Medical Physics Education and Training in the Global Village

Issues, Strategies, and Experiences

4 August 2013
Jacob (Jake) Van Dyk
Who is involved in teaching?

• International teaching?
• Local teaching?
  – Formal teaching?
  – Radiation safety training?
  – Training on new techniques?
  – In-house continuing education?
  – Seminars?
International Courses Taught in Last Ten Years

- Home base
- IAEA courses given
- 5 IAEA courses planned
- Courses coming up
- AAPM course
- Australian TP course
Experiences

• **Every course is different**
  – With some similarities

• Course duration usually 5 days (3 - 6 days)

• Course components
  – Lectures (~67-75%)
  – Hands on/practicals (~25-33%)

• Attendees
  – Depending on topic and/or local language
    • Medical Physicists only
    • Team: Medical Physicist & Radiation Oncologist & possibly Radiation Therapist
    • Variable experience
    • Variable technologies
    • Variable knowledge of English language

• IAEA courses – often regional courses – from different countries – diversity of backgrounds/technologies
  – Given in English

• Participants receive CD/USB drive
  – With PDF copies of PPTs
  – Resource materials
Hierarchy of Student Learning in the Cognitive Domain

- Retrieve relevant information from long-term learning
- Construct meaning from instructional messages, including oral, written, and graphic communication
- Carry out a procedure in a given situation
- Break material into its constituent parts and determine how the parts relate to one another and to the overall structure or purpose
- Making judgments based on criteria and standards
- Put elements together to form a coherent whole function; reorganize elements into new patterns of structure

In-house meetings on education/training

6 levels of knowledge/cognitive skills

Very few of us have had formal training in educational theory and practice!

Thomas NB Pascual M.D. M.H.P.Ed
How to Write Learning Objectives Using the Revised Blooms Taxonomy of Learning (Cognitive Domain)

1. Select a verb for performing the task
2. Determine if the verb you have chosen best describes the type of behavior that the learners need to display after training
3. Under what conditions must the task be performed? Determine to what standards the task must be performed.
4. The taxonomy is hierarchical; so multiple objectives must be written so.
5. Each level is subsumed by the higher levels and has a basic chronological element: you achieve certain levels before others.

Thomas NB Pascual M.D. M.H.P.Ed
Lessons Learned

• Engagement

• *Everyone wants more practicals*

• Course evaluations are crucial

• Student evaluations are helpful
  – As teaching & learning tool
  – As self-evaluation aid

• Lecturers tend to give too much detail in lectures
  – Students need to assimilate & apply knowledge at home

• Student mother tongue ... usually not English
  – Instructors need to adapt accordingly

• Good to know students’ available technologies
  – SurveyMonkey® survey
Observing the Teaching and Examination of the Treatment Planning Course

A report for the Principles and Practice of the University Teaching Course

Chen-Yu Huang
Postdoctoral Research Fellow
Sydney Medical School
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Course: Training Course on the Physics of External Photon Beam Radiation Treatment Planning
Date: 24-29 June 2013
Venue: Lecture Theatre 2, School of Physics, University of Sydney

1. Observing Prof. Jake Van Dyk Teach

I participated a five day training course on the treatment planning of external beam radiotherapy. This is primarily targeted at medical physics registrars and later extended to PhDs, postdocs and lecturers in the Medical Physics field. The total number of participants was about 50. The course
What draws attention?

Jake showed us a movie poster of the “Collateral Damage” in his PowerPoint (Figure 1). He drew an analogy between the massive destructive weapons/soldiers to the radiotherapy treatment because if not used properly, it can cause huge damage to patient. I think the poster successfully arouse interests and attention of the audiences.

![Movie Poster](image_url)

Figure 1 A movie poster

He asked every one of us to introduce ourselves by saying our name, from where, description of training status and projects. This method quickly grouped the whole classroom into one because we are interested in people in the same stage of career development. It provided a chance for us to know people sitting around. Besides, students will know that they are encouraged to interact
“Good teachers recognise the importance of context, and adapt their teaching accordingly; they know how to modify their teaching strategies according to the particular students and subject matter, ...”

Chen-Yu Huang
Key Observations

• Engage the audience
• Clear objectives
• Not too many details
• Relevant examples
• “Deep learning” assessment
Evaluation of Success of Training

• Very difficult to get objective answer
• Ideally,
  – Independent objective observer provides assessment of on-the-job competence
• Practically,
  – Such data hard to come by
Evaluation of Success of Training

- Multiple methods of assessment during training
- What about quality of on-the-job work?
Evaluation of Success of Training

• Survey of graduate residents
  – SurveyMonkey®
  – Residents of previous 10 years
    • 16 residents
  – 10 questions
7. How well did the residents feel that their training prepared them for working as a medical physicist in a clinical environment?

- **Survey provided useful feedback on effectiveness of residency training program**
  - Including comments on where improvements could be made
Medical physicists, esp. in less developed countries, are very hungry for learning from more experienced medical physicists.

Well organized courses provide one venue for learning.

Attendees always want more hands-on/practicals.

Course evaluations by students are essential.

Assessment of attendee learning is useful & essential
   - For both teachers and students.

Coordination of international teaching remains an issue
   - Need single website with all RT-related training courses.

Follow-up assessment of “real” benefit of teaching programs remains an issue.