Teaching & Learning Strategies and Evaluation Tools in Undergraduate Pediatric Education: Focus on Core Pediatric Topics

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A Short History of Medicine

2000 B.C. - "Here, eat this root."
1000 B.C. - "That root is heathen, say this prayer."
1850 A.D. - "That prayer is superstition, drink this potion."
1940 A.D. - "That potion is snake oil, swallow this pill."
1985 A.D. - "That pill is ineffective, take this antibiotic."
2000 A.D. - "That antibiotic is artificial. Here, eat this root."

~Author Unknown

Let’s go back to the basics

Road Map

- State of nutrition education in medicine
- Teaching/learning Growth & Development and Preventive Pediatrics
- Mastery of basic medical topics
- Teaching-learning strategies
- Evaluation tools/ framework
- Relevant and revisited spiral curriculum
- Importance of effective educators
- Formula for success
- Summary

State of Nutrition Education in Medicine

- Nutrition education in US medical schools remains inadequate (2004 survey on all 126 US medical schools, N=106)

  - students received 23.9 contact hrs of nutrition instruction during medical school (range: 2–70 h)

  - only 40 schools required the minimum 25 h recommended by the National Academy of Sciences

  - most instructors (88%) expressed the need for additional nutrition instruction at their institutions

Adams et al. *Am J Clin Nutr*. 2006 April ; 83(4): 941S–944S

- Amount of nutrition education that medical students receive continues to be inadequate (127 medical schools, N= 103)

  - 19.6 contact hrs of nutrition instruction during medical school career (range: 0–70 hours)

  - only 28 (27%) met the minimum 25 required hours set by the NAS

Adams et al. *Academic Medicine*. 2010 September, Vol. 85, No. 9

Teaching/Learning Growth & Development and Preventive Pediatrics

- Successful incorporation of preventive paediatrics (including normal growth and development) into the medical curriculum of the University of British Columbia→ students more equipped

  - use of specific teaching methods (tutorials, family visits, “medical student mornings”)

    Read J. Preventive Pediatrics in Medical Education. *Canad Med Ass J.* April 1963, Vol 88

- Students had weak knowledge scores regarding main concepts of child growth and development after the Pediatrics Courses

  - creative strategies that improve nursing students’ growth and development knowledge retention and demonstration are needed

    Ahmed A & Richardson C. Child growth and development knowledge among senior nursing students. *J Nurs Educ and Prac*, January 2013, Vol. 3, No. 1

Mastery of Basic Medical Topics

- Relevant and revisited spiral curriculum
- Well formulated instructional design for topic/s
  - objectives
  - content
  - teaching-learning strategies
  - evaluation

  ] CONGRUENT TO EACH OTHER
- Committed faculty/experts who serve as role models to students
- Progressive research

Malau-Aduli B et al. BMJ Med Educ. October 2013
Overbaugh R. Instructional Design taking the Teaching-Learning Process to a higher level. http://ww2.odu.edu/ao/instadv/quest/InstructionalDesign.html
Undergraduate Medical Education Curricular Review 2008 http://umanitoba.ca/faculties/health_sciences/medicine/media/UGME_External_Review.pdf

Teaching-Learning Strategies

One Minute Preceptor

SNAPPS

Abbreviated Case Presentation: “Aunt Minnie”

Activated Demonstration

“One Minute Preceptor” (Neher et al 1992, 2003)

Education using the 5 microskills

Neher JO, Stevens NG. The one-minute preceptor: shaping the teaching conversation. Fam Med. 2003;35(6):391-393. PubMed PMID: 12817861

SNAPPS (Wolpaw et al 2003)

Learner-led education

Summarize

- Relevant history and physical exam findings
- In 3 minutes or less

Narrow

- Differential diagnosis or possible interventions
- 2-3 most relevant and likely possibilities

Analyze

- Compare/ contrast possible explanations for differentials
- Verbalize thought process

Wolpaw TM, Wolpaw DR, Papp KK. SNAPPS: a learner-centered model for outpatient education. *Acad Med*. 2003;78(9):893– 898

SNAPPS (Wolpaw et al 2003)

Learner-led education

Probe

- Ask preceptor about difficulties, uncertainties, other approaches (preceptor as knowledge source)
- Insight on learner's thought process and knowledge base

Plan

- Management
- Brief management plan or specific intervention with preceptor's input

Select

- Case-related issue for self-directed learning and reading
- Preceptor input to help focus questions/ select resources

Wolpaw TM, Wolpaw DR, Papp KK. SNAPPS: a learner-centered model for outpatient education. *Acad Med*. 2003;78(9):893– 898

Abbreviated Case Presentation: "Aunt Minnie"
(Cunningham et al 1999; Sackett et al 1985)

- Employ the value of pattern recognition in clinical practice
- "If the lady across the street walks like your Aunt Minnie and dresses like your Aunt Minnie, she probably is your Aunt Minnie"

(1) the student evaluates the patient then presents to the preceptor the chief complaint and the presumptive diagnosis

(2) the student begins a write-up and the preceptor evaluates the patient

(3) the preceptor discusses the case with the student

(4) the preceptor reviews and signs the medical record

Cunningham AS, Blatt SD, Fuller PG, Weinberger HL. The art of precepting: Socrates or Aunt Minnie? *Arch Pediatr Adolesc Med.* 1999;153(2):114-116. PubMed PMID: 9988240

Activated Demonstration

Teaching a skill

- Maximizes the educational value of a demonstration
- Learners are NOT passive observers
- Steps:

1. determine learner's relevant knowledge and the learning objectives for the demonstration

2. preceptor provides clear guidance as to what the learner should do during the skill demonstration (history and PE of patient)

3. preceptor discusses learning points with the learner post demonstration, and sets an agenda for future learning opportunities

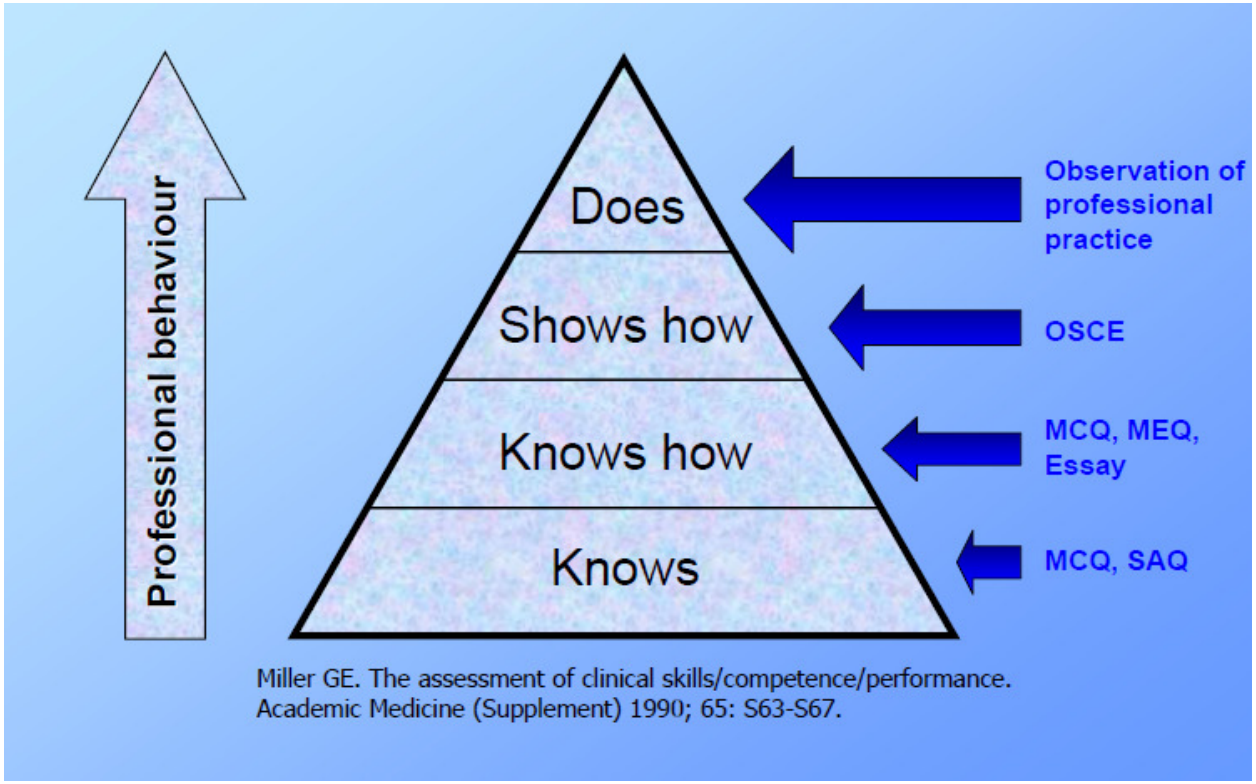
Cayley W. Effective Clinical Education: Strategies for Teaching Medical Students and Residents in the office. WMJ August 2011, Volume 110 No 4

Evaluation

Pre- and Post-testing

Progress Test

R.I.M.E. Evaluation Framework



Pre- and Post-testing

- **Pre-test:** set of questions given to participants *before* learning activity begins to determine their knowledge level of the course content
- **Post-test:** same set of questions (pretest) or set of questions of comparable difficulty given to participants after activity has been completed
- Comparing participants' post-test scores to their pre-test scores→ assess if activity is successful in increasing participant knowledge of the content to be learned

International Training and Education Center for Health (I-TECH) Guidelines #2. University of Washington 2008

Progress Testing (Maastricht University, 1970s)

- Longitudinal, feedback-oriented test
- Written (usually MCQs)
- Given twice a year within same year level
- Samples the complete knowledge domain expected of new graduates upon completion of their courses
- Differences between students' knowledge levels show in the test scores→ the further a student has progressed in the curriculum the higher the scores

- resultant scores provide a longitudinal, repeated-measures, curriculum-independent assessment of cognitive objectives of entire program

van der Vleuten et al. Fifteen years of experience with progress testing in a problem-based learning curriculum. *Medical Teacher* 1996. Vol 18(2):103–110

R.I.M.E. Evaluation Framework (Pangaro 1999)

Reporter, Interpreter, Manager, Educator

REPORTER

Proficient history taking and examination

Problem identification

Normal versus abnormal

Expected level – clinical clerk

INTERPRETER

Create differential diagnosis

Prioritize problems

Follow-up tests

Expected level – Senior medical student – First year resident

MANAGER

Select appropriate diagnostic tests

Finds common ground with patient (customizes therapy)

Expected level – Second year resident

EDUCATOR

Identifies knowledge gaps

Plans continuing education

Teaches students, peers, faculty

Expected level – The ideal senior resident

Pangaro, L A New Vocabulary and Other Innovations for Improving Descriptive In-Training Evaluations. *Acad Med* 1999; 74: 1203-120

R.I.M.E. Evaluation Framework (Pangaro 1999)

Reporter, Interpreter, Manager, Educator

MANAGER			**I**	**P**		**M**
Diagnostic Plans		I	I	P	M	
Therapeutic Plans			I	P	P	M
Benefit/Risk Decision making			I	P	P	M
Basic Procedures (IVs, etc.)			I	P	M	
Advanced Procedures				I	P	M
Incorporates Patient Values in Plan			I	P	M	
System-based Practice			I	P	P	M
EDUCATOR	**I**		**P**			**M**
Reflective, self-directed Learning	I	P	M			
Critical Reading Skills			I	P	P	M
Practice-based learning & Improvement			I	P	P	M
Teaching Skills			I	P	P	M

I – Introduced in the curriculum

P – Practice, repetition

M – sufficient proficiency, mastery for the next level of independence

M* - sophisticated, complex situations or procedures

Pangaro, L A New Vocabulary and Other Innovations for Improving Descriptive In-Training Evaluations. *Acad Med* 1999; 74: 1203-120

Relevant and Revisited Spiral Curriculum

Table 1 Nutrition education in the undergraduate and graduate degrees at the University of Cambridge, School of Clinical Medicine

Undergraduate degree (6 years; ~150 students)	Graduate degree (4 years; ~15 students)	Current nutrition education	Future nutrition education (~250 students by 2017)
Y1–3 – Medical and Veterinary Science Tripos (preclinical years)	N/A[a]	Minimal specified nutrition education.	Ongoing curricular review to identify opportunities for nutrition education.
Y4 – clinical year 1	Y1 – clinical year 1	4-hour session (undergraduates); 1.5 hour session (graduates), including under and over nutrition, nutrition screening, and assessment. Evaluated by students through a questionnaire completed online before and 1 month after the session to assess nutrition knowledge, attitudes, and practices. An open-ended questionnaire also collects qualitative feedback from both students and the teaching team for overall feedback.	Maintain current teaching (update each year). Evaluation by students through a quantitative questionnaire completed online before and 1 month after the session to assess attitudes and confidence in nutrition care. An open-ended questionnaire distributed after the session to be completed by students and the teaching team for overall feedback.
Y5 – clinical year 2[b]	Y2 – clinical year 2[b]	Minimal specified nutrition education.	Podcasts to supplement students' learning of clinical conditions and diseases. These will be supported by short face-to-face interactions. The same questionnaire used in the previous year will be administered again, pre- and post-teaching.
Y6 – clinical year 3	Y3 – clinical year 3	2-hour session on the relationship between diet and disease and its application to lifestyle behavior.	Incorporation of nutrition leadership into current nutrition education. The same questionnaire used in Y4/Y1 will be administered pre- and post teaching.

Revisit: continuous review

Pre- and Post-test: test understanding & develop mastery

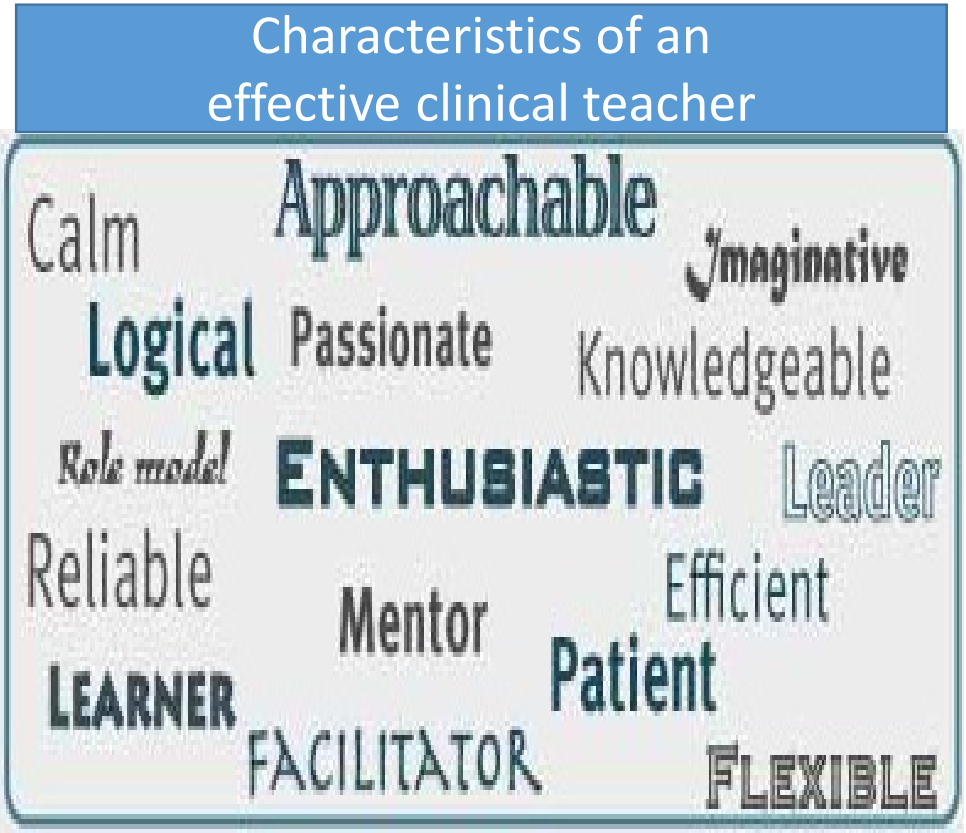
Relevance: feedback

Spiral: topic presented all throughout training years

Spiral: topic incorporated in other courses

Ball et al. Nutrition in Medical Education: Reflections from an initiative at the University of Cambridge. *Journal of Multidisciplinary Healthcare*. May 2014

Importance of Effective Educators



- Necessary knowledge

  - adult learning, learning styles, adapting teaching to different situations, evaluation

- Necessary skills

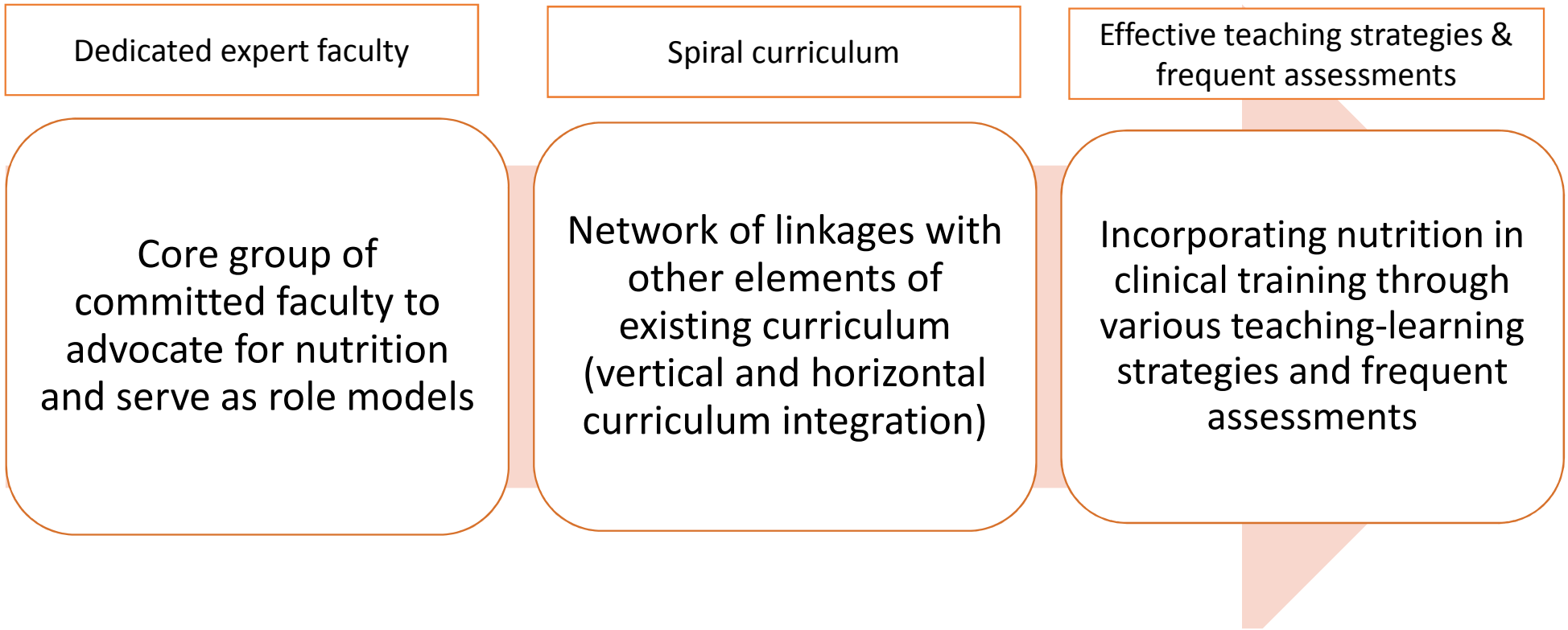
  - facilitating, questioning, giving and receiving feedback

- Necessary attitudes

  - reflective practice, introspection

Ralhan et al. BMJ Careers ; doi: 08 February 2012

Formula for success



Ball et al. Nutrition in Medical Education: Reflections from an initiative at the University of Cambridge. *Journal of Multidisciplinary Healthcare*. May 2014

Krebs NF, Primak LE. Comprehensive integration of nutrition into medical training. *Am J Clin Nutr* 2006 Apr; 83(4) 9455-9505

Summary

- Observed inadequacy in mastery of core pediatric topics such as nutrition, growth and development and preventive paediatrics among medical students globally

- Need for more relevant and effective teaching-learning strategies and evaluation tools/ frameworks to enhance mastery of competencies

- Formula for success→ dedicated faculty, spiral curriculum, well formulated instructional design

"*The practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head.”*

Sir William Osler

1849- 1919