



**INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY  
CASE STUDY: HEALTHCARE IN AN EAST AFRICAN COUNTRY**

For use in May and November 2010.

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**INSTRUCTIONS TO CANDIDATES**

- Case study booklet required for higher level paper 3 information technology in a global society examinations.

## Foreword

The ITGS case study, *Healthcare in an East African Country*, is the stimulus material for the research investigation required for May and November 2010 higher level paper 3. All of the work related to the case study should reflect the integrated approach explained on page 8 of the ITGS guide.

Candidates should consider *Healthcare in an East African Country* with respect to:

- relevant IT systems in a social context
- both local and global areas of impact
- social and ethical impacts on individuals and societies
- current challenges and solutions
- future developments.

Candidates are expected to research real-life situations similar to *Healthcare in an East African Country* and relate their findings to first-hand experiences wherever possible. Information may be collected through a range of activities: primary and secondary research, field trips, guest speakers, personal interviews and e-mail correspondence.

Candidates are expected to research the vocabulary and concepts that are related to the IT technologies in the case study.

Responses to examination questions must reflect the synthesis of knowledge and experiences that the candidates have gained from their investigations. In some instances, additional information may be provided in examination questions to allow candidates to generate new ideas.

## Overview

- This case study is set in the city of Oobunta, in an East African country. Oobunta has a population of 100 000 and it is the provincial headquarters for the Western Province. It serves as a focal point for the many surrounding villages. Until recently the population in the province had suffered from a poor provision of healthcare with many people not living beyond their 50th birthday.
- 5 Recent developments in education, transport and IT have brought some improvements to the health of the people, but provincial leaders are aware that this is only the start.

## Dr\* Mukami Ogola

- Dr Mukami Ogola, who was born in the Western Province, has been studying in Europe and working there in various major hospitals for the last 10 years. He has now returned to the province where he has been appointed as Medical Officer of Health. The leader of the province wants a
- 10 major effort to be made to improve the health services in both the provincial headquarters and also the surrounding rural areas. Dr Ogola, with his experience of healthcare systems in the developed world, has been identified as a key player in this vision.

- The major studies that Dr Ogola undertook overseas were in the area of information technology in medicine. He realizes that the new technologies, in particular information technology,
- 15 promise great benefits to the nation's health services. The rapid growth in the use of mobile phones and the Internet could revolutionize the way people receive treatment. The success of this initiative depends on Oobunta Hospital becoming the focal point for the distribution and management of improved health services in the surrounding rural areas, especially in local health centres.

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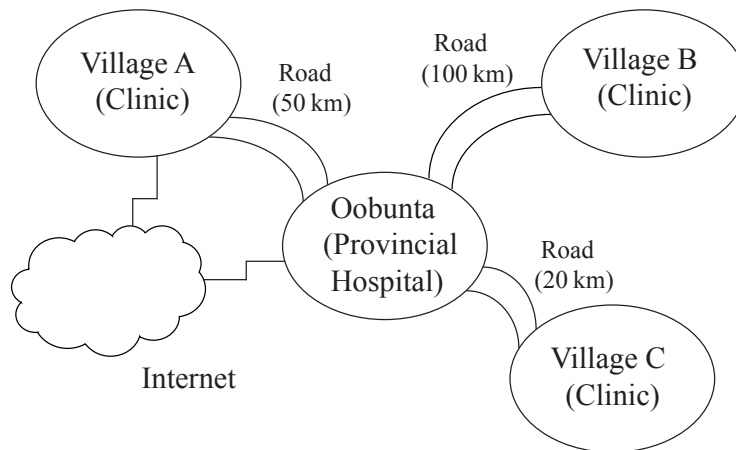
\* Dr: doctor, one duly licensed to practice medicine; a member of the medical profession; a physician

### IT systems

20 Within the province, Oobunta is the only major centre with a hospital. In some of the surrounding villages there are clinics; elsewhere there are no healthcare facilities.

The use of IT in healthcare within the province also varies greatly. In Oobunta Hospital there is a network, but in the village clinics some have simple networks while others have no IT provision at all.

25 The diagram below illustrates the relationship between the hospital and some of the outlying villages possessing healthcare facilities.



The following systems are currently in place:

#### Oobunta Hospital

The hospital has a local area network (LAN) that connects 20 desktop computers. Also, there are diagnostic tools such as CT scanners and x-ray machines with embedded IT systems.

30 All computers are running Windows XP and Microsoft Office 2007. They have reliable access to the Internet, e-mail and a private online medical expert system based in the nation's capital.

A single server, running Microsoft Small Business Server 2003, stores all information for:

- keeping patient's records in a database that are accessible on their Intranet
- managing financial information using simple accounting software
- personnel management records in a different database.

35 It also supports e-mail, the hospital Intranet and access to the Internet through a local service provider.

Currently, the information is periodically backed up to an external hard drive which is stored in the server room at the hospital.

### **Village A**

40 In this village, a voluntary organization from Canada donated hardware to set up the following IT facilities in the clinic:

- Six desktop PCs running Windows 98 and Microsoft Office 97 which form a Peer-to-Peer (P2P) network. These are used for patient and financial record keeping.
- A cell (mobile) phone and a landline phone connection.

45 The village has intermittent Internet access with a dialup, low bandwidth connection using the landline. In addition to record keeping, the IT facilities in the clinic are used for accessing Oobunta Hospital's Intranet and the online medical expert system as well as for using e-mail.

### **Village B**

This is a very small clinic, run by one health worker who has the following:

- One computer running Windows XP and Microsoft Office 2003 which is used for patient record keeping.
- 50 • No Internet access.

### **Village C**

The clinic has no IT facilities other than the use of a cell (mobile) phone. The phone network has recently reached the area. All records are handwritten on record cards.

### Challenges faced

Dr Ogola has commissioned research to provide information about the state of healthcare in the province. In addition to the IT systems mentioned previously, he has found the following:

- 55 • If a case is too complicated or cannot be addressed in the local clinics, the patient is referred to the hospital. This can involve substantial travel and accommodation costs which many patients are unable to afford.
- Often, treatment in the province is delayed because of the time required to get the patients to Oobunta Hospital and also because of the lack of medical knowledge about unusual cases.
- 60 In some instances this has led to the death of patients.
- The hospital subscribes to an online medical expert system for use by its professional staff. However, a number of doctors have started to use the Internet search engines in order to diagnose patients, which has raised some concerns.
- Most medical staff lack appropriate training on the existing IT systems.
- 65 • There are problems with connections between the IT systems in the hospital and the outlying villages.
- The hospital has a network administrator whereas the healthcare workers are responsible for the upkeep of the IT systems in Village A and Village B.
- 70 • Some medical records, such as patient histories, x-rays and pathology results are on paper and are therefore not accessible through the IT system. Others are in separate databases. There is no integrated electronic medical record (EMR) management system at present.
- In 2007, there was a significant loss of data when the system crashed due to a power surge. An effective disaster recovery and backup plan was not in place and has still not been implemented.

### Strategic development of healthcare in the province

- 75 In 2008, Internet coverage was good in Oobunta and major provincial cities but poor or non-existent in rural areas. The government has recently started improving Internet coverage, including WiFi and Broadband Wireless Access, as well as increasing the number of cell (mobile) phone providers licensed to operate in the country.

- 80 Dr Ogola sees this as an opportunity to extend his planned upgrades to the hospital's information technology which will include telemedicine to enhance communications and health services in the villages. He investigated possible sources of finance for the hospital and clinics from the government and charitable foundations and was able to secure some funding. Dr Ogola needs to prioritize how and where this money is spent.

85 Dr Ogola wants the Western Province to be in the forefront of medical care in the future and to be an example for other provinces to follow. The key to this transformation will be the development of an integrated IT system linking the hospital and the outlying clinics. However, Dr Ogola has been informed that there are several issues that will need to be addressed:

- The purchase of an appropriate IT system that would allow:
  - data to be accessed and transferred between the hospital and the village clinics.
- 90 • The purchase of a pre-existing or custom-built EMR management system from a local or multinational company that would lead to improvements in the:
  - healthcare of patients
  - accuracy of record keeping
  - efficiency of the hospital and clinics.
- 95 • The investigation of other medical expert systems to determine a possible suitable replacement for the current system.
- The implementation of new IT systems based on the improving cell (mobile) phone technology to support medical practices in outlying rural areas by providing:
  - telemedicine outreach to village clinics in the province
  - 100 – education and training to medical and paramedical staff
  - effective distribution of medical information.
- The formulation of an appropriate disaster recovery plan that covers issues such as:
  - policies to address backup issues such as: where, when, who, how, what
  - backup strategies
  - 105 – failover systems
  - disaster and recovery procedures
  - responsibilities
  - data redundancy.
- 110 • The security of the equipment, the software, the information, the access to the information and the communications between the hospital and the clinics is guaranteed.

Other countries in Africa also want to increase the use of information technology in their health programs and will be watching the progress, the benefits and the problems encountered. However, Dr Ogola is concerned that he may not get sufficient funding to complete all developments.

## **Additional Terminology to the Guide**

Backup software  
Broadband Wireless Access  
Client/server network  
CT scanner  
Data redundancy  
Disaster recovery  
Embedded IT systems  
EMR – electronic medical record  
Failover systems  
File server  
Firewall  
Internet  
Intranet  
LAN hardware and software  
Network server  
Peer-to-peer network  
Security software and hardware  
Server  
VPN  
WiFi

*Any individuals, towns or provinces named in this case study are fictitious and any similarities with actual entities are purely coincidental.*

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