TBL
Breakthrough or Latest Fad?

“Hot” fashion trend
1968 Graduation Ceremony-
Augusta L. Troup Jr. High
New Haven CT

Revolution in
Personal Computers
What is TBL?

? ? ?

LECTURE

? ? ?

PBL?

Workshop?

? ? ?
# Knowledge acquisition
## Comparing TBL to Lecture

<table>
<thead>
<tr>
<th>Lecture</th>
<th>TBL</th>
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<tbody>
<tr>
<td>• Single person 50 minute</td>
<td>Homework reading/study</td>
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<tr>
<td>• Student then “learns” material at home</td>
<td>Time in class spent analyzing Problem solving/digesting</td>
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<tr>
<td>• Memorization emphasized</td>
<td>Direct application</td>
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<tr>
<td>• MCQ testing simple recall</td>
<td>Team work, communication</td>
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**Pre-assigned Reading**

**Individual Exam (IRAT)**

**Group Exam (GRAT)**

**Application**
TBL - PBL?
Small Groups

**PBL**
Students benefit from own small groups but not other classmates

**TBL**
• Students benefit from own small groups and other class groups
TBL - PBL?

Execution

**PBL**
Variability in facilitator quality

**TBL**
Deliberate pairing of complementary or even controversial facilitators
TBL - PBL?

Directed Self Learning

PBL
• Each student individually works on assigned LO
• Individual variation in breadth and depth of outcomes
• Student is expert in only one LO and has to study other LOs on their own

Common:
Clinical Application of Basic Principles

TBL
• Every student given same LO and directed reading
• Identical outcome measures (IRAT)
TBL – PBL
Limitations of Application

PBL
• Individual group variability
• Driven by LO of assignment

TBL
• Everyone in class benefits
• Application can explore controversial subject and expose students to widely different interpretations
See following image for analysis of estrogen receptor (ER) staining in your patient and another breast cancer patient (panel B). What would you conclude about the ER status of patient B?
ER Status?

A. ER-positive

B. ER-negative

C. ER status inconclusive
ER Status of Tissue Prep B?

A. ER-positive – Basic scientist with knowledge of published & unpublished studies examining role of “nongenomic” ER signaling in breast cancer

B. ER-negative – Practicing pathologist following established guidelines
For MCQ students can get question right for wrong reason. In TBL assessments (IRAT, GRAT) misconceptions identified and clarified.
TBL

Students can be credited for challenges to convention or in depth reading of assigned article

Question writing problem, gives student a chance to explain their thought and get credit

Q: Gefitinib (Iressa®) is useful for treating breast cancers because it:

A. induces expression of the estrogen receptor.
B. inhibits the activity of constitutively active and ligand-activated EGFR.
C. binds to and inhibits both EGFR (ErB1) and Her2 (ErbB2).
D. induces DNA damage and ensuing apoptosis of cancer cells.

Challenge by student group:
“We initially chose A because the assigned article stated the inhibition of a pathway (EGFR or ER) could cause a shift between the pathways. Therefore, if EGFR is inhibited by Gefitinib, that would impact ER pathway and therefore return the tumor to a ER-dependent state. This would make the cancer more sensitive to endocrine therapy.”

TBL: Does it work?

The Impact of Team-Based Learning on Medical Students’ Academic Performance

Method
The authors analyzed the performance of second-year medical students on 28 comprehensive course examinations over two consecutive academic years (2003–2004, 2004–2005) at the Boonshoft School of Medicine.

Results
The 178 students included in the study achieved 5.9% higher mean scores on examination questions that assessed their knowledge of pathology-based content learned using the TBL strategy compared with questions assessing pathology-based content learned via other methods ($P < .001$, t test). Students whose overall academic performance placed them in the lowest quartile of the class benefited more from TBL than did those in the highest quartile. Lowest-quartile students’ mean scores were 7.9% higher on examination questions related to TBL modules than examination questions not related to TBL modules, whereas highest-quartile students’ mean scores were 3.8% higher ($P < .001$, two-way analysis of variance).
TBL: Does it work?


Our results show that departmental and NBME subject examination scores for TBL-based anatomy were higher than those for lecture-based anatomy. Since the introduction of TBL in anatomy, student performance has progressively improved in the NBME subject examination. (New Jersey Medical School)


The application of TBL to medical ethics education improved student performance and increased student engagement and satisfaction. (Korean Medical School)


We used an unblinded crossover design with 112 students rotating through the Ambulatory Medicine clerkship and compared performance on the knowledge examination for those items taught with TBL and those with SGL. Performance by students taught by TBL was higher than those taught by SGL in each topic, except hypertension. (Johns Hopkins U)
TBL – Dynamic Potential Future Innovations

**Inter-professional TBLs**
- Mixed teams with exercises exploiting individual strengths
- No individual facilitator to impress
- Mixed facilitators in session sets good example (already effective in Human Genetics Class with Dr. Paula Monaghan-Nichols and Ms Darcy Thull (Genetics Counselor) running “Cancer Genetics and Counseling” TBL)

**Team Grade for GRAT & IRAT**
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