The H ermann Ohlthaver T rust
Report 2010

Contents

Report by Professor Paul Webb

Introduction

The Hermann Ohlthaver Trust has been a stalwart supporter of the activities of the Department of Science, Mathematics and Technology Education (SMATE) at the Nelson Mandela Metropolitan University for a number of years. In the past the funding supplied by the Trust has not been allocated to any specific project, but has supported SMATE science, mathematics and technology oriented activities overall. As such, reporting was done via quarterly reports which covered all SMATE activities.

Over the past two years there have been a number of changes made in terms of the structure of the Faculty of Education at the NMMU, the most recent being a 'school' structure in which the Department of Science, Mathematics and Technology Education (SMATE) was subsumed into the School for Professional Development. The community engagement activities of SMATE now reside in the SMATE Unit of the Centre for Educational Research, Technology and Innovation (CERTI) and, as such, this report is made on the specific project for which the Hermann Ohlthaver Trust funds were allocated within the SMATE Unit, namely the Information Technology in Schools project.

Recent funds were used to support teacher training, hardware and software installation and connectivity in four primary and two high schools in Port Elizabeth, namely Emafani, Emfundweni, Kwanoxolo and Kama Primary, and Lungisa and Kwamagxaki High School.

Genesis of the IT in Schools project

The IT in Schools project started in April 2008 after the installation of 120 computers in a cluster of selected schools positioned around the Missionvale Campus of the NMMU. The computers were donated to the schools by the Dell Foundation via a proposal made by SMATE. Twenty computers were set up in each of the six participating schools by SMATE members and technical staff from the ICT Services Department of the university, i.e. they were cabled and networked and extra electrical outlets, connections, software, etc. were provided in other to fit out the schools with functioning computer laboratories.

Selected teachers from each of the schools were trained over the course of the year in a NMMU computer laboratory on the Missionvale campus. The teachers became conversant with Microsoft Word, Excel, Powerpoint and the use of the internet and email. In addition, schools were assisted to draw up their school vision and plan of action for computer implementation and usage during 2008 and beyond. The participants were also helped to plan for computer integration across the curriculum in their schools, primarily by the use of cyberhunt techniques. Templates were provided for both the visioning and integration of IT activities. The process continued until March 2009, where after the teachers were deemed ready to implement the strategies in their schools.

Focus in the schools

From April 2009 to date the focus has been on activities within the schools. Further basic assistance was provided to the teachers on site, but a major obstacle to taking the project forward was the lack of internet connectivity in the schools. After a series of negotiations with the NMMU ICT Services section of the NMMU, the University agreed to provide Internet bandwidth free of charge to the participating schools. However, the telephone lines to these schools have been stolen on a number of occasions and Telkom refuses to replace them. The SMATE project team investigated all possible options and the only option that appeared to be viable was the provision of wireless links to the schools. An information technology specialist contracted to the NMMU was recruited to analyse the wireless linking possibilities for the participating schools and subsequently he provided an action plan and an inventory of the required equipment and installation costs.

Lungisa High School will serve as a 'hopping station' for
wireless connectivity to other participating schools.

Connectivity strategy

The strategy adopted was 'line of site' wireless connectivity. The installation of the equipment at the main Internet broadcast site was done in August 2010, to be followed by a roll-out to the schools. Phase one included a wireless survey to find a central 'high site and management point' from the Missionvale campus of the Nelson Mandela Metropolitan University (NMMU). It was found that all of the schools, apart from Kama Primary, i.e. Emafini, Lungisa, Emfundweni, Kwanoxolo and Kwamagxaki, had line of sight to the central high site, or could be connected by 'hopping' the signal from one school to another. The South African Police have living facilities (tall blocks of flats) in the Algoa Park area which is high enough to use as a relay link for Kama Primary. The police were approached via Colonel Marius van Rooyen and given specifications of the antennas that could be installed on the roof of their building, viz. 26.5cm x 25.5cm x 7.5 cm and 30cm x 40 cm antennae without extension cards, consuming a maximum 25 W, which would be supplied via an Ethernet cable from any existing power point. After a protracted period of negotiation (three months) our request was refused. As such, providing connectivity to Kama Primary still remains a challenge.

Missionvale - Schools Internet Project
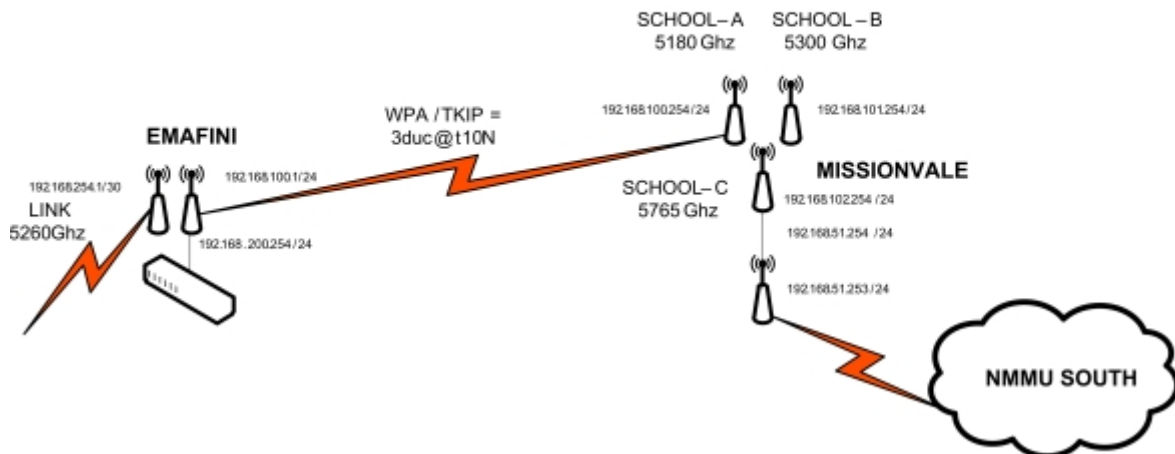
Connectivity plan for the IT in schools project

The second phase of the project included the installation of the antennas and the required equipment at the Missionvale campus of the NMMU. The routing of internet traffic was done across the existing NMMU wireless link from Missionvale to South Campus, with the internet usage throttled to 1Mb/s across the wireless link and provided to schools. The equipment supplied for the relay site was:

EQUIPMENT FOR MISSIONVALE HIGH SITE:

3x 5.8GHz 15Dbi 120° Sector Antenna
Routerboard 800, 800Mhz, 256MB Ram, 3 Gig
3 x Mini PCI Cards XR5
3 x MMCX - N (F)
Power over Ethernet Adaptor
Power Supply 48V
3 x LMR400 NM - NM Cable 1m
50m network cable

Emafini was the first school to have antennas installed and receive connectivity. The equipment supplied to the school included:

EQUIPMENT FOR EMAFINI

1 x WLAN iPoynt 5Ghz, 20Dbi-AWLAN-044
1 x ROUTERBOARD 433, 3ETHERNET, 3 MINI PCI
*2 x MINI PCI ALPHA 11a/b/g 1*mmcx*
1 x MMCX - SMA(M) 20CM PIGTAIL
1 x MMCX - N (F)
1 x Power over Ethernet Adaptor
1 x POWER SUPPLY - 18V
1 x LMR400 NM - NM Cable 1m
1 x 5 - 6 GHz Grid Dish Antenna 24Dbi - Small

Aerial installed at Emafini Primary School.

Internet connectivity achieved.

Teacher training

A major part of the teacher development aspect of the project was the development of an internet related strategy, developed by André du Plessis. The 'Extended Cyberhunts' strategy formed the framework of the process which enabled research to be conducted in terms of the first order (context based) barriers and the second order (psychological, motivational) barriers to successfully implementing computer integration into the school curriculum. The research questions included; how ready are teachers and their schools for ICT integration?; what skills are developed by 'teachers-as-learners' during their participation in the cyberhunt approach?; does the creation of a cyberhunt promote motivation and interest?; does the process of creation of cyberhunts promote collaboration?; and how should the teacher development process for ICT integration using cyberhunts be managed? This research resulted in a PhD degree being awarded to André du Plessis in April 2010.

Dr. Andre du Plessis

Future planning

Dr André du Plessis will be on sabbatical for the first semester of 2011 and he plans to provide onsite assistance to the participating schools, assisting teachers with onsite Internet and extended cyberhunt implementation. He will also assist learners to become the designers o' knowledge through the use of the extended cyberhunt approach and by establishing online Social Learning Communities. These online communities should enable children to develop web links to one another on educational issues or topics.