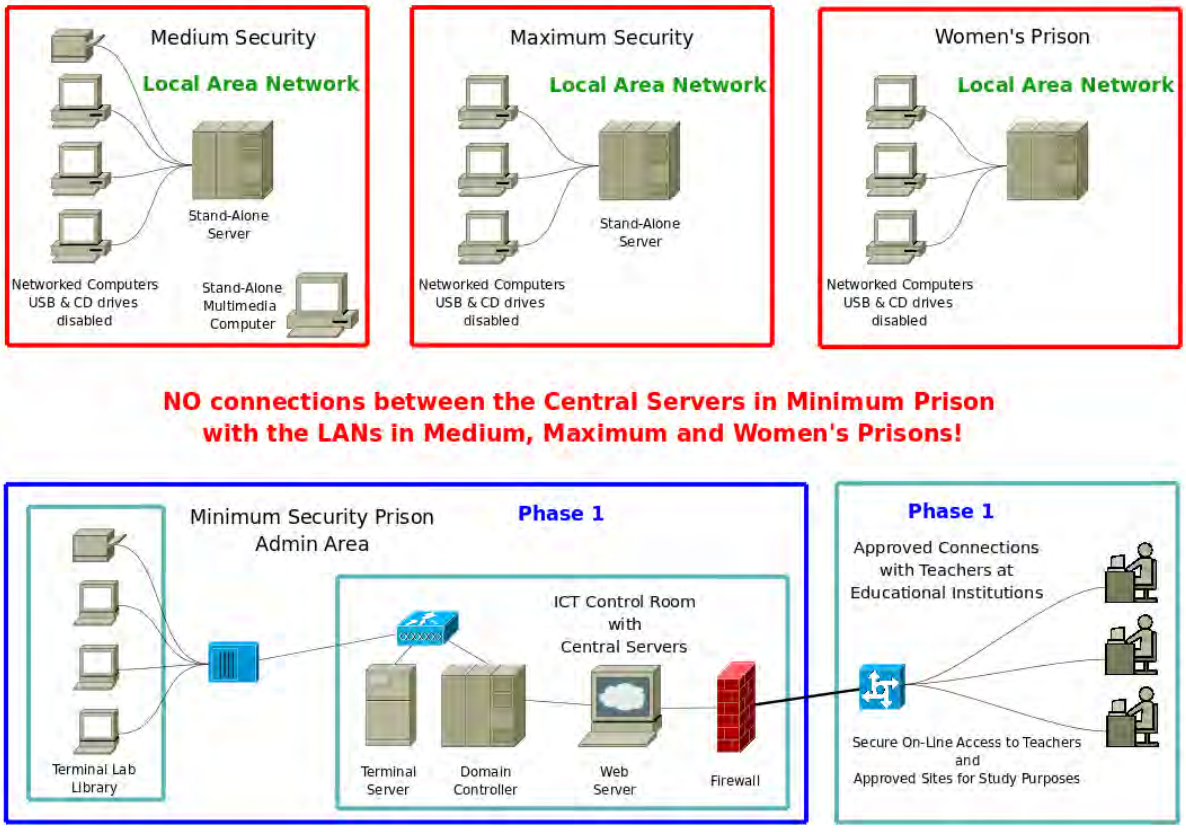
The network architecture in a prison environment for the delivery of education by the Hobart College (now part of the Tasmania Polytechnic) to students was designed with the following restriction and unique requirements:

- Secure student access to teachers at the Hobart Polytechnic Campus.
- All Internet access blocked.

- Communication between inmates on the network blocked.
- Long term back-up facilities for audit purposes.
- No access to USB ports and CD drives to prevent up-loading of data by inmates.
- Network hack-proof from outside and inside the prison.
- Permanently capturing any communication between teacher and student.
- Provide Internet type resources without access to the Internet.
- The network has to be quarantined from the Department of Justice staff network and the prison's digital security control network.

Figure 3

Pilot Network – Risdon LINC



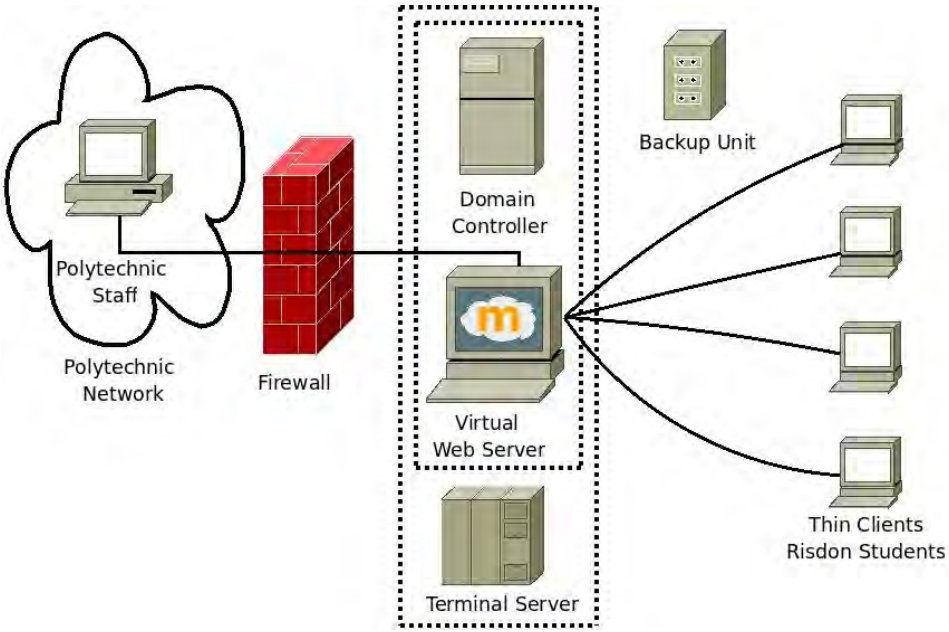
The initial pilot network in the Minimum Security section of the Risdon Prison Precinct is not connected to any other area of the prison (Figures 2 & 3). A secure dedicated fibre link connects the Hobart Polytechnic Campus with the communication centre of the Risdon Prison Precinct. Teachers have to complete a visitors induction programme before they are given a

network account to access the network and deliver on-line courses.

Computers are not used – the network at the Minimum Security consists of thin clients (terminals) connected to a terminal server. Thin clients, in contrast to a networked computers, depend on the processing activities of the terminal server for software operations. Thin clients remotely access software from the terminal server during a logon session. Our thin clients have no access to USB ports and CD drives and the lack of the thin clients' processing power makes it impossible for a user to engage in network hacking activities.

Figure 4

Server Architecture



Moodle, an Open Source course management program, is installed on a virtual web server and acts as the only interface between the campus teacher and the students in the prison. Moodle provides a secure and interactive on-line learning platform for students – security settings in Moodle are highly configurable due to its open source coding (Figure 4). The web server is not connected to the Internet (see Appendix I on page 18 for more technical details).

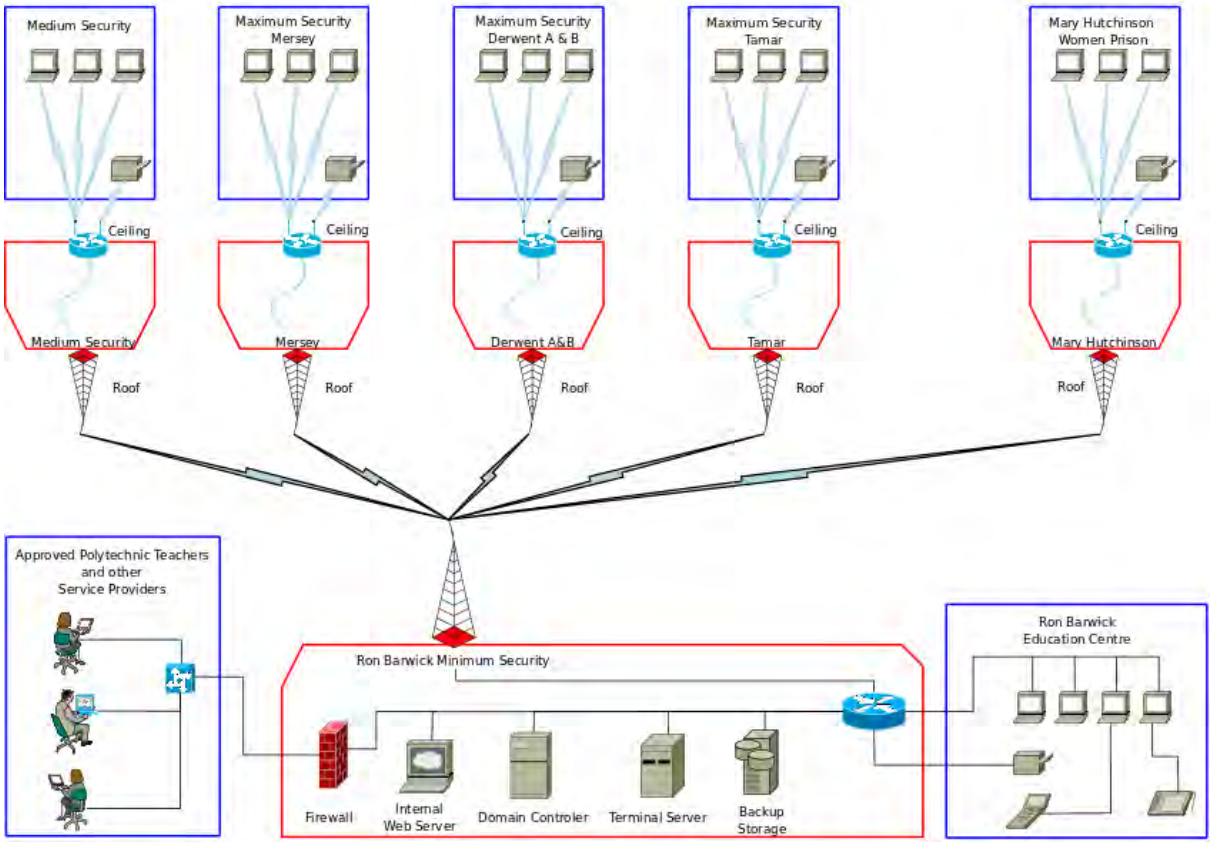
Network Expansion into Maximum, Medium and Women's Prisons

Maximum, Medium and Women's Prisons are not connected to the Risdon LINC servers. Students have access to stand-alone local area networks. As those networks are not

connected to the central server, teachers are unable to access students for the delivery of on-line courses. Work is lost if inmates are moved between the prison's minimum, medium and maximum security sections.

Figure 5

Expansion – Connecting all Sections of the Risdon Prison Precinct



Laying cables between the prison buildings for the expansion of the network is not possible. We have made plans to connect all the prison sections to the Risdon LINC servers in Minimum Security using dedicated encrypted radio signals (Figure 5). Once the extension is complete, we will be able to keep user accounts in a central location on the Risdon LINC server and on-line courses can be delivered to all inmates in the Risdon Prison Precinct.

Network Usage

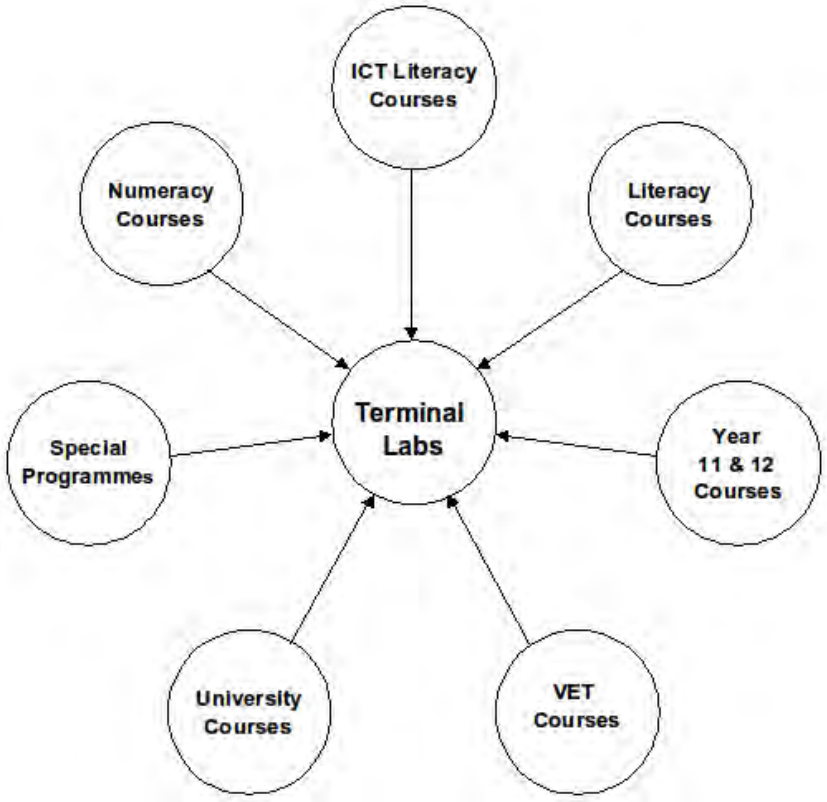
The thin client network in the Minimum Security Prison is used on a regular basis by about 40% of the inmates. See Appendix II on page 20 for more detailed information.

At this point in time the target groups for the Risdon LINC thin client network are for

inmates engaged in education (Figure 6).

Figure 6

Target Groups for Risdon LINC Thin Client Network



Change Process

The recently published CHAOS Summary 2009 report by the Standish Group (2009) show that only 32% of all Information Technology projects started are completed and delivered on time. Although completion rates have slightly improved since 1995, these low completion rates are very costly to the economy. One of the responses to such high failure rates of IT projects has been an explosion of text books on project management for information system courses. Although some of these books are used to educate students in the art of project management, like the excellent textbook by Kathy Schwalbe (2002), project completion rates remain very low.

Henry Mintzberg (2000) in his book *The Rise and Fall of Strategic Planning* is very critical of the rigid application to project management and planning:

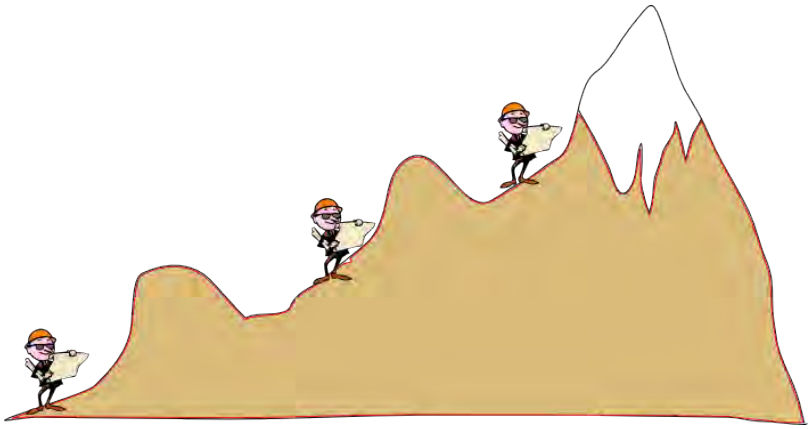
> Planning, as noted, is meant for coordination. And the more tightly coordinated the plan,

> the less flexible it must be. Change one serious part of an integrated plan and it disintegrates.
>
> The planning literature expresses clearly the need to make strategy explicit. But the more clearly articulated the strategy, the greater the resistance to its change – due to the development of both psychological and organizational momentum. (pp. 174-175)

Important security considerations make it difficult and complex to implement such a radical ICT network project. The successful implementation of this ICT network in a very difficult and restrictive environment might well be due to our unconventional project implementation.

Figure 7

Restricted Views of the Summit (Project Aim)



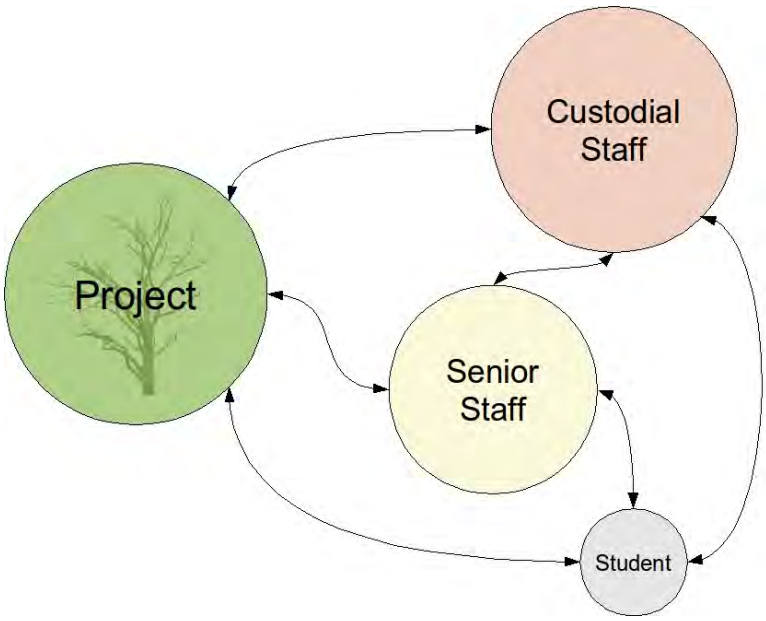
It is very important with a project of this magnitude to have the support of all the stakeholders particularly from the custodial staff who have to manage the physical security of all the equipment and the prisoners using the network. Climbing a rugged mountain might be one way to visualise the hurdles that have to be overcome in a project. If the summit of the mountain is the project's aim, stakeholders are at different stages of the climb to the summit. Due to the rugged terrain of the mountain, most stakeholders will be unable to view the summit or ultimate aim of the project (Figure 7 page 13). How then do we take all of these stakeholders on the climb to the top?

A more holistic and organic approach to this project was inspired by Jakob von Uexküll's *Umwelt*. Mihhail Lotman (2002) adapts Jakob von Uexküll's 1928 concept of *Umwelt*, for which there is no English translation, and interprets it as representing a subjective dynamic interaction with the environment that an organism selectively creates, organises and reconstitutes according to its specific needs and benefits. For example, several

Umwelten can be created by a tree as a rough textured and convoluted terrain for a bug, a scary shape to a young child, a home for a nesting bird and a great place to hide for an adventurous ten year old. The organisms' experiences of the tree are quite different – their understandings of the tree overlap but are not the same. Applying Lotman's concept to the interactive and dynamic environment each stakeholder as a unique institutional and personal *Umwelt*, we might be better able to understand the *Umwelten* (plural *of Umwelt)* of all the stakeholders.

Figure 8

Interconnected Islands of Stakeholders' Umwelten



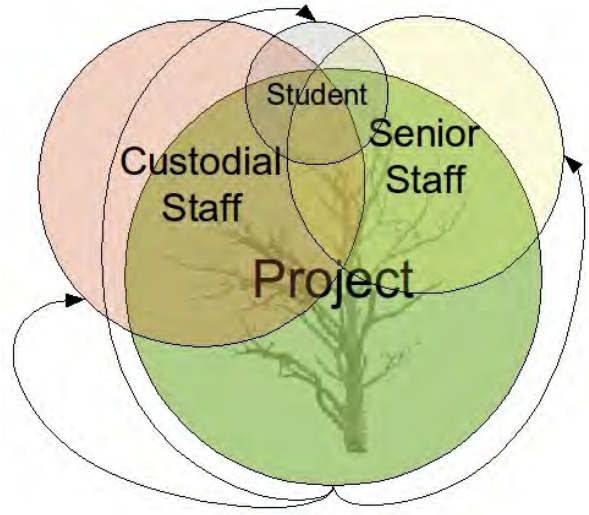
At the start the *Umwelten* of the stakeholders in relation to this project were like little islands with complex connections. Although there are many more stakeholders, we have only used a few of the stakeholders in the diagrams for illustrating our *Umwelt* approach to a project implementation.

Rather than leaving the stakeholders' *Umwelten* as isolated islands, a considerable amount of time and effort was spent in trying to create a greater awareness of the unique and different benefits to each stakeholder. For example, the custodial and senior staff do not have to worry any more about the complex digital security of the network. Supervision of inmates is easier for the custodial staff as more inmates are now peacefully engaged in education. And

inmate students are now able to access the network for personal use as well, like typing letters, thus less likely to damage equipment or compromise the network. A graphical representation of this process is represented in Figure 9 on page 15. The Project as an *Umwelt* has a far greater support from all the stakeholders and there is a greater awareness of mutual benefits by all the stakeholders.

Figure 9

Making the Stakeholders' Umwelten Part of the Project (Tree) Umwelt



Conclusion

Our computer network design and implementation for use in a correctional environment as a collaborative effort between the prison and a secondary college is a first for Australia. The unique design, architecture and management of this network provides a very high level of digital security with on-line access for prisoners to teachers and courses. We did not use standard project design principles and the success of this project might well be attributed to a high level of involvement from all stakeholders.

The thin client network creates a far more flexible learning environment and will provide the resources needed for inmates to gain ICT literacy skills. To avoid frustration, students with poor reading and writing skills should not be left to struggle on their own. Holistic curricula design with the network but a part of the curriculum might be a more realistic approach for the use of the ICT infrastructure.

The cost of the ICT network infrastructure is relatively low compared with the annual cost of an offender in custody. The pilot project equipment cost of about $75 000 is below the

cost for one prisoner over year ($94 000 in Tasmania). There is a danger that the maintenance cost for such a network is ignored. Given the very strict security requirements for a ICT network, continuous monitoring and maintenance of the network by qualified IT technicians is essential. The ICT network is a platform for the access of resources and the delivery of a wide variety of on-line courses. The initial uptake by prisoners of the thin client network is very encouraging. It might be easy for evaluation purposes to collect data on the usage of this network but to find a correlation between learning outcomes, a reduction in recidivism and the use of the ICT network might be more problematic.

It is possible for non-educational external service providers to use this network. Most information resources are web-based and web site copies can be placed on the network's virtual web server.

Well maintained and managed, the secure ICT infrastructure network at Risdon will provide an important part for curriculum activities in the prison.

References

Attorney-General's Department (2005). *Crime Prevention*. Retrieved from: http://www.crimeprevention.gov.au/agd/WWW/ncphome.nsf/Page/Publications_Intervention_for_prisoners_returning_to_the_community_b1-Introduction.

Australian Bureau of Statistics (2008). *Household Use of Information Technology, Australia, 2007-08*. Australian Bureau of Statistics. Retrieved from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8146.0.

Graffam, J., Sinkfield, A. J. & Hardcastle, L. (2007). The Perceived Employability of Ex-Prisoners and Offenders. *International Journal of Offender Therapy and Comparative Criminology*, *52*, 673-684.

Koudstaal, D. (2007). *Business Case for Funding: Establishing a Risdon LINC (Learning and Information Network Centre) with Hobart College. Creating an ICT infrastructure and Providing a Flexible Education at Risdon Correctional Facilities using Digital, Text and Classroom Based Teaching Methodologies*. Tasmanian Department of Education. Retrieved from: http://koudstaal.org/wp-content/uploads/2008/11/risdonlincsubmission.pdf.

Koudstaal, D. & Pugh, R. (2005). *An essay: 21st century curricular construction using 20th century tools, and students' ICT literacy. Proceedings of The Fourth International Conference of Science, Mathematics and Technology Education. Simon Fraser*

University, British Columbia, Canada. Retrieved from: http://www.koudstaal.org/wp-content/uploads/2006/08/koudstaal_and_pugh.pdf.

Lotman, M. (2002). Umwelt and Semiosphere. *Sign Systems Studies*, *30(1)* , 33-40. Retrieved from: http://www.ut.ee/SOSE/sss/mlotman301.pdf.

Mintzberg, H. (2000). *The Rise and Fall of Strategic Planning*. Prentice Hall.

Schwalbe, K. (2002). *Information Technology Project Management*. Thomson Learning.

Standish Group (2009). *CHAOS Summary 2009*. Retrieved from: http://www1.standishgroup.com/newsroom/chaos_2009.php.

Steurer, S. J. & Smith, L.G. (2003). *Education Reduces Crime, Three-State Recidivism Study Executive Summary*. Correctional Education Association. Retrieved from: http://www.ceanational.org/PDFs/EdReducesCrime.pdf.

Tasmania Together 2020 (2008). *Goals and Benchmarks*. Tasmania Together Progress Board. Retrieved from: http://www.tasmaniatogether.tas.gov.au/goals_and_benchmarks.

Tasmanian Legislation (1994). *The Education Act*. Government of Tasmania. Retrieved from: http://www.thelaw.tas.gov.au/tocview/content.w3p;cond=;doc_id=86%2B%2B1994%2BGS47A%2FGs4%2FEN%2B20071104000000;histon=;prompt=;rec=;term=#GS47A@Gs4@EN.

van Dijk, J. & Hacker, K. (2003). The Digital Divide as a Complex and Dynamic Phenomenon. *The Infromation Society*, *19*, 315-326.

Warshauer, M. (2002). Reconceptualizing the Digital Divide. *First Moday*, *7(7)*, Retrieved from: http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/967/888.

Wei, H. (2007). *Measuring Option Values and the Economic Benefits of Completing Secondary Education (Research Paper 1352.0.55.082)*. Australian Bureau of Statistics, Canberra.

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Appendix I

Server Hardware, Software and Firewall

Domain Controller:

HP Proliant DL360

1 Quad core CPU

4 GB RAM

Mirrored 72 GB HDDs

MSA20 external drive array

Windows Server 2003 R2 64 bit

Terminal Server:

HP Proliant DL360

1 Quad core CPU

6 GB RAM

Mirrored 36 GB HDDs

Windows Server 2003 R2 64 bit

Web Server:

VM ware Virtual Server

Ubuntu Server 8.04

Moodle 9.4+

MSA20 external drive array:

redundant drives provide 1TB storage

Firewall:

Any PC

pfSense 1.2.2

Backup Unit:

Thecus N4100+

Mirrored 1TB drives

Thin Clients:

HP t5135

ThinConnect S2ST0084

Client Software

Free Open Software is used:

- OpenOfficeorg
- GIMP
- Dia
- Inkscape
- Audacity
- MindMap
- Blender
- Gantt Project
- Firefox

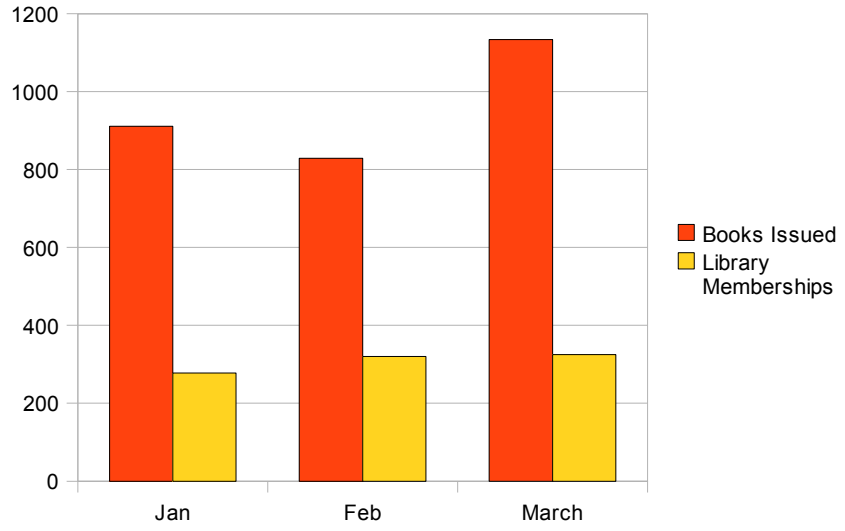
Appendix II

During the installation of the Risdon LINC terminal network in 2008, the library was also refurbished by the Tasmania Library Service as part of the Risdon LINC development.

Figure 10

Library Memberships and Issues (2009)

Total Prison Population - 500



The Risdon LINC thin client network is only accessible by inmates in the Minimum Security Prison of the Risdon Prison Precinct. The figures below are based on a prison population of 111 in the Minimum Security Prison.

Table 4

Registered Users with the Risdon LINC Terminal Network in Minimum Security (2009)

	Number of Registered Users
Teachers (Computer Accounts)	11
Students (Computer Accounts)	51 (46%)

Table 5

Printing Jobs - Thin Client Network in Minimum Security during Jan, Feb and March 2009

Total Printing Jobs	343 distinct print jobs
Total Pages	889 pages
Average Pages/Printing Jobs	2.6 pages per printing job
Average Printing Jobs/Students	6.7 printing jobs per student

Table 6

Distinct Logon Numbers to the Thin Client Network in Minimum Security in 2009