e-Learning Using Wireless ad hoc Networks to Support Teaching and Learning in Rural Zambia

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Introduction

• What is e-Learning?
  – is the utilisation of ICT facilities in the provision of education

• The goal of e-Learning is to provide interactive learning
Wireless Ad hoc Network:

• Ad hoc is from Latin meaning for this purpose only

• all nodes are mobile and can be connected dynamically in an arbitrary manner

• there is no use of default routers. Each node becomes a router and must be able to forward traffic on behalf of others
Problem statement

Rural areas in Zambia are lagging behind because of the following challenges:

• inadequate ICT infrastructure
• Lack of qualified teachers
• Insufficient learning resources such as books especially in science subjects
Scope

• Project will be limited to secondary schools (grades 8-12) for a start
• Level of difficult in science subjects is higher
• Ministry of Education, Science, Vocational Training and Early Education has developed an ICT Curriculum for grades 8-9, and 10-12
Possible solutions

• Use of mobile phones in teaching and learning
• Set up a telecentre accessible by mobile phones
• Students use mobile phones to access material on the server(s) as well as access resources on the Internet
Architecture Design
Operation – Proposed System

• Main server is a fixed infrastructure with Internet connection. Education materials can be entered manually
• The nodes (mobile phones) have access to the resources in the server
• They can associate on ad hoc basis
• Self organizing and peer level communication is achieved without reliance on fixed infrastructure
• Key applications include disaster recovery, heavy construction and others
Application areas of ad hoc networks have expanded since their first introduction.

Ideally one would desire a fixed infrastructure for teaching and learning, but fixed infrastructure is expensive.

May take too long to bring ITC to rural schools if we insist on fixed ICT infrastructure.
Benefits of Mobile ad hoc Network

• Simple, fast and cheap to setup (in our case only the server needs to be physically wired to a network connection e.g. DSL modem for Internet connection)

• Less transmission power is needed compared to a wireless infrastructure network

• More robust concerning single component failure
The technical/operational challenges for implementing such a framework

- Would require support from ministry of education
- Lack of support from cooperating partners
- Inadequate of funds
Conclusion and Future Work

• The successful implementation of this project will yield the following benefits:
  – bring ICT to the rural schools
  – reduce the digital gap between rural and urban secondary schools
  – Improve teaching and learning in rural schools
  – Improve grade 12 results
Future Work

– training teachers on the use of ICT
– conduct regular workshop on the ICT new trends - sensitisation
Thank You!