Improvements in pedagogy in life sciences and medicine

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• Pedagogy is an art of Teaching.
• It is essentially a combination of knowledge and skills required for effective teaching.
• The more traditional definitions describe pedagogy as “Either the science/theory or art/practice of teaching that makes a difference in the intellectual and social development of students.”
Bloom’s Taxonomy

- **Remember**: Recall facts and basic concepts
  - define, duplicate, list, memorize, repeat, state
- **Understand**: Explain ideas or concepts
  - classify, describe, discuss, explain, identity, locate, recognize, report, select, translate
- **Apply**: Use information in new situations
  - execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch
- **Analyze**: Draw connections among ideas
  - differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test
- **Evaluate**: Justify a stand or decision
  - appraise, argue, defend, judge, select, support, value, critique, weigh
- **Create**: Produce new or original work
  - design, assemble, construct, conjecture, develop, formulate, author, investigate

Vanderbilt University Center for Teaching

Bloom et al, 1956
• Start your lesson with clear learning objectives
• Explain fundamental concepts before digging into complicated ideas
• Use multiple teaching approaches
• Formative assessments can help you gauge your students’ understanding
• Implement active learning
Empowering Educators.
Inspiring Students.

Real science, real stories, and real data to engage students in exploring the living world.

Teaching Support

Storylines
Coherent lesson sequences driven by students asking questions about phenomena.

Resource Playlists
Ordered sequences of BioInteractive resources for teaching a course, unit, or lesson.

Workshops
In-person professional learning workshops led by educators.

Science News
Articles that connect current events to BioInteractive resources.

Discover tools to help plan lessons and opportunities to support professional learning.
Timeline to becoming a Physician

- Pre-Medicine: 4 years of undergrad, prerequisite courses include Biology, Physics, English, and Chemistry, and Organic Chemistry.

- Medical College Admission Test (MCAT): Students must take the MCAT which covers chemistry, biology, critical analysis, reasoning skills, biochemical foundations, psychology, sociology, and is a 7.5 hours long exam.

- Medical School: 4 years of coursework and clinical practice, Classroom, Clinical, and Community experiences.

- Residency: 3-7 years of hands-on experience, 1-2 years of fellowship in a subspecialty area.

- Certification, Licensure, and Continuing Medical Education (CME): Physicians must obtain licensure in the state in which they will practice their chosen specialties. Specialty boards require recertification on a regular basis (Maintenance of Certification).

Changes in Healthcare Delivery

- Moving care from: Acute, One physician, One patient, Clinic.
- Moving care to: Chronic, Teamwork, Population health, Community.
The physician of the 21st century (FMEC)

- Skilled clinician
- Able to adapt to new knowledge & changing patterns of illness as well as new interventions, personalized therapeutics and rapidly changing medical science and health care systems.
- Physicians will need to:
  - Be independent and critical thinkers, capable of appraising evidence free from personal bias and inappropriate influence.
  - Manage uncertainty, tolerate ambiguity, non-algorithmic work
Educational Tools: Thinking Outside the Box

Figure 1. Roadmap of educational tools available in the different settings where medical education takes place. 3-D, three dimensional.
Simulation-based learning
Stanford give all medical students an iPad
Integrating eLearning

- Small group teaching
- PBL
- Tutorials
- Ward based teaching
- eLearning
- Workshops
- Dissection
- Lectures
- Clinical Skills
Web 2.0 tools for social learning
Medical education today: all that glitters is not gold

Conclusion: Unless there is further modification, the new integrated curricula are at risk of produce graduates deficient in the characteristics that have set physicians apart from other healthcare professionals, namely high-level clinical expertise based on a deep grounding in biomedical science and understanding of the pathologic basis of disease. The challenges for education of the best possible physicians are great but the benefits to medicine and society are enormous.
### Ten key features of the future medical school—not an impossible dream

Ronald M. Harden

AMEE, An International Association for Medical Education, Dundee, UK

<table>
<thead>
<tr>
<th>The past and present</th>
<th>The future</th>
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<td>The real world and the authentic curriculum</td>
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<td>Just-in-case learning</td>
<td>Just-in-time learning</td>
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<td>Basic science/clinical medicine divide</td>
<td>Basic sciences and clinical medicine integration</td>
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<td>Teaching and teachers undervalued</td>
<td>Importance of teaching and teachers recognized</td>
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<td>Student as a client</td>
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<td>A mystery tour</td>
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<td>Standard uniform program</td>
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<td>Compartamentalized assessment of learning</td>
<td>Program-focused assessment for learning</td>
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<tr>
<td>Working in isolation</td>
<td>Greater collaboration</td>
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*Medical Teacher, 2018*