Methods of Teaching 101: Why and How to Incorporate Team- and Problem-based Learning into your Medical Education Sessions

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To actively participate, visit PollEv.com and type in karenmlounsbury608 to join the session
Objectives of this Session

Prework:
• Outline the different roles for faculty and students in an active classroom compared with didactic lectures
• Describe the importance of objective-driven sessions and the 4 Ss of Team-based Learning
• Recognize the primary differences in delivery and assessment for Team-based and Problem-based Learning modalities used by Larner College of Medicine

Session:
• Discuss the benefits of active learning for medical knowledge, communication, and professionalism in medical education
• Recognize the value of active learning concepts using Team-based Learning and Problem-based Learning
• Describe the most common complaints about active learning from faculty and students and develop strategies to overcome challenges
• Outline specific ideas for creating active learning sessions that link specific objectives to assessments, follow standard procedures, and are responsive to faculty and student feedback
How are you feeling about the prospects of using active learning in your teaching?

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The science supporting active learning and specific advantages for medical education
Best Teaching Strategies

• “All new learning requires a foundation of prior knowledge.” Learners make sense of their experiences (and learning) using their own knowledge organizations.

• Any technique that requires you to solve a problem (retrieve prior knowledge) before being shown the solution is beneficial to long term encoding/storage and the building of complex knowledge organizations.
Misconceptions for Study Techniques

• Re-reading highlighting are believed to be the best study techniques
  • This notion has been debunked by studies in all levels of learners, but still persists!

• Learning and then retrieving and applying through Active Learning is better for retention
Reduce the cramming mentality before exams!

• Not fun, not effective
Training of Physicians: Metacognition leads to improved Critical Thinking and Diagnostic Reasoning

- Thinking about one’s own thinking processes
- Evaluate the process, identify knowledge gaps, find the resources to fill those knowledge gaps, and apply that new knowledge to solve future problems.

- This process is also key to developing good diagnostic reasoning skills
Recognize the value of active learning concepts using 4 multiple choice questions

Think for 30 sec, pair share, answer

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1. Which of the following results from using class time for active learning?

A. Less interaction with the instructor
B. Less material can be covered
C. More learning from peers
D. More study time outside of the classroom

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1. Which of the following results from using class time for active learning?

A. Less interaction with the instructor—explains difficult concepts
B. Less material can be covered—many concepts don’t need in-class time
C. More learning from peers—builds team skills
D. More study time outside of the classroom—less time reviewing after

Careful Design is necessary to balance pre-work and in-class material
USMLE Performance
Step One Score Distributions: Graphs represent the school mean (+/- 1 standard deviation) as compared to the national mean.

2018 (Co2020)

1. MK: Applying Foundational Science Concepts
2. PC: Diagnosis
3. PC: Management
4. PBLI: Evidence-Based Medicine
5. Behavioral Sciences
6. Biochemistry
7. Genetics
8. Gross Anatomy & Embryology
9. Histology & Cell Biology
10. Microbiology & Immunology
11. Nutrition
12. Pathology
13. Pharmacology

2021 (Co2023)

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Performance on First Attempt

<table>
<thead>
<tr>
<th></th>
<th>Examinees from Your Medical School</th>
<th>Examinees from U.S. &amp; Canadian Medical Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Passing</td>
<td>99</td>
<td>96</td>
</tr>
<tr>
<td>Total Test Mean</td>
<td>234 (16)</td>
<td>230 (19)</td>
</tr>
</tbody>
</table>
Training of Physicians: Effective Teams

• Sets clear and demanding performance goals
• Task-oriented discussion in which everyone participates
• There will be disagreement (viewed as good)
• Everyone is respectful of each member of the team
• Decisions are made when there is general agreement
2. Effective sessions align competencies, session content and assessment through which of the following?

A. Exam questions
B. Pre-work and Session objectives
C. Step 1 study guides
D. Student evaluations

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2. Effective sessions align competencies, session content and assessment through which of the following?

A. Exam questions—objectives drive assessment
B. Pre-work and Session objectives
C. Step 1 study guides—caution against minimizing to only Step 1
D. Student evaluations—caution against curriculum changes without faculty curriculum committee oversight

Establish Session Objectives that link to Course Objectives and Competencies
3. The most effective application questions in team-based learning sessions have which of the following characteristics?

A. Each student team works on a different problem
B. Student teams report answers after the session is over
C. Student teams select one best answer from the options offered
D. Student teams work on only basic science problems
3. The most effective application questions in team-based learning sessions have which of the following characteristics?

A. Each student team works on a different problem—SAME
B. Student teams report answers after the session is over—SIMULTANEOUS
C. Student teams select one best answer from the options offered—SPECIFIC
D. Student teams work on only basic science problems—SIGNIFICANT

4 Ss of Active Learning
4. Which of the following Active Learning teaching modalities at Larner College of Medicine does not have a readiness quiz component (RQ or iRAT/gRAT)?

A. Case-based learning  
B. Problem-based learning  
C. Team-based learning  
D. Workshop
4. Which of the following Active Learning teaching modalities at Larner College of Medicine does not have a readiness quiz component (RQ or iRAT/gRAT)?

A. Case-based learning—RQ taken on own before class (quiz flexibility)
B. Problem-based learning—no preparation, self-directed learning
C. Team-based learning—iRAT/gRAT taken in class (attendance)
D. Workshop—RQ taken on own before class (quiz flexibility)

Most modalities include quizzing.
<table>
<thead>
<tr>
<th>Quick Overview of Active Learning SOPs</th>
<th>Team-Based Learning</th>
<th>Case-Based Learning</th>
<th>Workshop</th>
<th>Problem-Based Learning</th>
<th>Integrative Review</th>
<th>eLearning Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Learning (Before class)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes - previously taught material should be identified</td>
<td>N/A</td>
</tr>
<tr>
<td>Time Estimate for Independent Learning (Students)</td>
<td>1:1.5 ratio for class time, prior to class</td>
<td>1:1 ratio for class time, prior to class</td>
<td>1:1 ratio for class time, after class</td>
<td>1:1 ratio for class time, prior to class</td>
<td>Calendar indicates time needed to complete and meet objectives</td>
<td></td>
</tr>
<tr>
<td>Prep Materials Due for Uploading</td>
<td>Monday the week prior to the session</td>
<td>Monday the week prior to the session</td>
<td>Monday the week prior to the session</td>
<td>N/A</td>
<td>Materials for review identified a week in advance</td>
<td>N/A</td>
</tr>
<tr>
<td>Prep Materials Available to Students</td>
<td>5 days ahead of session</td>
<td>5 days ahead of session</td>
<td>5 days ahead of session</td>
<td>N/A</td>
<td>5 days ahead of session</td>
<td>All materials available 5 days prior to calendar event</td>
</tr>
<tr>
<td># of Objectives per preparatory hour</td>
<td>Approx. 10 for Independent Learning and 5 for in-class</td>
<td>Approx. 10 for Independent Learning and 5 for in-class</td>
<td>Approx. 10 for Independent Learning and 5 for in-class</td>
<td>Students set objectives.</td>
<td>5 in-class objectives covered</td>
<td>10 or fewer objectives</td>
</tr>
<tr>
<td>Graded Component</td>
<td>IRAT &amp; GRAT in class</td>
<td>7-10 question RQ completed by 7 am day of class</td>
<td>7-10 question RQ completed by 7 am day of class</td>
<td>N/A</td>
<td>None</td>
<td>7-10 question RQ completed by 7am day after calendar event</td>
</tr>
</tbody>
</table>
What challenges do you predict for introducing more Active Learning sessions?

Enter one or two words to form a word cloud
Panel Presentation and Discussion

- Andy Hale, MD: Asst. Professor of Medicine, Course Director and Instructor, Cardiovascular, Respiratory and Renal
- John Miller, MD: Asst. Professor Internal Medicine, Course Director and Instructor, Convergence
- N. Karina Lopez, MA, ME: Instructional Designer, Curriculum Team, Office of Medical Education
Team-based Learning vs. Problem-based Learning

• Introductions: What experience with TBL and PBL?
• Compare and Contrast the preparation, delivery, and assessment
• What questions will help decide which topics or types of learning should be delivered by TBL vs. PBL and why?
• What are best practices and common pitfalls in the design of TBLs?
• Questions from Audience
Faculty Challenges

• Myths and Anecdotes of horrific experiences, some are true
• FEAR of consequences
  • Why change what is working?
  • We are gutting the curriculum!
  • Students will hate this.
  • Why are my evaluations so bad now?

• TIME
  • Sessions take a significant amount of time to develop, especially MCQs for readiness quizzes, case questions, and formative quizzes

• Resources
  • More tech training
  • Trust in Instructional Designers
  • Team approach to teaching

• Compensation
  • Clinical faculty especially need supportive Chairs to protect time
Student Challenges

- **Orientation**
  - Buy-in: Different from previous successful strategies
  - Expectations
  - Quiz fatigue

- **Faculty Dev.**
  - Pacing of Sessions
  - Quantity/Density of Prework
  - Alignment of quizzes and exams with objectives

- **Student Services**
  - Students from underrepresented groups (imposter syndrome)
  - Students with processing disabilities (session pacing)
Advice for TBL

• Limiting pre-work, aligning objectives to sessions, and session pacing are the hardest challenges

• Following SOPs for session modalities that limit pre-work and session content is critical

• We made a lot of changes based on student proposals that do not strictly follow desired pedagogy, so check with your course director
  • Release of answers was the most controversial until COVID
  • Release of session recordings took its place

• Review evaluations from students and possibly ask for a peer faculty evaluation to improve your session
Advice for PBL

• Gather small group faculty well in advance and make sure they are trained in PBL methods to ensure consistency between groups
• Choose problems or cases that build on student’s previous learning (not recommended for the first experience with a topic)
• A clear rubric for faculty to evaluate students
• Evaluate outcomes
A Six-Step Active Learning Design Process

An overview of transitioning to Active Learning in the LCOM curriculum

**STEP 1**
Course Director/Faculty Review/Revise Course & Session objectives. MCC approves any changes to Course Objectives

**Reminder:** Check for Alignment. Assessment must correlate to pre-learning and in-class objectives. See "How to Write LCOM Learning Objectives."

**STEP 2**
Faculty Choose a Class Activity (Modality).

PBL Problem-Based Learning
CBL Case-Based Learning
TBL Team-Based Learning
Workshop
Integrative Review
Reflection
Lab (Path, Histo, Anatomy)
Simulation, including Standardized Patients, Clinical Skills
Journal Club
COMET-based Instruction

**STEP 3**
Faculty Design In-Class activities active learning requires students to think and do

Engage Bloom’s Higher Order Thinking Skills: Apply, Analyze, Synthesize, Evaluate, Diagnose

Some In-Class activities include solving cases and problems, creating illness scripts and concept maps, formulating differential diagnoses, and playing games for review

**STEP 4**
Faculty Design Independent Learning that helps establish foundational knowledge. Check for ADA compliancy—see the Active Learning Team. Post all material on VIC no later than five days prior to session. Aim for interactive, engaging modules.

Assessments of Independent Learning include IRATs, GRATs, and RQs
Self-Directed Learning is evaluated by faculty

**STEP 5**
Align and Assess Assessments align with pre-learning and in-class objectives.

Assess students’ knowledge, analytical skills, professionalism, ability to access credible resources, synthesize information and predict outcomes

**STEP 6**
Evaluate course and class

Review Student Evals and Test Scores
Capture ideas for course revision
Communicate course changes to You Said/We Did and SEG

After a learning activity, encourage students to reflect, pause, relearn, recall, map their learning process (metacognition)

**Engage Bloom’s Lower Order Thinking Skills: Identify, Match, Recall, Describe and Classify**

Some Independent Learning formats include Topic Overviews (PDF), Videos, Narrated Slide Shows

**Some In-Class activities include** solving cases and problems, creating illness scripts and concept maps, formulating differential diagnoses, and playing games for review

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The Curriculum Team, part of the Office of Medical Education, comprises a manager, curriculum coordinators, and instructional designers. Our mission is to support faculty and course directors. Contact an Instructional Designer today to start planning an upcoming session.

http://www.med.uvm.edu/activelearning/home
Teaching Academy Resources

Develop Skills in Educational Scholarship
- Educational Research and Scholarship Series
- Medical Education Grand Rounds
- Writers Workshop & Manuscript Marathon
- Medical Education Research Group
- Medical Education Fellowship Program

Develop Skills in Teaching
- Clinical Faculty Development Series
- Snow Season Education Retreat
- Mentoring
- Essentials of Teaching and Assessment

Find Funding
- Frymoyer Scholars Program
- UVM Health Network Medical Group Education Award
- Teaching Academy Curriculum Development Award *
- Teaching Academy Travel Award *

Get Involved
- Attend Events
- Read the Newsletter
- Apply for Membership

*Open to Teaching Academy members only

For more information visit: http://med.uvm.edu/teachingacademy
Thank you