Self-regulated Learning and Academic Performance in Medical Education

Designing Evidence-Based Medicine Training

Educating for the 21st-Century Health Care System

OME Journal Club

November 18, 2015
Goal: To facilitate faculty member’s knowledge about current trends in medical education and literature analysis through group discussions with peers.

Learning Objectives

As a result of participation in the OME Journal Club discussions, the faculty will be able to:

- Increase exposure to evolving concepts in teaching
- Identify, develop, and teach critical appraisal skills
- Promote medical education research
- Consider applying new concepts in teaching to course delivery

15 minute discussion for each article
Educating for the 21st-Century Health Care System: An Interdependent Framework of Basic, Clinical, and Systems Sciences


**Key Points**

- **Research Question:** Where in medical education curriculum are learners provided with patient experience and systems science and can a new conceptual model reframe medical education?

- **Method:** Generated the Systems-based curriculum at the Pennsylvania State University College of Medicine Systems Navigation Curriculum (SyNC)

- **Results:** 3 Tier curriculum-- 1) basic science, 2) clinical and 3) systems science

- **Discussion:** Governmental and health care organizations have begun to address the gaps in focus and the misdirected resource allocations that allow system failures. **It is time for medical school curriculums to shift from the two-pillar basic sciences + clinical curriculum to a new interdependent three-pillar triad of basic, clinical, and systems sciences to better prepare physicians for practice in the 21st century.**
3-Tier Interdependent Curriculum

- Basic Science
  - Human Anatomy
  - Biochemistry
  - Microbiology
  - Pharmacology
  - Physiology
  - Pathology

- Clinical Science
  - Internal Medicine
  - Neurology
  - OB/GYN
  - Pediatrics
  - Psychology
  - Surgery

- Systems Science
  - Healthcare Finance
  - Population Health
  - Quality Improvement
  - Socio-ecological Health
  - Informatics
  - Teamwork & Leadership

**Students as patient navigators**
1. Authentic patient experience
2. Direct experience with core systems-based practice
3. View the care through patient’s eyes

Prepares for practice
Fosters relevance and motivation
<table>
<thead>
<tr>
<th>Module</th>
<th>Curriculum module title</th>
<th>Contact hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient Navigation Principles</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Healthcare Delivery (cost/reimbursement, insurance, coordination)</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Healthcare Reform (policy, reform, informatics)</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Population Health Management and Public Health</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Socio-Ecological Medicine and Determinants of Health</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>High-Value Care Delivery</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>Leadership and Change Agency</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thread</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teamwork and collaboration</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Evidence-based medicine</td>
<td>28</td>
</tr>
</tbody>
</table>

*Curriculum threads are embedded within each module—teamwork (one 2-hour session per module) and evidence-based medicine (two 2-hour sessions per module).
Topics to discuss

- Do agree with the authors that a 3-tier curriculum is the right approach to frame medical education?

- Do you think the BUSM Curriculum could be transformed into a 3-tier interdependent systems curriculum?

- What do you consider is biggest challenges to make this reframing in medical school curriculums?
Self-regulated learning and academic performance in medical education


Key Points:

1. **Research question:** Do medical students’ self-regulated learning skills change during medical school and is this related to academic performance?

- **Method:** Two cohorts of first-year students and one cohort of third-year students (949 completed the survey) from the Erasmus MC Medical School, Rotterdam, the Netherlands. Used Self-Regulation of Learning Self-Report Scale (SRL-SRS). First-year and third-year grade point average (GPA) was used for academic performance.

- **Discussion:** The levels of self-regulated learning skills did not differ between the first and third year at medical school, except reflection, which was higher in the third year. Some variation in performance could be explained by the students’ self-regulated learning skills, both in the first-year and in the third-year.
Self-Regulation Theory

As applied to medical education, describes the cyclical control of academic and clinical performance through several key processes that include:

- Goal-directed behavior
- Use of specific strategies to attain goals
- The adaptation and modification to behaviors or strategies to optimize learning and performance

Topics to Discuss

- Do you agree with the authors reporting that the students may have over-estimated their self-regulating skills?

- Do you believe a survey was the best method to assess the results of the study?

- Do medical schools assume that students develop these self-regulated learning skills anyways, and therefore do not explicitly teach their students how?

- After reading this article, would you consider changing anything in your course?
Designing Evidence-Based Medicine Training to Optimize the Transfer of Skills From the Classroom to Clinical Practice: Applying the Four Component Instructional Design Model

Maggio L, ten Cate O, and Irby DM. Acad Med. 2015; Published ahead online: 1-5. Available at http://goo.gl/GXF9Kh.

Key Points:
- **Research question:** Will the use of the Four Component Instructional Design (4C/ID) model guide the design of EBM training?
- **Method:** Authors examined the four model components—learning tasks, supportive information, procedural information and part-task practice—might be applied to EBM.
- **Discussion:**
  - No approach to teaching EBM at the undergraduate level is universally endorsed
  - 4C/ID provides learners with whole-task challenges to facilitate transfer of knowledge to clinical practice and support mental models for recurrent tasks
### 4C/ID Model Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Tasks</strong></td>
<td>A whole-task activity in which learners practice all the parts of a complex task in an integrated fashion</td>
<td>Student write a clinical question based on a patient’s condition, locate a relevant article, critically appraise that article, and present the findings to the clinical team in a brief presentation</td>
</tr>
</tbody>
</table>
| **Supportive Information** | 1. **Theory**: systematic approaches to a problem  
2. **Background**: general cognitive strategies to systematically approach a problem | An online module that describes how an information database is structured or that provides examples of how to critically appraise meta-analyses |
| **Procedural Information** | Learners use a step-by-step or rules-based approach for recurrent or routine elements | A worksheet with a step-by-step approach to creating a clinical question using the mnemonic PICO (Patient, Intervention, Comparison, Outcome) |
| **Part-task Practice**  | Learners situate the part-task component within the larger whole task.       | Search strings created in PubMed with an emphasis on quickly and correctly selecting Boolean operators (and/or) to facilitate the realistic and rapid completion of a search enabling a learner to locate evidence and practice EBM in a short period of time. |
### Examples of Evidence-Based Medicine (EBM) Training Activities Based on the Four Component Instructional Design (4C/ID) Model

<table>
<thead>
<tr>
<th>Component</th>
<th>Preclerkship level</th>
<th>Clerkship level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning tasks</td>
<td>For whole-task content, learners are:</td>
<td>For whole-task content, learners:</td>
</tr>
<tr>
<td></td>
<td>• Provided with a written patient case derived from real-life practice that focuses on a single, familiar condition.</td>
<td>• Identify a patient case from their own clinical experience or adopt a patient case identified by a preceptor in morning rounds.</td>
</tr>
<tr>
<td></td>
<td>For whole-task format, learners are:</td>
<td>For whole-task format, learners:</td>
</tr>
<tr>
<td></td>
<td>• Provided with a set of clinical questions and asked to complete the remaining EBM steps.</td>
<td>• Identify a clinical question and execute all steps of EBM.</td>
</tr>
<tr>
<td>Supportive information</td>
<td>Prior to the activity, learners:</td>
<td>Prior to the activity, learners:</td>
</tr>
<tr>
<td></td>
<td>• Read an article on critically appraising diagnostic articles.</td>
<td>• Watch a short video of a physician thinking aloud through her EBM reasoning process.</td>
</tr>
<tr>
<td></td>
<td>• Listen to a librarian describe her thought process for selecting a database to find diagnostic articles.</td>
<td></td>
</tr>
<tr>
<td>Procedural information</td>
<td>During the activity, learners are:</td>
<td>During the activity, learners are:</td>
</tr>
<tr>
<td></td>
<td>• Provided with a step-by-step handout to guide question formulation.</td>
<td>• Offered an online checklist to guide the critical appraisal of articles.</td>
</tr>
<tr>
<td></td>
<td>• Offered over-the-shoulder feedback from roving teachers while working on a search or appraisal task.</td>
<td></td>
</tr>
<tr>
<td>Part-task practice</td>
<td>During the activity, learners are:</td>
<td>During the activity, learners:</td>
</tr>
<tr>
<td></td>
<td>• Provided data on four screening modalities and challenged to calculate the likelihood ratio for each test.</td>
<td>• Do not engage in part-task practice if they have achieved mastery of the recurrent elements of EBM.</td>
</tr>
</tbody>
</table>

---

*Ideally, throughout medical school, learners engage in multiple EBM activities organized from simple to complex, depending on their level.*

*Based on a patient case, learners are asked to perform the steps of EBM (ask, acquire, appraise, apply) to propose the best next step for further investigation or treatment of the patient case.*
Topics to discuss

- What one key point did you take away from reading this article?
- Would you implement 4C/ID model in your class?
- Can you identify anything missing in this study?
- Would you recommend this article to a colleague?
Thank you for participating!

Save the date: OME Journal Club next meeting is **Thurs, January 21, 2016**

In the meantime – if you find an interesting article, please send it to me gmarch@bu.edu so we can include it in our upcoming meetings