Global Health Technology Management (HTM) Training and Clinical Engineering Division (CED) eCourse Project

Tobey Clark, University of Vermont, USA
Tobey.clark@uvm.edu
Anna Worm, THET, Benin
Anna@worm.nl
Disclosure

• The presenters declare no conflict of interest with the materials provided.
Table of Content

• Setting the scene
• CED’s initiative: E-course project
• E-course project master-plan
• Project status
• Virtual training, what’s the value
• University of Vermont Equipment Technology sequence
• Top Ten Free HTM Resources on the World Wide Web + application
• Hybrid Training Example: International Clinical Engineering Internships
Setting the scene

Demand
• LMIC technicians often ask for more training
• Limited resources ($$) for organising BMET training in LMICs

Offer
• IFMBE CED source of knowledge
• IFMBE interested in supporting LMIC BMETs and professional associations
E-course Project Master-plan

We defined two streams

1. Intense online course for selected candidates
   • 45h over 15 weeks, classes of ~20, covering ~40 topics on e-course platform

2. Ready made courses to be used:
   1. For CPD by professional associations
   2. For schools/teaching institutions as teaching support
   3. For individuals' wanting to upgrade their skills
   • Downloadable, on e-course platform, per equipment, incl videos, working principles, PPM, Trouble shooting, safety considerations

With help of partners! Roos Geutjes, Pieter de Ruijter, Chris Mol, Ben Fleishman
Status

• Juridical challenges in implementing the intense course
• Otherwise ready to advertise (3 pilot countries Zambia, Mozambique, the Gambia)
• Videos: work in progress
• First ESU e-course ready on e-course platform for testing
Virtual Training: What is the value?

Asynchronous – 24x7 access
• Online educational resources always available
• Does not interfere with work or other activities

Cyberspace – no limitation on location
• Just need a computer and connection
• No travel time
• No set scheduling
• No travel costs – gas, parking, tolls, tickets

Full Use of the World Wide Web Resources
• Documents
• Tutorials
• Case studies
• Scenarios
• Videos
• Computer-based simulations

From the EMS Professional website
University of Vermont Biomedical Equipment Technology Sequence

• Initial development 2006-2008, continuously updated
  ➢ Website: http://its.uvm.edu/medtech/index.html

• Primary Course Audience
  ➢ Technical staff in hospitals – BMET, electricians, maintenance and other technical personnel

• Areas covered for each device/topic area
  ➢ Principles of operation, Clinical application, Device safety, Common problems and solutions, Inspection, testing and preventative maintenance, & Technology management

• Bilingual course also taught via WHO PAHO office and three universities in South America – Peru, Colombia, & Argentina

• Over 1000 students from 40 countries have taken the courses
  ➢ Colombia, Peru, Mexico, Venezuela, Uruguay, Costa Rica, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Puerto Rico, Dominican Republic, Barbados, Jamaica, Grenada, Antigua, St. Lucia, Belize, British Virgin Islands, St. Vincent, St. Kitts, Turks & Caicos, France, Spain, China, Trinidad and Tobago, Dominica, Barbuda, Guyana, Bahamas, Anguilla, Honduras, Cuba, El Salvador, Panamá, Ecuador, Nicaragua, and the USA
Top Ten Free HTM Resources on the World Wide Web

1. WHO Medical Devices http://www.who.int/medical_devices/en/
   a. Collaborating Center – India National Health Systems Resource Center
2. IFMBE Clinical Engineering Division http://cedglobal.org/
4. EBME Clinical Engineering Articles http://www.ebme.co.uk/articles/clinical-engineering
5. Frank’s Hospital Workshop http://www.frankshospitalworkshop.com/index.html
8. US Food & Drug Administration https://www.fda.gov/MedicalDevices/default.htm
9. Cadex Battery University http://batteryuniversity.com/learn/
10. Fluke Biomedical Advantage Training http://www.flukebiomedical.com/biomedical/usen/advantagetraining/training
Top Ten Medical Technology Resources on the World Wide Web

2. Electrocardiography - University of Utah ECG Learning Center [http://ecg.utah.edu/](http://ecg.utah.edu/)
5. Medical Physics Tutorial – Antonine Education
   a. X-rays [http://www.antonine-education.com/Pages/Physics_GCSE/Unit_3/Triple_01_X-rays/Triple_page_01.htm](http://www.antonine-education.com/Pages/Physics_GCSE/Unit_3/Triple_01_X-rays/Triple_page_01.htm)
   b. Ultrasound [http://www.antonine-education.com/Pages/Physics_GCSE/Unit_3/Triple_02_Ultrasound/triple_page_02.htm](http://www.antonine-education.com/Pages/Physics_GCSE/Unit_3/Triple_02_Ultrasound/triple_page_02.htm)
9. Ventilator Modes Part 1 and 2 – David Gibson
   a. [https://www.youtube.com/watch?v=IUZ3Plmz_YQ&feature=PlayList&p=CB8DC524E601DFF4&playnext=1&playnext_from=PL&index=14](https://www.youtube.com/watch?v=IUZ3Plmz_YQ&feature=PlayList&p=CB8DC524E601DFF4&playnext=1&playnext_from=PL&index=14)
   b. [https://www.youtube.com/watch?v=nGJlePPGQn0&feature=related](https://www.youtube.com/watch?v=nGJlePPGQn0&feature=related)
How can you use WWW resources to improve HTM capacity in your reality?

• Do you have adequate internet access and speed?
• If yes,
  ➢ What would you like to see in an eCourse?
  ➢ What virtual training is being done now?
    ▪ Formal courses?
    ▪ Pre-course review?
    ▪ Via webinars?
    ▪ Train as you work via resource lookup?
    ▪ What other virtual HTM resources are in your top ten?
  ➢ How can you combine world wide web resources with classroom, hands-on laboratory, internships, mentoring and other training methods? (Hybrid training)
• If no, what are the virtual alternatives – cellular, smartphone?
Hybrid Training Example:  
**International Clinical Engineering Internships**

**Purpose** – To provide orientation, training and mentoring of engineering students in the area of healthcare technology management to allow them to begin a career in clinical engineering.

**Arrangement** – Paid by the hour; responsible for all expenses

- **Week 1:** Orientation to Vermont program and the clinical engineering field
- **Weeks 2-4:** Training by Certified Clinical Engineers, online course & readings with written and oral examinations
- **Weeks 5-25:** Weekly oral and written assessment of student learning
  - Clinical engineering internship
    - 4 weeks hands-on, QA & maintenance
    - Assist staff clinical engineers in completion of consultation, investigative, and planning work
    - Database orientated projects, e.g. medical device cybersecurity, research end-of-support, purchase price, optimum PM schedule, other as required
    - Other projects as needed, e.g. educational product development, website programming, instrument development
- **Week 26:** Final report, evaluation, and celebration of achievement

Students: [https://www.youtube.com/watch?v=qA5X_yby3xo&feature=youtu.be](https://www.youtube.com/watch?v=qA5X_yby3xo&feature=youtu.be)