(Almost) Fifty Years of Education in Medical Physics

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Disclaimers

• No conflicts of interest noted
• Any opinions expressed are my own, and not of any organization
• Commercial products not intended to be promoted

Learning Objectives

After attending this presentation, the participant will:
• Identify developments in medical physics education from 1970’s to the present
• Identify some directions AAPM could go in improving teaching quality
• Be able to guide new faculty members in the teaching of medical physics
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My Entry Into Medical Physics

1972 – awarded PhD in chemical physics; started postdoc
1974 – completed postdoc; transitioned into medical physics
Education: Johns & Cunningham; clinical observation
1975 – sent to community hospital; half-day a week at main hospital
1977 – awarded ABR certification

My “Training” Program

- Obtain PhD in some branch of physics
- No formalized syllabus
- No formalized program
Changes in Medical Physics Education

- Specification of didactic knowledge and clinical skills
- Credentialing of educational programs
- Continuing education opportunities in education for medical physicists

Specification of Didactic Knowledge

- Report 44 (1993): Academic Program for Master of Science Degree in Medical Physics
- Report 197 (2009): Academic Program Recommendations for Graduate Degrees in Medical Physics

Specification of Clinical Skills

- Report 36 (1990): The Clinical Training of Radiological Physicists
- Report 90 (2006): Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs
Credentialing of Programs

• 1970’s – Informal credentialing
• 1988 – formation of Commission on Accreditation of Educational Programs for Medical Physicists (AAPM)
• 1994 – concern over liability led to formation of independent accreditation body (CAMPEP)

Continuing Education

• 1978 – AAPM Summer School
  – “The Teaching of Medical Physics” Santa Cruz CA
  – 29 sessions
  – 28 sessions on “What to teach”
  – 1 session on “How to teach”
  - Compared teaching of concepts vs teaching of facts
• 2008 – Workshop
  – “Becoming a Better Teacher of Medical Physics” League City TX

• 2010 – AAPM Annual Meeting
  – Ed Council Symposium: Use of web-based resources
• 2010 – AAPM Summer School
  – “Teaching Medical Physics: Innovations in Learning”
• 2014 – AAPM Annual Meeting
  – Ed Council Symposium: Online education
  – Symposium: “Stop Lecturing Me!”
Continuing Education

• 2016 – AAPM Annual Meeting
  – Ed Council Symposium: Revitalizing Your Medical Physics Classroom
• 2017 – AAPM Annual Meeting
• 2018 – AAPM Workshop
  – Improving the Teaching and Mentoring of Medical Physics

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Where Do We Go From Here?

• Educators Resource Guide
  – Medical Physics as Educators Committee wiki
  – Teaching workshop presentations
Where Do We Go From Here?

- Shareable material – we collaborate with others in research, why not collaborate in education?
  - Lecture recordings
  - Problem sets
  - Exam questions

Where Do We Go From Here?

- Create library of modules for teaching medical physics students
  - Analogous to AAPM/RSNA file for radiology residents

Where Do We Go From Here?

- Library of video clips of techniques
  - Relatively easy to generate
  - Need curator for library
- Continue to reward (and publicize) Innovations in Education Symposium
Where Do We Go From Here?

• Assist medical physicists in incorporating disruptive technologies into their educational methodologies
  – Coined by CM Christensen (Harvard B School) in 1997
  – Defined to be a technology that causes a major paradigm shift in the way we do things
    o PC – replaced typewriter
    o Email – replaced snail mail
    o Smartphones – replaced cell phones, PDAs, pocket cameras, calculators, etc.

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If You’re Just Getting Started

• Find a coach/mentor
• Get credit for your teaching efforts
• Leave your comfort zone
• Communicate with your students
Find a Coach/Mentor

- Use of coaching
  - https://www.newyorker.com/magazine/2011/10/03/personal-best

Find a Coach/Mentor

- Use of coaching
  - Observes teaching effectiveness
  - Identifies existence of plateau in acquisition of skills
  - Use of expert observer to enable moving beyond plateau
  - Currently used by world-class athletes, opera singers, etc.

Get credit for teaching

- May be difficult in some settings
- “How is my teaching effectiveness going to be evaluated?”
Leave Your Comfort Zone

- Try non-lecture methods of teaching – lectures can be pre-recorded
  - Problem-Based Learning
  - Flipped Classroom
  - Peer Instruction
- Write creative problems
  - Avoid plug ‘n’ chug
  - Students need to determine input as well as output

Communicate with Your Students

- Teaching is not a one-way street
- Get feedback from your students

Closing Thought

- Our role as medical physics teachers is not to teach our students medical physics.
Closing Thought

• Our role as medical physics teachers is not to teach our students medical physics.
• Our role as medical physics teachers is to teach our students to learn medical physics.

Thank you