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

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Content

- Introduction
- Statement of the Problem and Scope
- Possible Solutions
- Proposed Architecture
- Operation – Proposed System
- Benefits of Mobile ad hoc Network
- Conclusion and Future Work

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

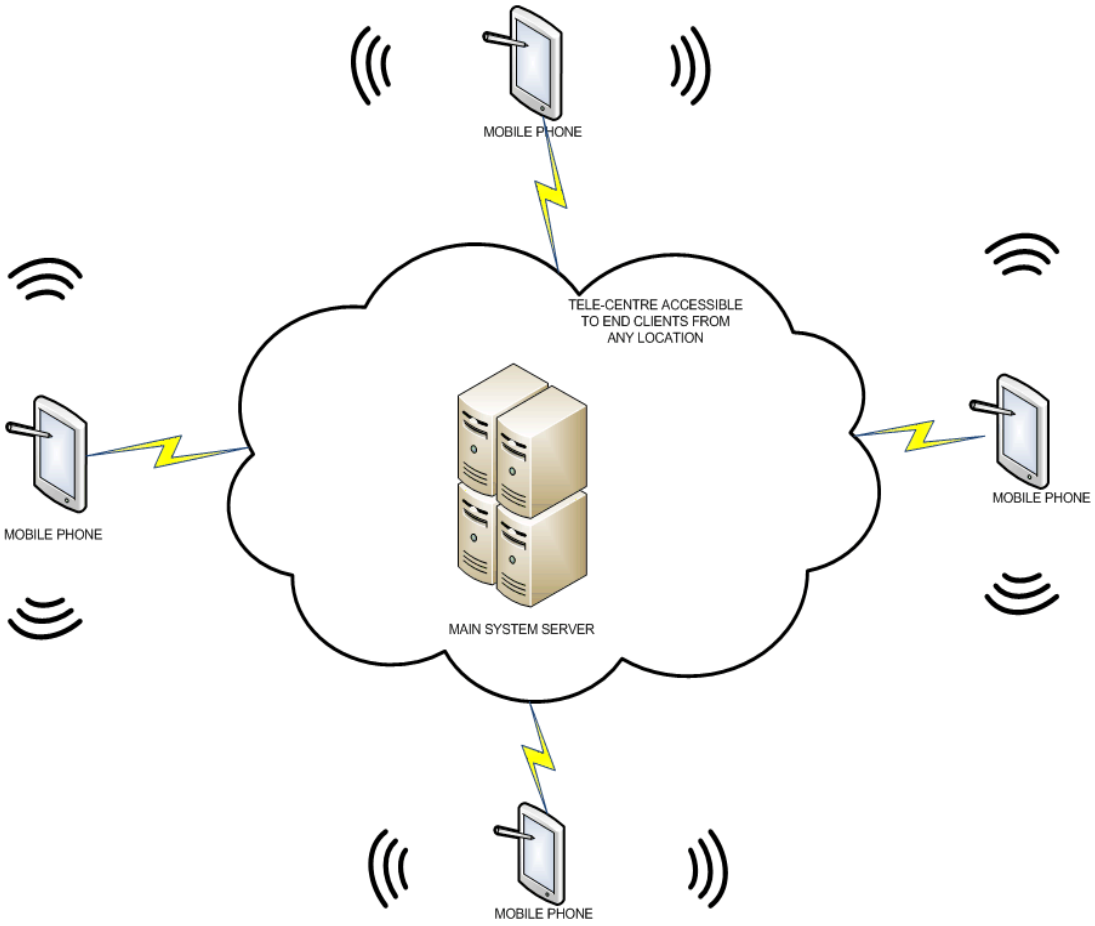
Scope

- 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

Operation – Proposed System (contd)

- 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 !