Everything I need to know about Emergency Medicine I learned in Undergrad

CAEP St. John’s NFLD
June 4th, 2011
Trevor Langhan MD FRCPC
Assistant Professor
Foothills Medical Center
University of Calgary
Top 5 Research Papers in Undergraduate Education

All EM Docs

- MEDICAL EDUCATION
- RESEARCH IN MEDICAL EDUCATION
- RESEARCH IN UNDERGRADUATE MEDICAL EDUCATION
Disclosure

- I do not have an affiliation (financial or otherwise) with any commercial organization that may have a direct or indirect connection to the content of my presentation.

- This presentation may contain adult content and is intended for mature audiences. Listener discretion is advised.

- Views expressed in the presentation do not represent CAEP or CAEP members.
KREB CYCLE
Objectives

• By the end of the lecture the participants will:
  – Be able to list sources of up to date EM education literature
  – Describe recent important advances in EM undergraduate education
What’s out there in Undergrad Ed?

- Published articles in EM clinical journals
  - CJEM, Acad EM, EM Clinics, Annals, etc...
- Published articles in general clinical journals
  - CMAJ, JAMA, NEJM, BMJ, etc...
- Published articles in education journals
  - Medical Teacher, Acad Med, etc..
- Presented material at conferences
  - SAEM, CAEP, ACEP, ICRE, CCME, etc...
- Posters at conferences
  - SAEM, CAEP, ACEP, ICRE, CCME, etc...
- Works in progress
  - Peer review, active writing, editorial boards, etc...
- Soft science
  - Oprah, Dr. Phil, Dr. Oz, The Doctors, etc...
Published Articles
Growing number of US schools with EM undergrad clerkships

- Growth of EM clerkships lags behind academic growth

- Breadth and scope of EM is the ideal training program for students

- Get involved in undergrad
  - preclerkship as well

- EM educators could teach:
  - at bedside
  - in classroom
  - Simulation
  - procedure labs
  - physical exam skills
  - PBL leader
A new emergency medicine clerkship program: students’ perceptions of what works

Marianne Yeung, MD; Jennifer Beecker, MD; Meridith Marks, MD, M Ed; Janet Nuth, MD; Brian Weitzman, MD; A. Curtis Lee, PhD; Jason R. Frank, MD, MA Ed

• New clerkship rotation in 2003
• Assessed student perceptions:
  – Teaching program
  – Educational value of EM
• Used 2 distinct measurement methods
  – Dyads
  – Open ended Qs
A new emergency medicine clerkship program: students’ perceptions of what works

Marianne Yeung, MD;* Jennifer Beecker, MD;* Meridith Marks, MD, M Ed;*† Janet Nuth, MD;* Brian Weitzman, MD;* A. Curtis Lee, PhD;* Jason R. Frank, MD, MA Ed*

- 81/94 – 86% response
- Open Ended EM is:
  - Highly valuable
  - Broad range of cases
  - Close supervision
  - Decision making
  - Procedural skills

- Active learning was rated more highly than passive
  1. ACLS
  2. Clinical Shifts
  3. Supervised teaching shift
  4. Procedural skills
  5. Tutorials
  6. PAL sessions
How shy is she?
• Is there a scale for shyness?
• How do you measure shy?
  – Head tilt
  – Blushed cheeks
  – Eyes downward
  – Shoulder shrugged
  – Slumped posture
  – Quiet voice
What affects student feedback, course evaluations?

Methods: factor analysis and multiple linear regression

Multi-question survey

2007-08 academic years

1st and 2nd year students surveyed

Evaluated 7 courses

Curricular content

Delivery of content

Assessment methods
What Factors Affect Students’ Overall Ratings of a Course?

Wayne Woloschuk, PhD, Sylvain Coderre, MD, Bruce Wright, MD, and Kevin McLaughlin, MB ChB, PhD

- 625/1022 – 61.2%
- 4 factor model accounted for > 50% of variance
- Strong association between factor and year of study and overall rating
- Four factors identified:
  - Assessment
  - Basic science teaching
  - Group learning
  - Teaching diagnostic approaches
What Factors Affect Students’ Overall Ratings of a Course?

Wayne Woloschuk, PhD, Sylvain Coderre, MD, Bruce Wright, MD, and Kevin McLaughlin, MB ChB, PhD

• Four factors identified –
  – 3 content delivery
  – 1 assessment
• Assessment factor strongest predictor of overall course rating (was the only factor for senior students)
  – ‘recency bias’
  – ‘testing effect’
  – ‘peak-end bias’
What Factors Affect Students’ Overall Ratings of a Course?
Wayne Woloschuk, PhD, Sylvain Coderre, MD, Bruce Wright, MD, and Kevin McLaughlin, MB ChB, PhD

Limitations
- Low response rate (60%)
- Single institution study
- End of rotation questionnaire
- Closed ended questions

Conclusions
- Four principal components load on course evaluation
- Assessment by far the strongest largest impact on course rating
- Peak-end rule – negative emotions of assessment
- Rotation end assessment may lose valuable information on other course elements
• No standard national exam bank exists
• Exam are often generated locally

• Article describes use of:
  – Standardized tests
  – MCQ exam writing guidelines
  – Reviews reliability and validity
  – Future direction of EM testing
• Item analysis is reviewed

• National curriculum
• Curriculum content should guide exam content not vice versa

• MCQ is a valued part of knowledge assessment

Other modalities are needed to ensure adequate learner assessment in multiple domains
• Regulatory bodies expect training programs to evaluate all aspects of ‘a good MD’
• Programs attempt to evaluate attributes such as:
  – Empathy
  – Altruism
  – Integrity
  – Compassion
Shift/ITER Evaluation Forms

<table>
<thead>
<tr>
<th></th>
<th>Below average</th>
<th>Average</th>
<th>Good (above average)</th>
<th>(well above average)</th>
<th>Excellent (top 10%)</th>
<th>Outstanding (top 5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic achievement</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Intellectual promise</td>
<td></td>
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</tr>
<tr>
<td>Quality of writing</td>
<td></td>
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<tr>
<td>Creative, original thought</td>
<td></td>
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<td></td>
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<tr>
<td>Productive class discussion</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Respect accorded by faculty</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disciplined work habits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maturity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction to setbacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concern for others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiative, independence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The evaluation forms have a column indicating the rating of various attributes for each category. The overall rating is marked with an 'X'.
• Looked at components of evaluation for IM clerkship
  – ITER (9 items)
  – MCQ exam
  – OSCE
• Exploratory factor analysis
• All students over 12 month period
• 103 students with all 11 aspects evaluated
Table 1. Orthogonally rotated principal component matrix to the normalized varimax criterion of ITER, OSCE and MCQ variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Information processing</th>
<th>Professionalism</th>
<th>Declarative knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data processing skills</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall ITER rating</td>
<td>0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of subject area</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical skills</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational attitudes</td>
<td></td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Attendance and dependability</td>
<td></td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>Initiative, interest and team relationships</td>
<td></td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>Professional relationships</td>
<td></td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td>Relationships with patients and their families</td>
<td></td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>MCQ</td>
<td></td>
<td></td>
<td>0.86</td>
</tr>
<tr>
<td>CSCE</td>
<td></td>
<td></td>
<td>0.55</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td></td>
<td>5.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Percent of variance</td>
<td></td>
<td>45.7</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8.9</td>
</tr>
</tbody>
</table>
• Limitations to discriminant validity of measurement tools
  – Halo effect
  – Constant error (severity, leniency, central tendency)

• Should be cautious how we use ITERs to measure various attributes
Peer Review
Using a Delphi process to establish consensus on emergency medicine clerkship competencies

RICK PENCINER¹, TREvor LANGHAN², RICHARD LEE³, JILL MCEWEN⁴, ROBERT A. WOODS⁵ & GLEN BANDIERA¹

¹University of Toronto, Canada, ²University of Calgary, Canada, ³University of Alberta, Canada, ⁴University of British Columbia, Canada, ⁵University of Saskatchewan, Canada

- Published this spring
- Novel process to achieve consensus on complex material
- Details the process undertaken to list EM competencies (what is important)
Grey Literature
Are our best teachers more effective – or do they just sound better?

Background
- It is reasonable to assume that if we improve the effectiveness of teaching that better learning outcomes will surely follow. But what is effective teaching, how do we measure it, and how do we improve it?
- Teaching effectiveness is a vaguely defined construct, typically evaluated using rating scales, which are prone to systematic biases such as the halo effect.
- The halo effect is the tendency of ratings to be influenced by a general perception; teaching effectiveness ratings may be influenced by a teacher's physical appearance, time of day, and mannerisms.
- Knowledge of these, how they influence teaching effectiveness, and how to improve them may lead to better teaching improvement interventions.
- Most of the previous work in this area has focused on non-verbal communication with the verbal component receiving relatively little attention. Here, we aim to study the impact of verbal communication on teaching effectiveness.

Study Objective
- Our objectives were to define attributes of effective verbal communication and determine the correlation between teaching effectiveness ratings of students briefly exposed to a teacher (thin-slice ratings) and end-of-course ratings.

Methods
- Using end-of-course surveys from the previous year (Class of 2011), the highest-rated teachers and five equated-rated teachers were examined. Non-verbal audio clips of each teacher's class instruction, taken the class of 2011, were rated.
- Students described the mental image created by each professor using six-point, Likert-scale rating scales.
- Students rated the teaching effectiveness of each professor using a five-point, Likert-scale rating scale.
- These ratings were compared to end-of-course ratings from the previous year (Class of 2011).
- Students rated the teaching effectiveness of each professor using a five-point, Likert-scale rating scale.
- These ratings were compared to end-of-course ratings from the previous year (Class of 2011).

Qualitative Results
- We identified three dominant attributes of effective verbal communication – being "caring," "entertaining," and "engaging."
- (statistically significant regression analysis?)

Quantitative Results
- There was a significant correlation (r = 0.9, p < 0.0005) between thin-slice ratings and end-of-course ratings from the Class of 2012.
- The data suggests that 80% of the variance in the overall teacher ratings can be explained by the perceived effectiveness of verbal communication.

Discussion
- It is clear from the results of this study that verbal communication plays a significant role in the perceived quality of teaching effectiveness.
- The strong association between thin-slice ratings and end-of-course ratings suggests that the halo effect is present in medical school.
- Within a short period of time, teaching effectiveness can accurately be predicted based upon verbal communication.

Conclusions
- Students' perceptions of teaching effectiveness are heavily influenced by verbal communication.
- Results indicate that teaching interventions should help teachers cultivate empathy and to both motivate and engage their students.
- However, it is unclear whether this will lead to better learning outcomes, or just more enjoyable learning experiences.

Literature Cited
• Look at abstracts published in journals after academic meetings
• Electronic mail out to all medical schools in US
• 2002-2009
• Measured trend over 8 years
  – Assessed mandatory or elective EM clerkship
  – Presence of absence of EM residency
  – 3rd or 4th year rotation
• 113 of 130 medical schools responded (86.9%)
• 109/113 offered EM rotations
• 45/113 had mandatory EM rotations (40%)
• Increasing linear trend per year of EM applicants
• More rapid growth of EM applicants from schools with EM

• Overall number of EM applicants
  – 9.2% vs 8.1% (p=0.007) with a mandatory EM rotation
  – 8.6 vs. 8.1 (p=0.269) – presence of residency program
Pop Culture
Name anything white.
Name anything white (in your fridge).
Why Some Ideas Survive and Others Die

MADE to STICK

Chip Heath & Dan Heath

With ADDED MATERIAL (now extra sticky!)
**S** \[\text{SIMPLE}\]  \[\text{UNEXPECTED}\]  \[\text{CONCRETE}\]  \[\text{CREDIBLE}\]  \[\text{EMOTIONAL}\]  \[\text{STORIES}\]

**SUCCESs**

**SIMPLE**
- Simplicity isn’t about dumbing down, it’s about prioritizing.
- Southwest will be THE low-fare airline.
- What’s the core of your message? Can you communicate it with an analogy or high-concept pitch?

**UNEXPECTED**
- To get attention, violate a schema. (Think: Nordie who wore a shirt...)
- To hold attention, use curiosity gaps. (What are Saturn’s rings made of?)
- Before your message can stick, your audience has to want it.

**CONCRETE**
- To be concrete, use sensory language. (Think: Aesop’s fables.)
- Paint a mental picture. (“A man on the moon...”)
- Remember the Velcro theory of memory—try to hook into multiple types of memory.

**CREDIBLE**
- Ideas can get credibility from outside (authorities or anti-authorities) or from within, using human-scale statistics or vivid details.
- Let people “try before they buy.” (“Where’s the Beef?”)

**EMOTIONAL**
- People care about people, not numbers. (Remember Bokja.)
- Don’t forget the WIIFY (What’s In It For You). But: identity appeals can often trump self-interest. (“Don’t Mess With Texas” spoke to Bubba’s identity.)

**STORIES**
- Stories drive action through simulation (what to do) and inspiration (the motivation to do it).
- Think: Jared. Springboard stories (See Denning’s World Bank tale) help people see how an existing problem might change.
Important Articles to Share
• My personal favorite EM clerkship article
• Not esoteric
• Students respond favorably to guided learning
• Straight forward pearls to help EM clerks succeed during their clinical rotation
  – And frees up my time as their preceptor
  – “more efficient flow in ED”
FIVE sources of Undergrad Ed.

1. Published articles
2. Works in progress
3. Grey literature
4. Pop culture
5. Reliable/useful ‘old standbys’
Conclusion

- EM is a valuable part of undergrad education
- Students value EM as a rotation
- Student assessment of EM is strongly influenced by the evaluation process
- Well designed, reliable and valid exams are key
- You can’t examine what you don’t identify – processes to achieve consensus exist and can be done
- Other tools of evaluation may not discriminate as well as we would like
- “Good teachers” may only be “good speakers”
- Being Sticky is good
Thank You.
### Table 1
Rotated Factor Loadings of Items on 625 Course Evaluation Surveys Completed by First- and Second-Year Students at the Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada, 2007–2008*

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning objectives were clear.</td>
<td>0.53</td>
<td>0.10</td>
<td>0.35</td>
<td>0.10</td>
</tr>
<tr>
<td>The core document was a useful study guide.</td>
<td>0.46</td>
<td>-0.03</td>
<td>0.30</td>
<td>0.06</td>
</tr>
<tr>
<td>There was an appropriate blend of lectures and small groups.</td>
<td>0.20</td>
<td>0.38</td>
<td>0.25</td>
<td>0.10</td>
</tr>
<tr>
<td>Lectures were interesting/helpful.</td>
<td>0.41</td>
<td>0.17</td>
<td>0.53</td>
<td>0.26</td>
</tr>
<tr>
<td>Small groups were interesting/helpful.</td>
<td>0.04</td>
<td>0.80</td>
<td>0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>I had enough time to prepare for small groups.</td>
<td>0.18</td>
<td>0.49</td>
<td>0.23</td>
<td>0.08</td>
</tr>
<tr>
<td>The climate of the small groups facilitated learning.</td>
<td>0.02</td>
<td>0.79</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Lectures and small groups were free of gender bias.</td>
<td>0.15</td>
<td>0.60</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>When working through clinical scenarios during lectures, instructors referred to problem-solving schemes.</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.87</td>
</tr>
<tr>
<td>When working through clinical scenarios during small groups, instructors referred to problem-solving schemes.</td>
<td>0.01</td>
<td>0.32</td>
<td>0.10</td>
<td>0.82</td>
</tr>
<tr>
<td>I was able to develop effective problem-solving strategies for the clinical presentations in this course.</td>
<td>0.45</td>
<td>0.30</td>
<td>0.23</td>
<td>0.35</td>
</tr>
<tr>
<td>Bedside clinical correlations sessions were useful.</td>
<td>0.16</td>
<td>0.40</td>
<td>0.04</td>
<td>0.22</td>
</tr>
<tr>
<td>Instruction of basic science material was clinically relevant.</td>
<td>0.21</td>
<td>0.11</td>
<td>0.65</td>
<td>0.04</td>
</tr>
<tr>
<td>Basic and clinical sciences were well integrated.</td>
<td>0.17</td>
<td>0.12</td>
<td>0.79</td>
<td>-0.07</td>
</tr>
<tr>
<td>Relevant health promotion/disease prevention was covered.</td>
<td>0.03</td>
<td>0.12</td>
<td>0.63</td>
<td>0.15</td>
</tr>
<tr>
<td>Pharmacology relevant to the clinical presentations taught was covered.</td>
<td>0.20</td>
<td>0.01</td>
<td>0.55</td>
<td>0.34</td>
</tr>
<tr>
<td>The workload of the course was appropriate.</td>
<td>0.30</td>
<td>0.10</td>
<td>0.47</td>
<td>-0.16</td>
</tr>
<tr>
<td>Course material posted on the curriculum information system was useful.</td>
<td>0.27</td>
<td>0.33</td>
<td>0.42</td>
<td>0.09</td>
</tr>
<tr>
<td>The integration of systems worked well.</td>
<td>0.17</td>
<td>0.17</td>
<td>0.33</td>
<td>0.28</td>
</tr>
<tr>
<td>Classroom patient presentations were useful.</td>
<td>0.12</td>
<td>0.46</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>The final written evaluation accurately reflected the course objectives.</td>
<td>0.69</td>
<td>0.09</td>
<td>0.23</td>
<td>0.22</td>
</tr>
<tr>
<td>The evaluation reflected the blueprint.</td>
<td>0.70</td>
<td>0.20</td>
<td>0.11</td>
<td>0.04</td>
</tr>
<tr>
<td>The evaluation tested the material actually taught.</td>
<td>0.83</td>
<td>0.15</td>
<td>0.15</td>
<td>0.03</td>
</tr>
<tr>
<td>My ability to solve problems was sufficiently tested.</td>
<td>0.76</td>
<td>0.14</td>
<td>0.11</td>
<td>0.06</td>
</tr>
<tr>
<td>Overall, the final evaluation was a fair test.</td>
<td>0.86</td>
<td>0.17</td>
<td>0.15</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* Results of the principal component factor analysis (varimax rotation) showing the rotated factor loadings on the end-of-course survey completed by 625 first- and second-year students. Reached the loading threshold of 0.65.

### Table 2
Standardized Beta Weights Depicting the Association Between the Four Factors In the Evaluation Tool and Overall Course Ratings for First- and Second-Year Students Completing 625 Course Evaluations at the Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada, 2007–2008*

<table>
<thead>
<tr>
<th>Factor</th>
<th>First-year students</th>
<th>Second-year students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta weight (95% CI)</td>
<td>P value</td>
</tr>
<tr>
<td>Assessment of students</td>
<td>0.45 (0.34 to 0.56)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Small group learning</td>
<td>0.18 (0.10 to 0.26)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Basic science teaching</td>
<td>0.13 (0.05 to 0.21)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Teaching diagnostic approaches</td>
<td>0.17 (0.06 to 0.29)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Standardized beta weights permit comparison across factors, and higher beta weights indicate stronger prediction.