

# **The Mamelodi Broadband E-Learning Pilot Project**



*“Connected We Learn”*

## **Project Summary Document February 2003**

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## The Ulwazi E-Learning Partnership (ULWELP)



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## **A Day in the life two Grade 10 Mamelodi Student**

Thembe and Vusi from Mamelodi High are keen to get to school for a number of reasons. Their class has spent the past two weeks being trained on how to use email and the internet and they are dying to see if they have any replies from the pupils of Mamelodi Technical College, Mediri High, Gatang High or St Alban's College. Their English teacher gave them an assignment of identifying cultural differences in family activities between the time they get home from school until they go to bed at night. Once the information has been compiled with at least five families from each of the five schools participating in the Ulwazi Project, they will have to compile a web page with their findings. This will be coupled to a comparison of the similarities and differences in the information gathered from other families.

Vusi and Thembe log onto the Ulwazi educational portal and they are pleased to have received at least twelve emails and they read each word with delight. Their teacher is even more excited that learners are using the computer centre on a daily basis and that real learning is taking place. A session for the development of web pages has been organized with the staff and pupils from St Alban's College leading the workshop.

A web cam has been set up on the computer in the corner, which also shows a picture of the activities in each of the other four computer labs. Vusi and Thembe wave to the other pupils and stop to use the IRC chat to pass on a message to their friends at Mediri and Gatang. Suddenly the friendly face of Stembani from Mamelodi College is recognized on one of the screens. They will use the same web cams to capture a picture of themselves to include in their own web page. Some schools have access to a scanner, which will allow them to scan some pictures of their families and paste these on their web pages.

Thembe and Vusi take a moment to see if the Grade 10 Science lessons using the Smartboard have been posted on the St Alban's College web page. As they log in they find the following lesson notes: An introduction to Chemistry, Metals and Non Metals, and the History of the Atom, and finally they come across Chemical Bonding. It is a difficult section but the diagrams that the teacher from St Alban's was using when he presented the section made it so much easier to understand. More importantly, the material developed during the actual lesson is available. Once they have reviewed the material together with the lesson they missed they are instructed to use the Encarta Class Server to check for further lesson materials and to complete an on-line test.

Thembe and Vusi decide to post an electronic notice on the web page. They are keen to start a virtual club with learners from the Ulwazi community. They compile the advert, giving a brief introduction and the time and date for the meeting. Thembe logs onto MSN Messenger, which they learnt how to use when they were taught internet skills. The message is posted but they forget to include their email addresses. In no time Vusi has instructed Thembe how to complete this simple task and they now have to be patient to read their first messages. While they are still logged on to MSN Messenger they decide to see if there are any other groups being formed. The bell goes and they have to rush off to class.

Vusi comes back in the afternoon to work on the Formula One in Schools Project. He is the Team Manager and he has to coordinate the efforts of four other learners in his team. He bumps into John, who is the Design Engineer, and they discuss the CAD design, looking specifically at the rules of the competition. They have to reduce the surface drag on the vehicle, especially around the wheels. John has done some research on the internet and has included some of these ideas in the current design. Vusi sends out an email to the other three partners at Modiri High asking them to report back as soon as possible.

Thembe also managed to stay for some time in the afternoon, as she wants to participate in the extra lessons that the Science teacher from St Alban's College is offering. The two SmartBoards, one at Mamelodi High and one at St Alban's College have been linked and a web cam captures the picture of the teacher. Thembe is able to direct questions during the lesson using the IRC Chat software installed. Her teacher asks her to go to the SmartBoard and to draw a picture depicting the arrangement of the electrons in a Nitrogen atom. Her teacher was is to rearrange two electrons to correct the model and she is very pleased with the outcomes. She will not forget this important lesson, which was also posted to the web. The lesson has to be terminated as the English teachers from the five schools have scheduled a meeting to discuss further projects using the Ulwazi network.

Vusi and Thembe can be pleased with the 'real contextual zed learning' that they have been exposed to. In the past their teachers were involved in mere information transfer and there was very little new knowledge generated. They decide to write to Motorola, the Department of Communication, the Department of Education, SmartBoard, Formula One in Schools, SchoolNet South Africa, the University of Pretoria, St Alban's College and ICASA to thank them for making a difference in their lives.

*Ron Beyers  
August 2003*

## **The Logo**

The logo depicts two learners putting their heads together to create a better future. The essence of the project is about the sharing of knowledge with learners and educators being able to see the potential in each other by being transparent to each other. In sharing they are able to learn and to help each other.

The graphic also gives the illusion of a hand. This is symbolic of the Community Partnering Projects of St Alban's where many projects have reached out to the community of Mamelodi to help others to realize their potential.



## **The Ulwazi E-Learning Partnership**

The **Ulwazi E-Learning Partnership** (ULWELP) is a partnership of five schools situated in the Tshwane metropolitan area. Four are situated in the township of Mamelodi and one is situated in the suburb of Lynnwood Glen, near the CSIR main campus. For the execution of the project, the schools in Mamelodi, viz. Gatang High School, Mamelodi College, Mamelodi High School and Modiri Technical High School need to be linked, by means of a high-speed broadband wireless network, to each other and to St. Alban's College, in Lynnwood Glen.

ULWELP came into being as a result of the need of the schools to interactively and in real time share in each other's learning, cultural experiences and knowledge. A working group consisting of ULWELP and associates has conceptualised an experimental pilot project in order to determine if these needs can be met and to explore how e-learning, by means of modern technologies (including broadband wireless technologies), may be advanced. One of the aims of the project is to extend the concept of the Connected Learning Community that St. Alban's College has developed, to the mentioned Mamelodi schools.

The pilot project, named the Mamelodi Broadband E-learning Pilot Project, is a true community project with commendable goals, in view of South Africa's legacy of disadvantaged communities and the need to improve and accelerate education. The project has the support of several associates, including the Knowledge Management and Multimedia units of the Department of Communications, as well as the Department of Education, the CSIR Innovation Hub, the University of Pretoria and Motorola Southern Africa (Pty) Ltd. The associates serve in a Project Working Group and steer the execution of the project.

The Working Group has ultimate responsibility for steering the project on behalf of ULWELP, St. Alban's College plays the role of leading the project on a day-to-day basis.

The radio network is key to the execution of the project. It is high-speed data network, capable of data rates of several megabits/second, which Motorola has undertaken to establish and maintain. The network will be established using Motorola's 5GHz technology called Canopy, operating in the band 5.725-5.825 GHz. The technology, which Motorola claims is a breakthrough technology for broadband connectivity – in terms of affordability, ease of use, and speed – has recently been type approved by ICASA (certificate No TA-2003/058.) The network will comprise radio terminals at each of the schools, plus radio terminals at a relay station midway between St. Alban's and Mamelodi

The project has the potential to become a landmark in the development of modern technology-based education and e-learning in South Africa. It is expected that lessons learnt from this project will be useful in contributing to the establishment of the countrywide educational network as envisaged by section 41(10) of the Telecommunications Act.

In summary, it is important to note that:

- The project is aimed at gathering experimental results on e-learning and knowledge-sharing and, as such, will be important for the future of distance education in South Africa;
- The focus is on bridging the digital divide one advantaged and several disadvantaged communities (schools);
- No commercial or other telecommunication service will be provided by the network;

The network is unrelated to any existing commercial or other telecommunication service and there are no consumer interests involved. The project totally relies, for its execution, on contributions by ULWELP associates.

## **Background to the Partnership and the Pilot Project**

ULWELP currently consists of the following schools: The Mamelodi-based schools Gatang High School, Mamelodi College, Mamelodi High School, Modiri Technical High School, plus St. Alban's College, based in Lynnwood Glen, Pretoria.

St Alban's College is a private school in Pretoria with a well established Outreach Programme. It is currently busing scholars from the Mamelodi schools to St. Alban's on a daily basis for learning in English, Mathematics, Science and Biology. This programme, although producing good results, suffers from benefiting only limited numbers of students and having limited opportunities for interaction. The time it takes to transport learners and the cost of transportation are also problematic.

St. Alban's has made great strides in the exploitation of modern electronic technologies and methods for e-learning, in its project called the Connected Learning Community Project. The college is keen to extend the valuable experiences gained through this project to a larger community of learners at the abovementioned Mamelodi schools.

The Mamelodi schools are keen to benefit from the St. Alban's experiences and to embark on collaborative e-learning experiments with St. Alban's. The problems mentioned, combined with the benefits that can be achieved by extending the St. Alban's experiences to the Mamelodi schools, has prompted a desire to looking at innovative electronic ways of learning and knowledge-sharing.

Fortunately, technologies available today present exciting opportunities and this has led to the conceptualisation of the Pilot Project. The purpose of the Pilot Project is to experiment with e-learning by means of a pilot system, yet to be deployed, that uses state-of-the-art technology. It includes a high-speed broadband data communication network linking the five schools, as well as - located at the schools - computer laboratories, interactive whiteboards, webcams, etc.

The project will go beyond the confines of programmatic teaching. While the pilot system will present opportunities for conventional distance learning, in terms of standard curricula, it will enable extending, to the Mamelodi schools, the boundaries of the St. Alban's Connected Learning Community. The latter involves a variety of

new, unconventional learning methods. The pilot system will therefore enable St. Alban's to serve, through its Outreach Programme, a much broader Outreach community than that currently served. The project will allow the true potential of learners in the Mamelodi schools to be leveraged.

ULWELP has the vision that connecting, by means of a broadband network, the abovementioned five schools as equal partners in an e-learning educational community will enable the learners to leapfrog the digital divide. Ulwazi meaning 'knowledge' was the reason for the name of the partnership to be "Ulwazi E-Learning Partnership". The motto to be "connected we learn" comes from ULWELP's belief that learning, through being connected on the human level, as well as electronically over large distances, is key to successful learning.

The main goal of the Pilot Project is to empirically explore the impact, on education in the South African context, of electronic knowledge distribution and e-learning, by means of broadband connectivity combined with computer-based tools.

### **Phases of the Pilot Project**

- (a) To install a wireless broadband network linking the five identified schools
- (b) To, at the schools, set up computer laboratories, or extend existing laboratories, as may be necessary, by installing the essential hardware and software
- (c) To do tests to establish the technical feasibility of the network, combined with in situ hardware and software tools at the schools, in the areas of:
  - Electronic (including Internet-based) knowledge sharing
  - Interactive audio-visual learning
  - Collaborative, interactive project work
  - Fast access to educational information
  - Enabling and facilitating cultural exchange
  - Contextualisation of ICTs for learning
  - Development of communication skills
  - Development of skills to become part of the globalised economy and information society
  - Scheduling of e-educators between schools in virtual classrooms
- (d) To, in the areas mentioned in (c), experiment with different methods of e-learning and to, where feasible, develop new methods of e-learning made possible by broadband connectivity
- (e) To publicly make available results from the Pilot Project, for the benefit of education and learning communities in general

The experiences gained from the project may have far-reaching lessons for e-learning in South Africa (and elsewhere). It is envisaged that the experiences would add value to distance education and to the establishment of educational networks and computer and Internet laboratories in schools, in South Africa, as well as other countries in Africa and the rest of the world.

## **Broadband network for linking schools**

A high-speed broadband data network for linking the five schools is essential for extending the Connected Learning Community to the schools. It will be necessary to transmit data, at any time, from any of these schools to one or more of the other schools. This needs to happen at data rates of several megabits per second. The network will be established by means of affordable wireless broadband communication equipment.

The equipment to be used for this project will be the Motorola Canopy broadband wireless equipment operating in the frequency band 5725-5825 MHz. The equipment has been type approved for general use, by the Independent Communications Authority of South Africa (ICASA).

The schools are spaced over an area with a diameter of roughly 20km. It has been calculated that, in addition to wireless terminal equipment needed at each of the schools, equipment will be needed at a relay station midway between Mamelodi and St. Alban's College. Terminal equipment is of a type that can be easily installed on existing structures (e.g. buildings) and can, if necessary, be easily removed or relocated.

### **ULWELP associates and management of the project**

A working group (called the Project Working Group) consisting of ULWELP and other interested parties (termed ULWELP associates) has been formed. The Working Group will steer the project and will make contributions – financial and in kind, as may be appropriate - towards its execution. Members of the working group will consist of, amongst others:

- The five abovementioned schools (ULWELP)
- The Knowledge Management Unit of the Department of Communications
- The Multimedia Unit of the Department of Communications  
Department of Education
- CSIR Innovation Hub
- Motorola Southern Africa (Pty) Ltd.
- Omega Digital Technologies
- Sangari – Formula 1 in Schools Project
- Schoolnet South Africa

Other potential associates are to be approached for their participation.

St Alban's College, in consultation with the other schools (the other members of ULWELP) and under the guidance of the Working Group, will lead the project on a day-to-day basis. The ultimate authority for the management of the project will lie with the Working Group. St. Alban's will therefore be accountable to the Working Group.

## **Financial aspects**

ULWELP associates (see section 4) will be contributing to many of the requirements of this pilot project. For instance:

- Motorola will sponsor the wireless broadband network for the linking of the schools, including the installation and maintenance thereof for the duration of the project
- St. Alban's College, in consultation with the Mamelodi schools, will offer educational value-add through various ICT related projects

Consideration is being given to approach, amongst others, the following for contributions:

The Universal Service Agency, for supplying computer laboratories

Funding agencies and business, for providing sponsorships for this project. In particular, sponsorship will be sought for:

- Connectivity, e-lounges, web cams, electronic whiteboards
- Project management resources
- Training
- Educational content
- Research to determine educational implications

St. Alban's College will create a separate fund in the name of ULWELP for the deposit of financial contributions to the project and will manage the fund according to guidelines laid down by the Working Group. An audited report on moneys received and moneys spent will be provided at the time St. Alban's normally provides reports on its regular school funds.

## **Conclusion**

A working Working Group of the Ulwazi E-Learning Partnership has conceptualised a project called the Mamelodi Broadband E-Learning Pilot Project. The project will entail connecting five schools, of which four are in Mamelodi, and one, St. Alban's College based in Lynnwood Glen, Pretoria. Use will be made of modern wireless communication and other in situ technologies. The project is aimed at doing e-learning experiments amongst the four schools in Mamelodi and St. Alban's College, including experimenting with the network and other technologies. It is viewed as a project that could add major value in crossing the learning digital divide in South Africa and elsewhere. With sponsorships already in place and more likely to follow, the project is likely to not only make a huge difference to the schools in the Ulwazi E-Learning Partnership, but to provide valuable experiences for e-learning in general, in South Africa.

The Working Group members are committed to making a success of the project.

## Proposed Schedule

The following is a proposed schedule and is subject to change as the project rolls out.

### **Week –3**

- Setting up of radio network
- Testing of radio Network
- Task Team Meeting

### **Week –2**

- Testing of radio Network
- Meeting with Principals of all schools
- Press release
- Training session#1 (2 Pupils and 2 teachers from each school)
- PC Basics
- Working on the network
- MS Word

### **Week –1**

- Training session #2
- Refresher Course
- Internet
- Email
- College Web Page
- SmartBoard

### **Week 1**

- Training session #3
- SmartBoard Communication Systems
- Diaries for teachers and pupils
- Other communication devices
- Subject Meetings
- Student and Teacher Diaries

### **Week 2**

- Training session #4
- Creating web pages
- F1 in schools and Grade 10 students
- Accessing Grade 10 Science and Grade 9 F1 Pages
- Grade 10 Science lessons
- Student and Teacher Diaries

### **Week 3**

- F1 in Schools Introduction
- Formation of teams with support from St Alban's pupils
- Grade 10 Science lessons
- Student and Teacher Diaries

### **Week 4**

- First Reporting Session
- Email Research Project for Grade 10 Science in Teams
- Grade 10 Science lessons
- Grade 10 Extra Science Lessons using the SmartBoard
- Student and Teacher Diaries

### **Week 4**

- First Reporting Session
- Email Research Project for Grade 10 Science in Teams
- Grade 10 Science lessons
- Grade 10 Extra Science Lessons using the SmartBoard
- Student and Teacher Diaries

### **Week 5**

- Grade 10 Science lessons
- Email Research Project for Grade 10 Science in Teams
- Grade 10 Extra Science Lessons using the SmartBoard
- Student and Teacher Diaries

### **Week 6**

- Grade 10 Science lessons
- Science Expo – Multi School Teams
- Email Research Project for Grade 10 Science in Teams
- Grade 10 Extra Science Lessons using the SmartBoard
- Student and Teacher Diaries

**Week 7**

- Grade 10 Science lessons
- Science Expo – Multi School Teams
- Email Research Project for Grade 10 Science in Teams
- Grade 10 Extra Science Lessons using the SmartBoard
- Student and Teacher Diaries

**Week 8**

- Second Reporting Session
- Science Expo – Multi School Teams
- Student and Teacher Diaries

**Week 9**

- Student and Teacher Diaries
- Extra Lessons

**Week 10**

- Student and Teacher Diaries

- Extra Lessons
- Inter School Subject Meetings

**Week 11**

- Student and Teacher Diaries
- Extra Lessons

**Week 12**

- Wrap up of Project
- Student and Teacher Diaries
- Completion of Trial

**Report Back**

- General
- Overall purpose
- Successes and failures
- Extracts from the diaries
- Technical Report
- Implications for Education
- Recommendations
- Press release

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