

# Medical Education Journal Club

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# Disclosure Information

Activity Directors / Planners / Reviewers / Faculty

Name	Role	Disclosure / Resolution
Carla S. Lupi, MD	Activity Director/Planner/ Speaker	Dr. Lupi reports no relevant financial relationships.
Vivian Obeso, MD	Planner/Speaker	Dr. Obeso reports no relevant financial relationships.
Christian Castro	Planner	Mr. Castro reports no relevant financial relationships.
Melissa Ward-Peterson, MPH	Planner	Ms. Ward-Peterson reports no relevant financial relationships.



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# Learning Objectives

- Be able to list the search results for one medical education database consulted in the design of a course or teaching session.
- Conduct a critical appraisal of an article in the medical education research.
- Identify the applicability of research results to one's own course or teaching session.



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## Medical Education Journal Club

- Establish a forum for faculty to share and discuss recent literature in medical education
- Use best evidence in medical education literature to evaluate and advance current practices in our educational program
- Establish a culture that promotes curricular innovation and change in an evidence-based manner
- Stimulate educational scholarship



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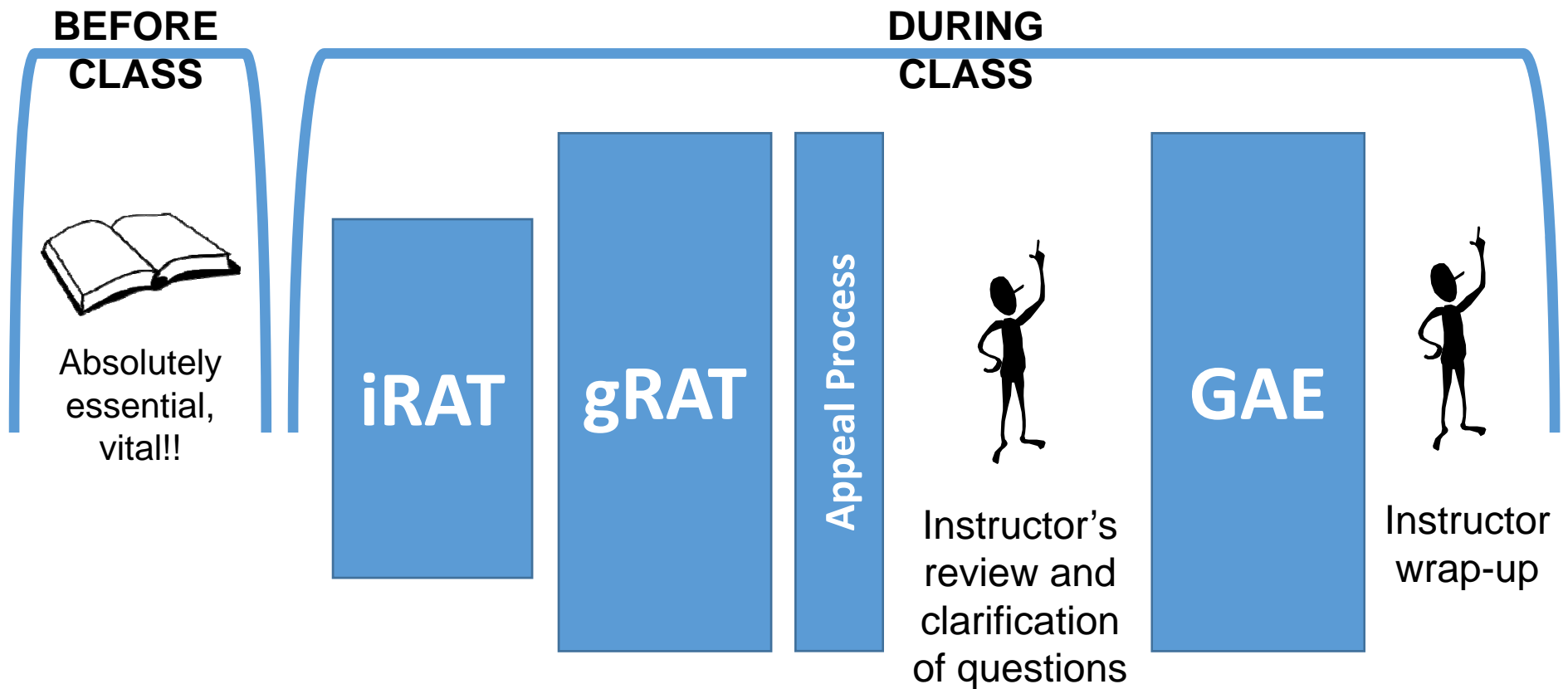
# Today's Objectives

- Review the elements of TBL
- Review the elements of appraising a systematic review by appraising one
- Appreciate (if you don't already) the BEME series
- Summarize the evidence on TBL in HPE
- Consider the implications for HW FIUCOM

# Background

Brief description of TBL

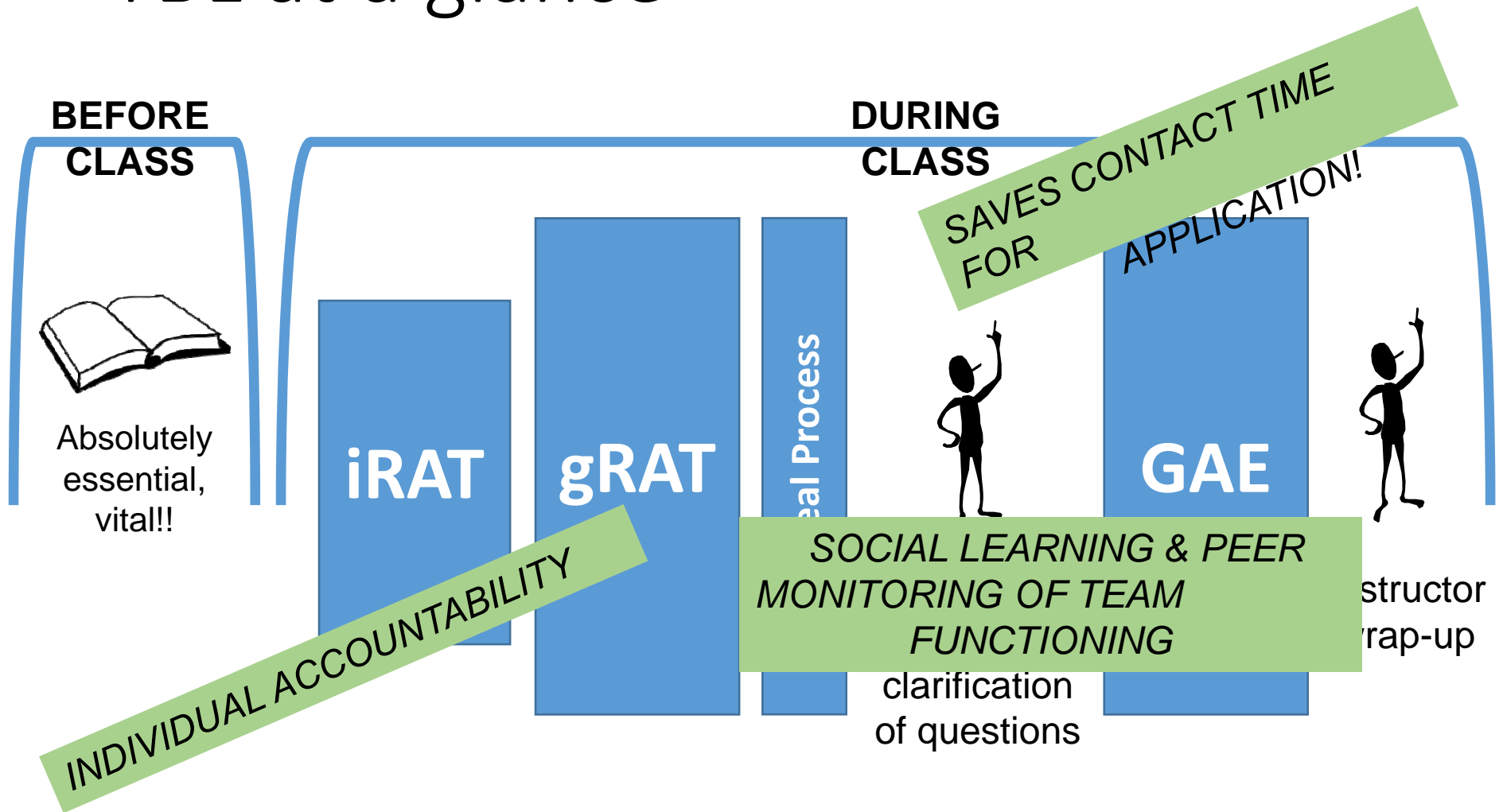
# TBL at a glance



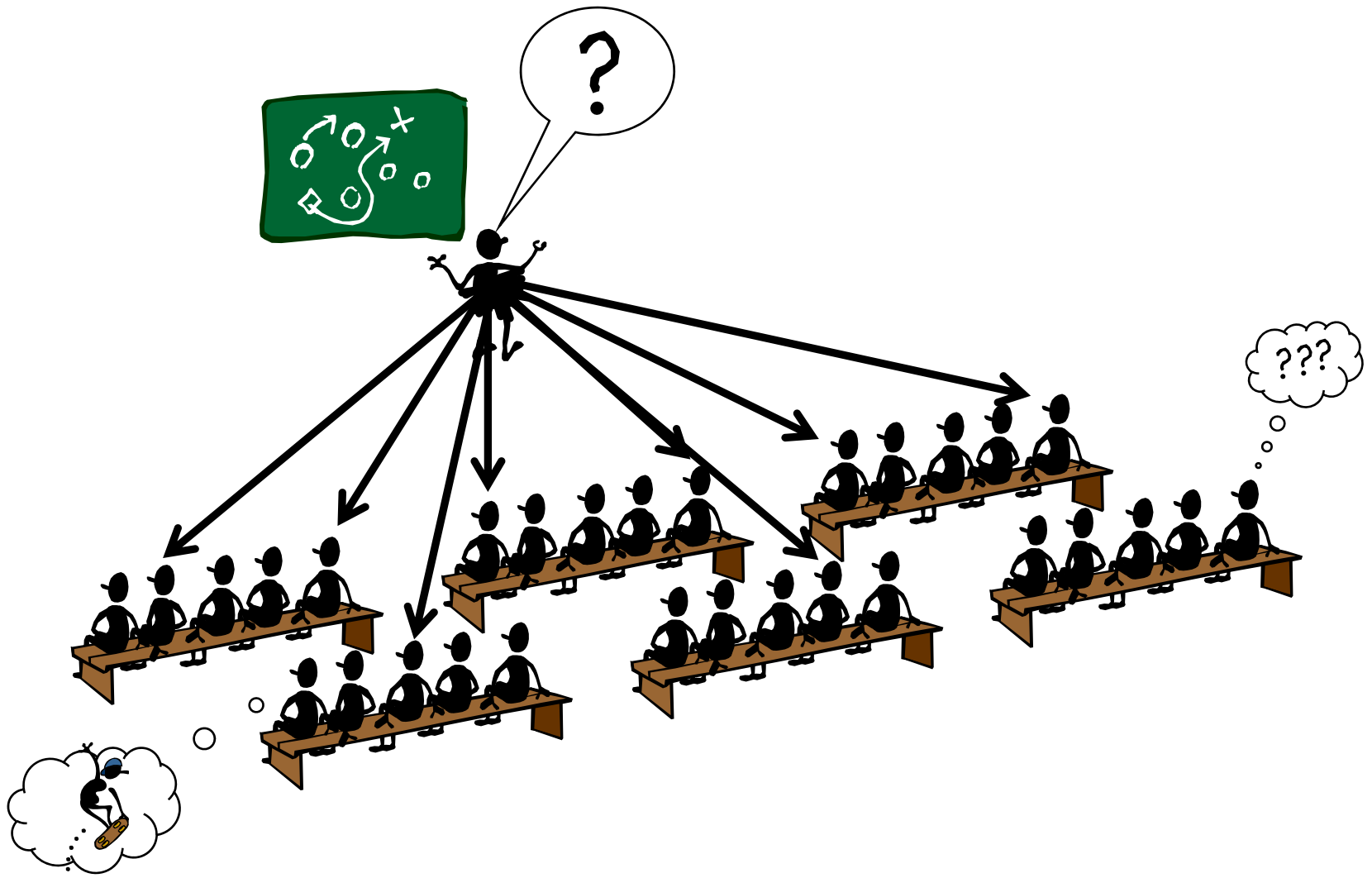
Peer Assessment

# TBL at a glance

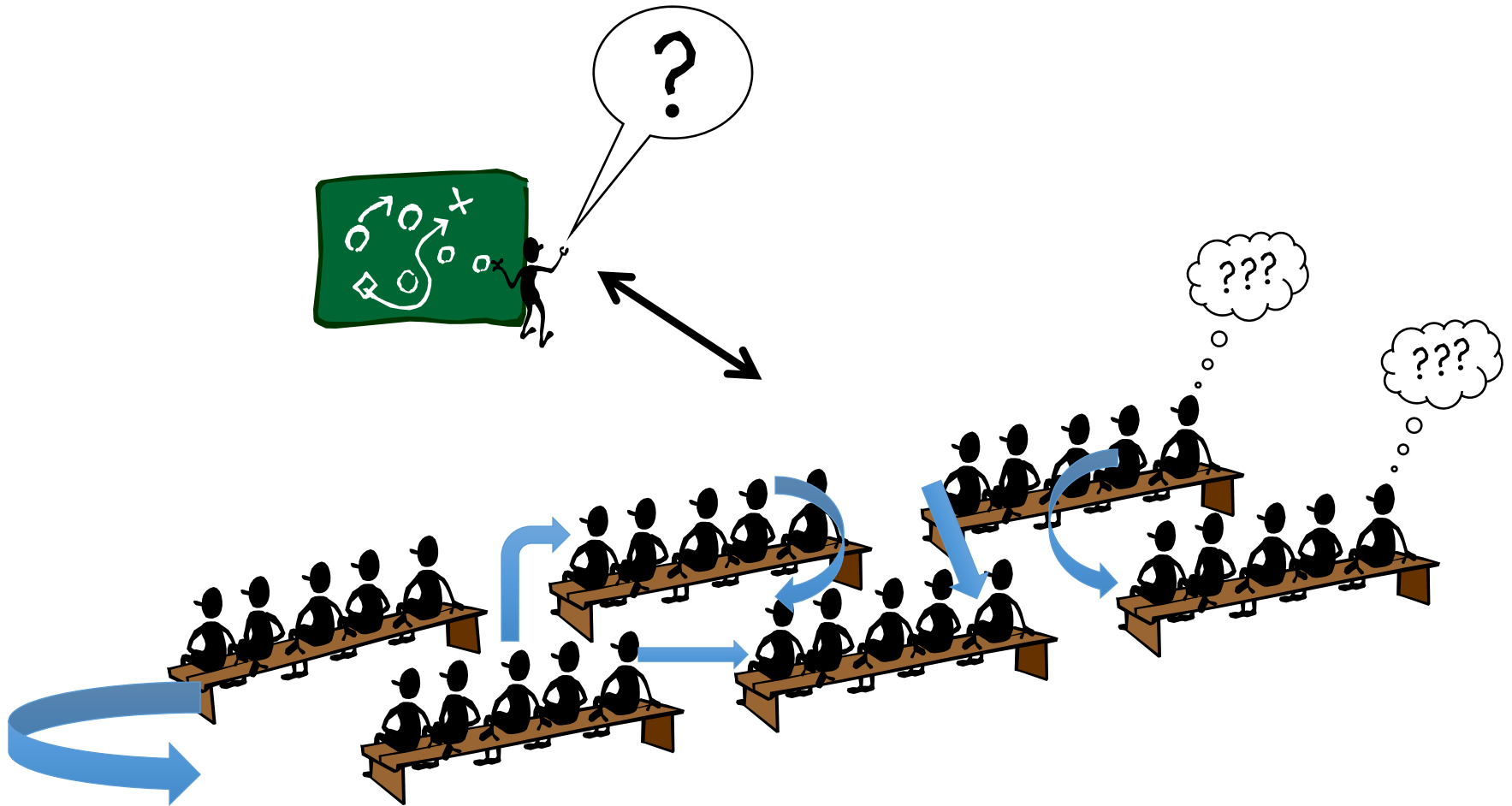
ALL WITH JUST ONE TEACHER!







JITT: Addressing the RAT Qs

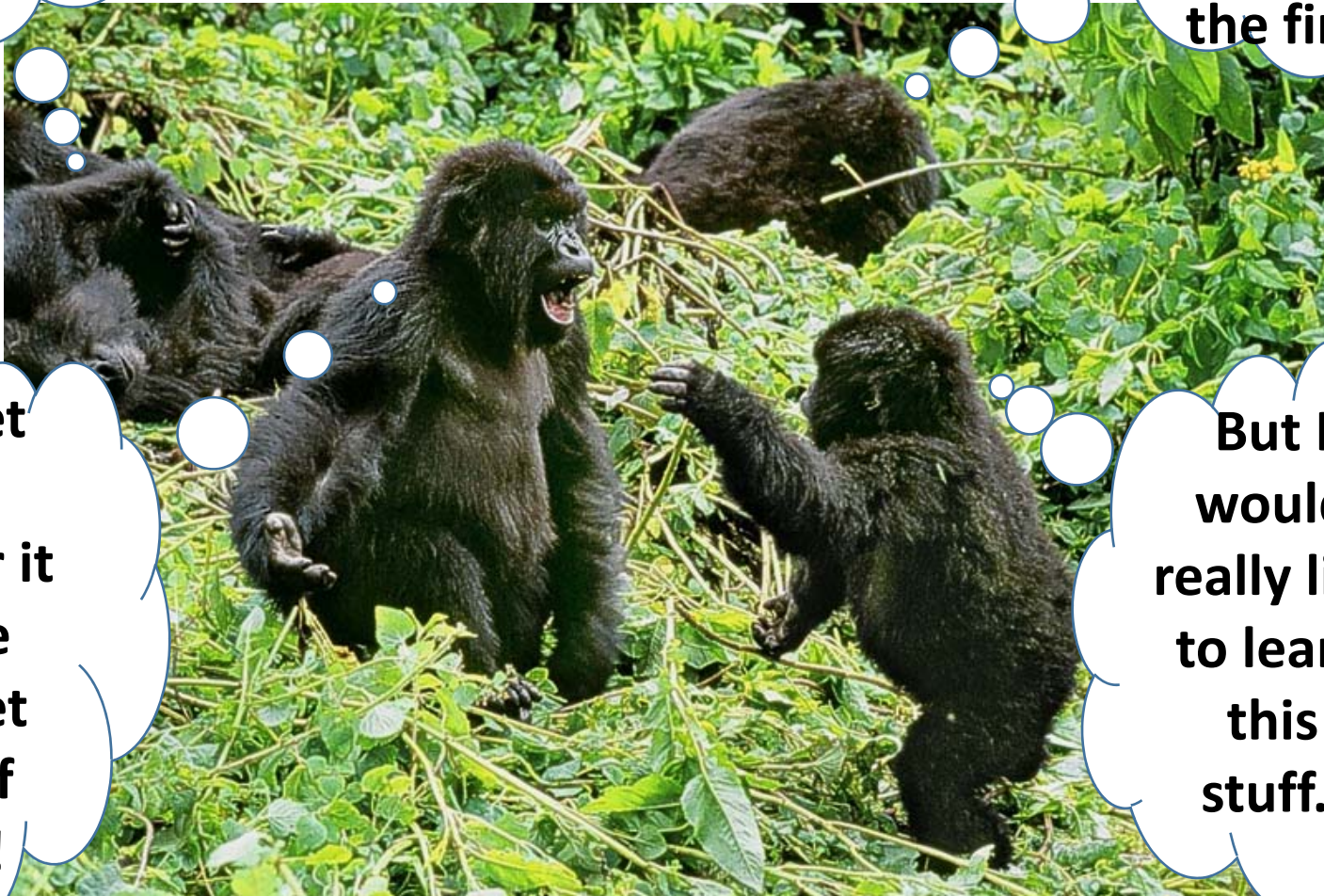


The Goal of Application Exercises:  
Students engaging with Students

# Small Group Learning

**Why don't  
they ever  
listen to  
me?**

**I'm not  
doing  
anything  
for this  
class until  
the final**



**Just let  
me  
answer it  
so we  
can get  
out of  
here!**

**But I  
would  
really like  
to learn  
this  
stuff..**

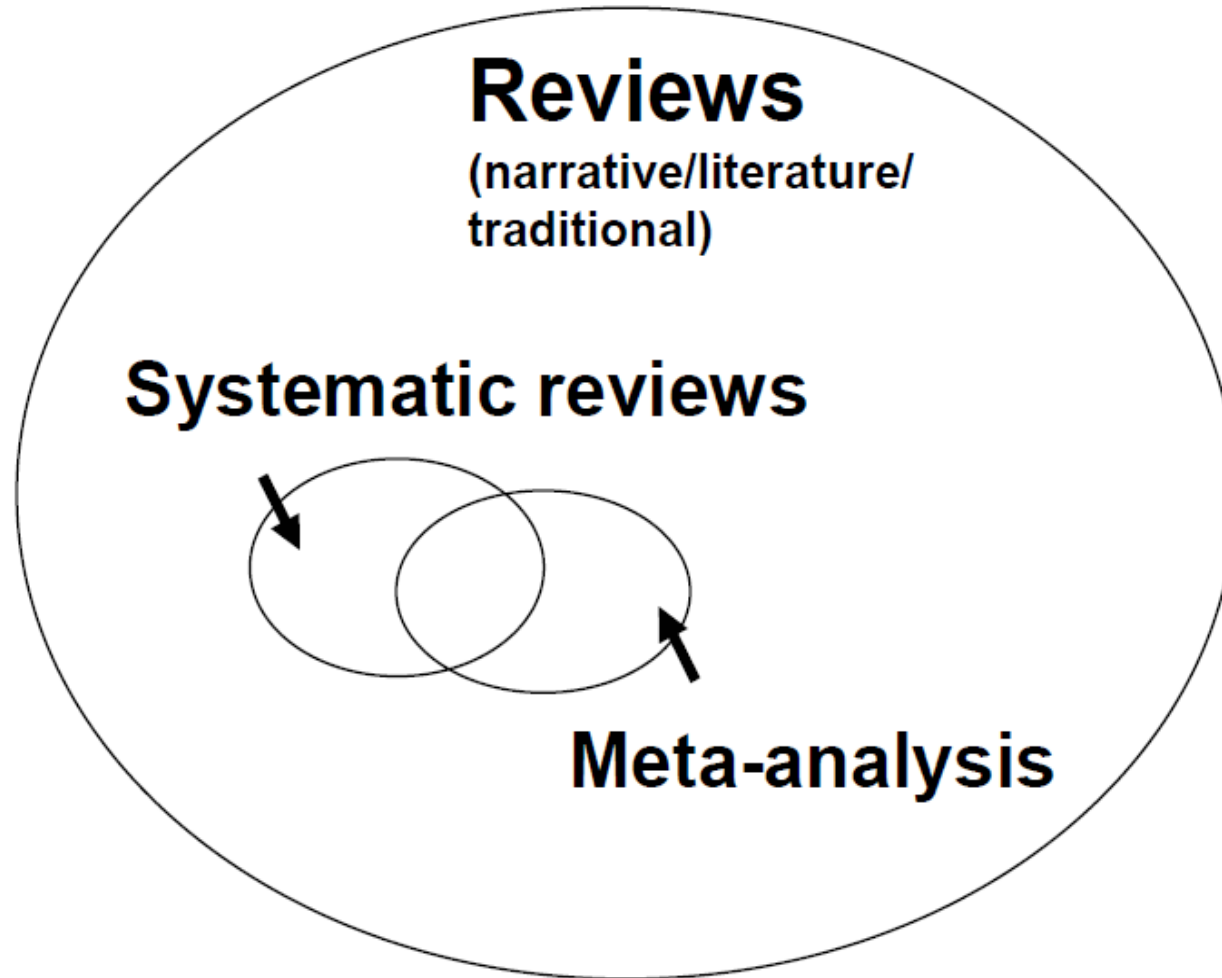
# Systematic Reviews & Appraising Today's Article

Types of review studies

The BEME series !

Framework for Appraisal of SR

# Types of Reviews



# The Best Evidence in Medical Education (BEME) Series of Systematic Reviews from AMEE/Medical Teacher

**SEPTEMBER 2013**

[Doctor Role Modelling in Medical Education](#)

**NOVEMBER 2013**

[A review of the literature regarding the effectiveness of interventions to promote successful adoption of Electronic Health Records in healthcare professionals](#)

**OCTOBER 2013**

[Impact of an Intercalated BSc on Medical Student Performance and Careers](#)

**DECEMBER 2013**

[The effectiveness of team-based learning on learning outcomes in health professions education: A Best Evidence in Medical Education Systematic Review](#)

- Methodology based on Cochrane principles  
available at: [www.bemecollaboration.org](http://www.bemecollaboration.org)
- Different than AMEE Guides=practical reviews



# Today's Article

WEB PAPER  
BEME GUIDE

## The effectiveness of team-based learning on learning outcomes in health professions education: BEME Guide No. 30

MIM FATMI, LISA HARTLING, TRACEY HILLIER, SANDRA CAMPBELL & ANNA E. OSWALD  
University of Alberta, Edmonton, Canada

### Abstract

**Background:** Team-Based Learning (TBL) is a student-centred active learning method, requiring less faculty time than other active learning methods. While TBL may have pedagogical value, individual studies present inconsistent findings. The aim of this systematic review was to assess the effectiveness of TBL on improving learning outcomes in health professions education.

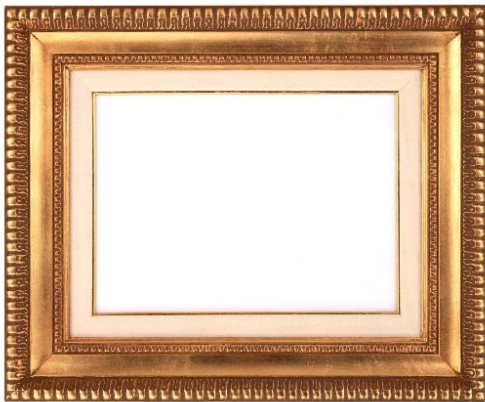
**Methods:** A peer-reviewed systematic review protocol was registered with the Best Evidence in Medical Education (BEME) organization. After comprehensive literature searching, title and full-text review were completed by two independent reviewers. Included studies assessed TBL and a valid comparator in health professions. Included studies were assessed for methodological quality by two independent reviewers. Studies were categorised by outcomes using the Kirkpatrick framework.

**Results:** Of 330 screened titles, 14 were included. Seven studies reported significant increase in knowledge scores for the TBL group, four reported no difference and three showed improvement but did not comment on statistical significance. Only one study reported significant improvement in learner reaction for the TBL group while another study reported a significant difference favouring the comparator.

**Conclusions:** Despite improvement in knowledge scores, there was mixed learner reaction. This may reflect the increased demands on learners in this student-centred teaching strategy, although further study is needed.

# Critical Appraisal of a Systematic Review with Fs

**Frame**



**Fetch**



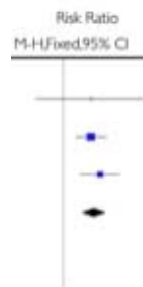
**Filter**



**Findings**



**Forest**



**Funding**





# FRAME

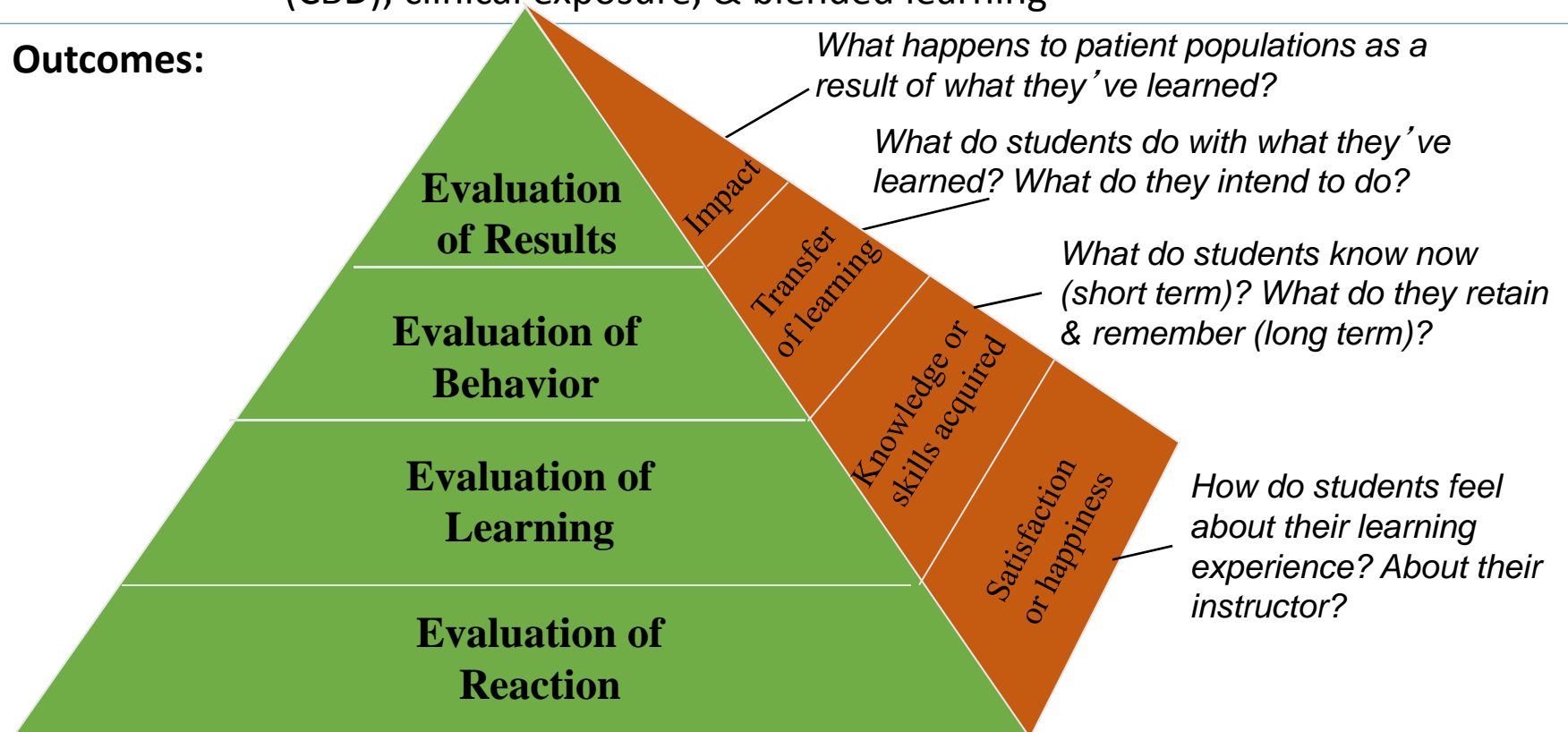
In comparison to other forms of education instruction... “Is TBL effective in improving learning outcomes in health professions education?”

**Population:** Health Professions Students

**Intervention:** TBL

**Comparator:** Lectures, workshops, small-group learning (SGL), case-based discussions (CBD), clinical exposure, & blended learning

**Outcomes:**



## FRAME

In comparison to other forms of education instruction.... “Is TBL effective in improving learning outcomes in health professions education?”



## FETCH

- Databases searched:
  - 5 health-related databases
  - 6 general databases
- Detailed search term list and strategy for each type of database
- Cited reference search
- Search for unpublished, recently published, or ongoing studies



## FILTER 1

Screening & Selection:

- Titles and abstracts screened by 2 reviewers
- Detailed inclusion/exclusion criteria used to eliminate irrelevant studies
- Full-text review then conducted



## FILTER 2

Assessment of Methodological Quality by 2 independent reviewers:

- Cochrane Risk of Bias tool used for controlled trials
- Newcastle-Ottawa Scale used for cohort studies



***BELIEVABLE ENOUGH TO LOOK AT THE RESULTS?***

What did the reviewers learn?

# Framing&Filtering1

336 studies identified –

> 14 studies included > 6 UME

- 1 RCT
- 1 NRCT
- 1 retrospective cohort study
- 3 non-concurrent cohort studies

# Framing&Filtering2

RCTs and NRCTs (3 studies) all at “high risk” of bias

no reporting of allocation concealment-3

non-randomized assignment-2

no blinding of participants-3

no or unreported blinding of outcome

assessors and/or data analysts-3

# Framing&Filtering2

Cohort studies: all 5 UME studies “fair”

retention/completeness of f/u – 4

representativeness of exposed cohort-2

# Summary Findings Across HPE



# Learning

(see table 5)

- Knowledge as assessed via MCQ, mixed between no difference and favoring TBL, with weight toward latter
- Comparator did not matter overall, but only RCT found no difference between TBL and CBGD

# Student Reaction

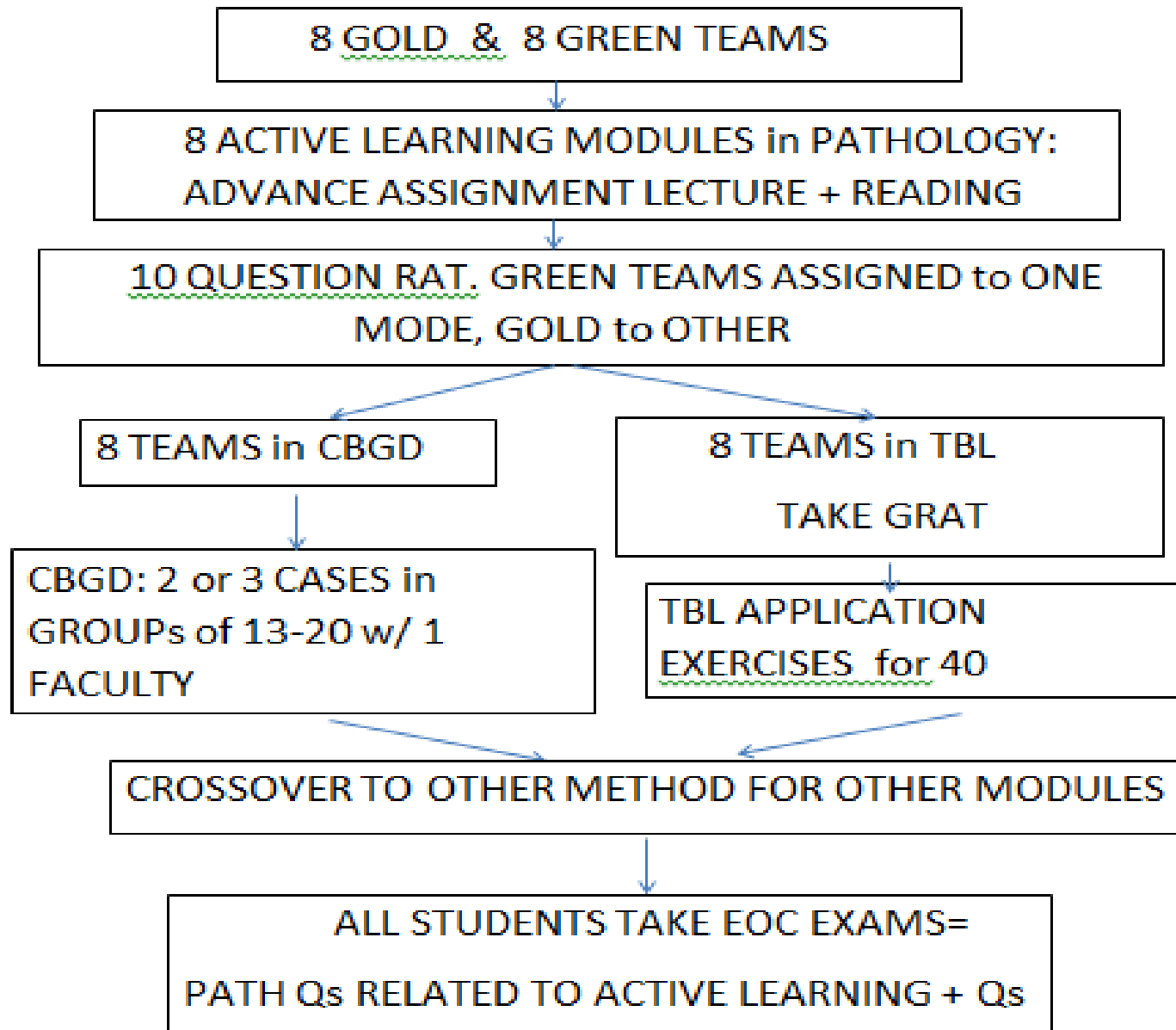
(see table 5)

- 7 studies reporting
- Comparator did not matter

Study Type	ID	Course	Summary of Findings
RCT: 83 M2s	Koles et al. 2005 Wright State	Pathology	No significant differences in exam scores were found between TBL session Qs and <b>CBGD</b> Qs.
NRCT: 167 M2s Assignment by last name	Willett et al. 2011 NJSMD	Pathophys Endo/rheu m module 6 sessions	Significant difference between the exam scores of TBL and <b>SGL</b> groups favoring TBL (81.7% vs. 79.7%, p=0.04). After adjusting for performance on non-TBL modules (prior coursework), no significant difference was reported.
NRCT: 112 M3s	Thomas 2011: Hopkins	Ambulator medicine modules	Significant difference favoring TBL over <b>SGL</b> of 4% in first three modules and then 12% in second three modules.
Retrospectiv Cohort: 178 M2s	Koles et al. 2010 Wright State	Pathology within OSMs	TBL-related Qs answered correctly on average 5.9% more often than than TBL-unrelated Qs ( <b>mixed learning</b> ). Within the lowest academic quartile, TBL-related Qs were answered correctly more often than in the highest academic quartile (7.9% vs. 3.8%, p=0.001).

Study Type	Name/Year	Course	Summary of Findings
Non-concurrent Cohort	Levine et al. 2004 173 lecture 133 TBL	Psychiatry Clerkship M3s	Significant increase in NBME psychiatry subject exam scores between the TBL cohort and <b>lecture cohort</b> (72.9% vs. 69.6%, $p < 0.05$ ).
	Nieder et al. 2005 N=95 M1s TBL N=276 M1s no TB	Anatomy M1s	No difference in average scores between groups. Significant decrease in number of exam failures after the implementation of TBL compared to the <b>lecture</b> group (1 vs. 6, $p < 0.001$ ).
	Zgheib et al. 2010 N=???	Pharm 2 sessions only M2s	Student performance on exams improved significantly in the module in which TBL was implemented compared to <b>the lecture</b> groups one and two years prior (75% vs. 58% and 47%, respectively, $p = 0.03$ ).

# Koles, RCT 2005



# Koles Retrospective Cohort, 2010

Table 3

**Comparison of the Performance of 178 Second-Year Medical Students on Pathology-Based Exam Questions (PBQs), Boonshoft School of Medicine, 2003–2005\***

Group of PBQs	No. of questions	DI: Mean (SD)	Score		P value <sup>†</sup>
			Mean % (SD)	Range %	
<b>All CCEs</b>					
TR	243	0.20 (0.12)	83.6 (6.1)	64.0–96.1	<.001
TU	462	0.22 (0.13)	77.7 (6.9)	59.7–91.3	
<b>Term 1 CCEs</b>					
TR	127	0.20 (0.12)	82.3 (7.3)	59.7–98.5	<.001
TU	267	0.22 (0.14)	77.5 (7.2)	60.0–93.6	
<b>Term 2 CCEs</b>					
TR	116	0.20 (0.13)	85.0 (7.0)	51.9–100.0	<.001
TU	195	0.22 (0.13)	78.0 (7.7)	57.3–96.2	

\* CCE indicates comprehensive course examination; DI, discrimination index; TR, TBL-related PBQ; TU, TBL-unrelated PBQ.

<sup>†</sup> The P value compares TR versus TU scores.

# Koles Retrospective Cohort, 2010

Table 4

**Performance of Second-Year Medical Students in the Highest Academic Quartile (n = 45) Versus Those in the Lowest Academic Quartile (n = 45) on Pathology-Based Examination Questions (PBQs), Boonshoft School of Medicine, 2003–2005\***

Academic quartile and group of PBQ	Score on all exams		Difference in scores <sup>†</sup>	
	Mean % (SD)	Range %	Mean % (SD)	Range %
<b>Highest quartile</b>				
TR	89.3 (4.0)	80.6 to 96.1	3.8 (5.4) <sup>‡</sup>	–7.7 to 13.3
TU	85.5 (3.2)	78.8 to 91.3		
<b>Lowest quartile</b>				
TR	77.5 (5.8)	64.0 to 86.8	7.9 (6.0) <sup>‡</sup>	–5.1 to 20.6
TU	69.6 (4.5)	59.7 to 77.5		

\* TBL, team-based learning; TR, TBL-related PBQ; TU, TBL-unrelated PBQ.

<sup>†</sup> TR versus TU scores.

<sup>‡</sup>  $P = .001$  for two-way ANOVA interaction comparing the difference in mean scores on TR and TU questions for highest- versus lowest-quartile students.

Source: Koles et al. The Impact of Team-based Learning on Medical Students' Academic Performance. Acad Med. 2010;85:1739–1745.

# Fewer Failures: Nieder et al, 2005

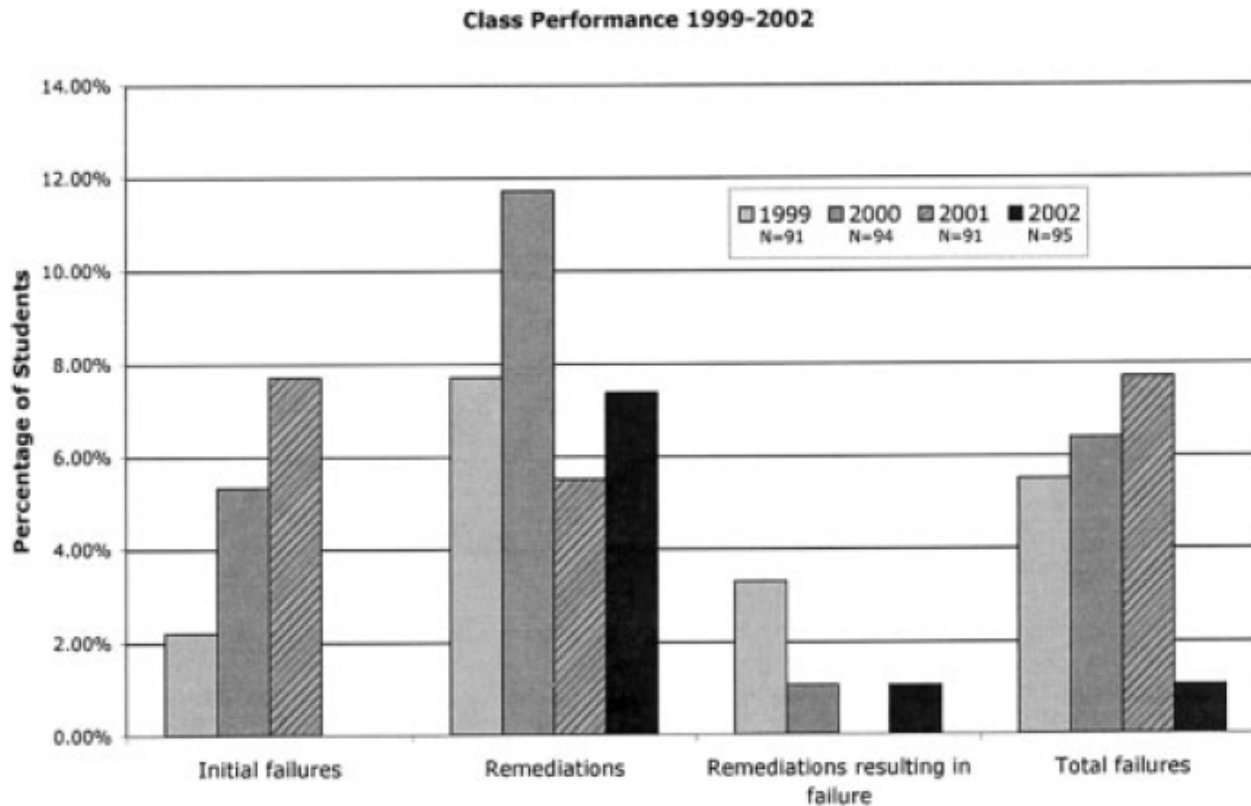
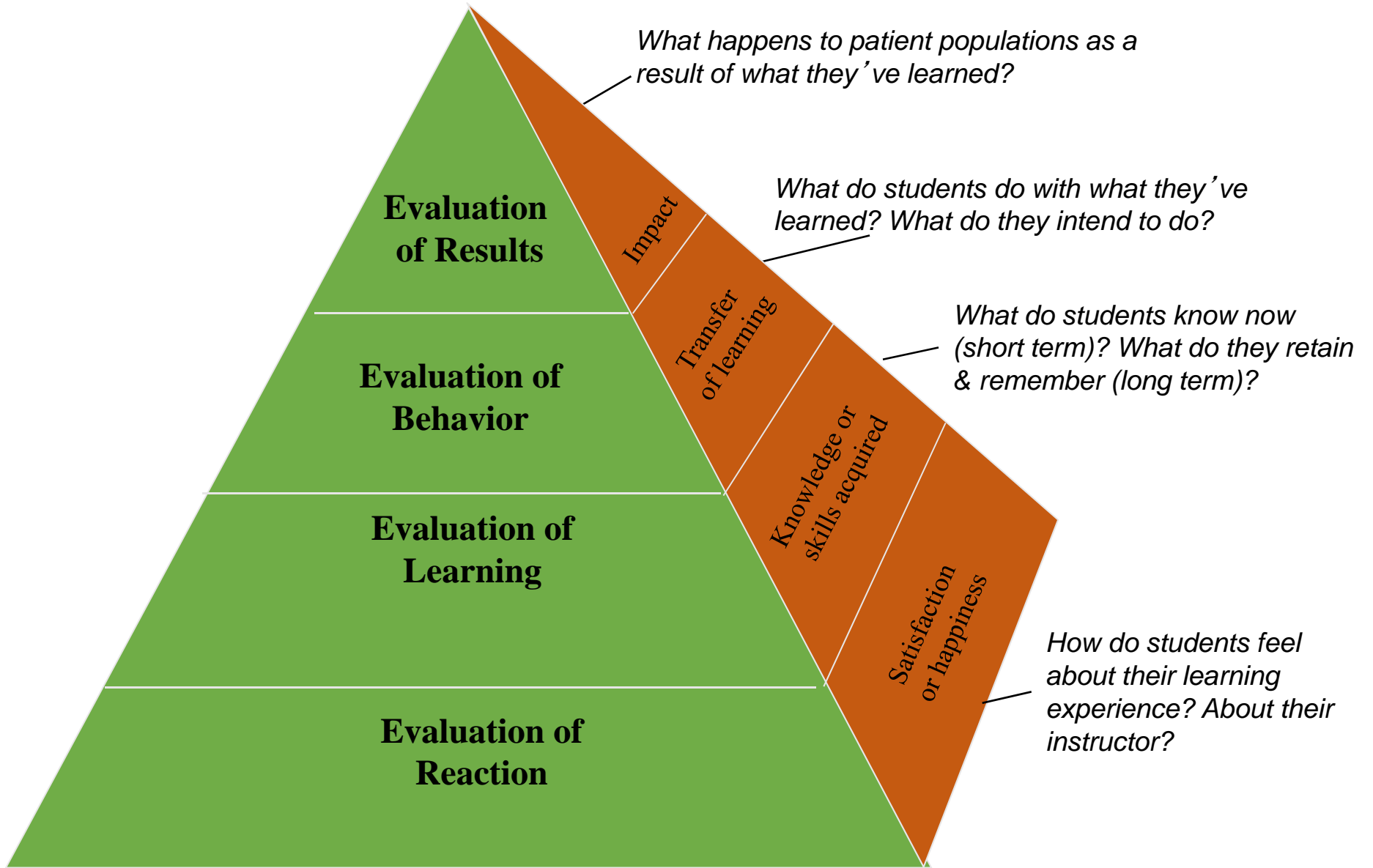


Fig. 1. Overall class performance in the Human Structure course in years 1999–2002. ‘Initial failures’ are those students achieving <60% average on major exams. ‘Remediations’ includes those students achieving an average  $\geq 60\%$  but <70%. ‘Remediation resulting in failure’ includes remediating students still not achieving 70% after the remediation retests. ‘Total failures’ are the sum of initial failures and failures after remediation. N = number of students in each class.



# Hmmmm.....

- Why validity of even MCQs, especially when the primary outcome, is seldom reported...., much less cognitive level of MCQ; and why are Ns missing?
- Why students aren't more enthusiastic....
- Can you really hold interventions assessing pedagogy to a standard of blinding students?
- The how and why of the elements of TBL
- How can research on TBL be designed to look at higher level Kirkpatrick outcomes?
- The faculty factor....& why TBL didn't trump lecture....



*What happens to patient populations as a result of what they've learned?*

**Evaluation of Results**

*Impact*

*What do students do with what they've learned? What do they intend to do?*

**Evaluation of Behavior**

*Transfer of learning*

*What do students know now (short term)? What do they retain & remember (long term)?*

**Evaluation of Learning**

*Knowledge or skills acquired*

*Satisfaction or happiness*

*How do students feel about their learning experience? About their instructor?*

**Evaluation of Reaction**

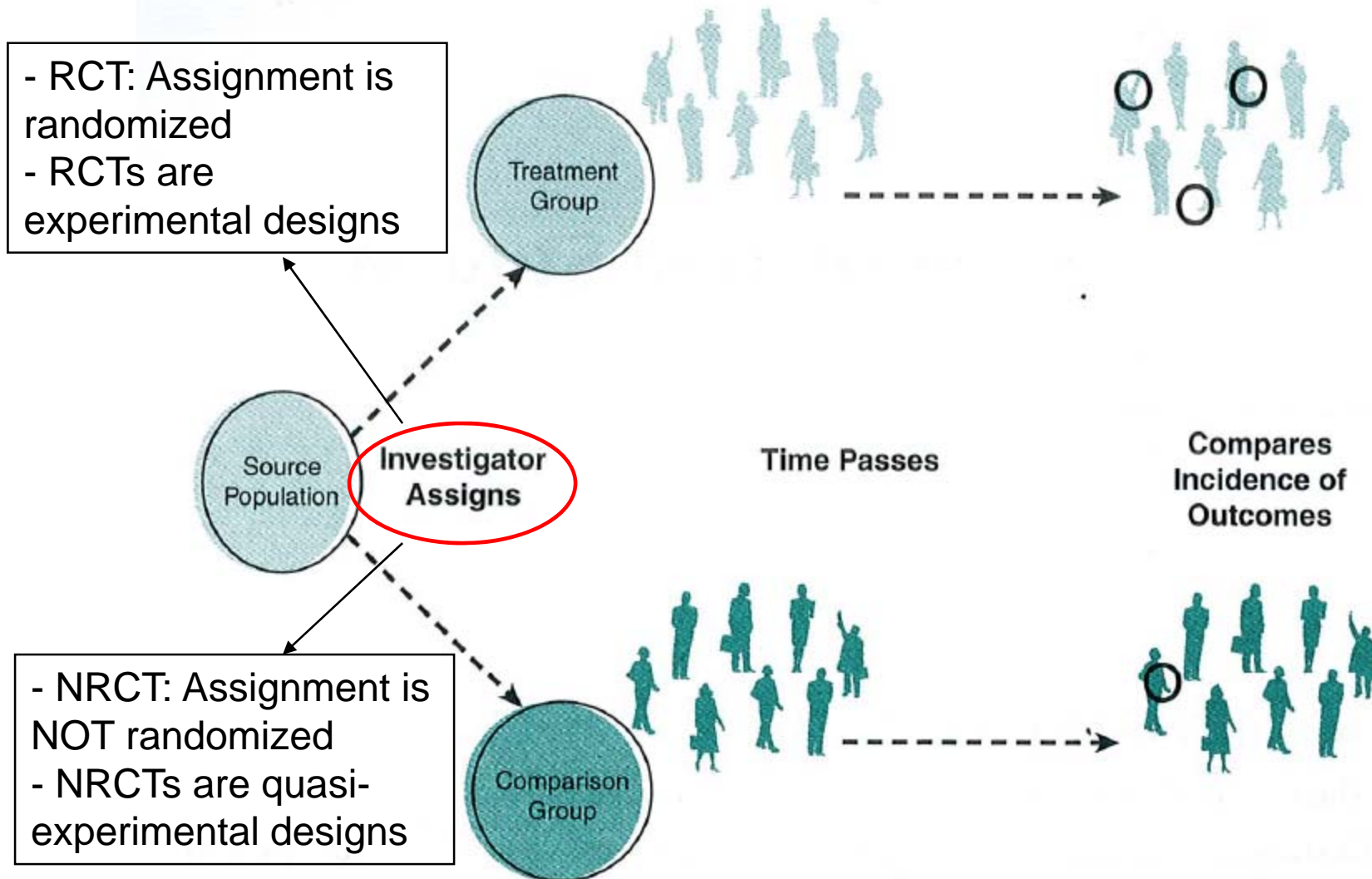
Questions, comments, and what about us?

Please complete the CME survey to receive credit for attendance.

- Two clerkship studies : Levine (3 point NBME performance) vs. lecture
- Thomas and bowen (Jhopkins) vs. sgl

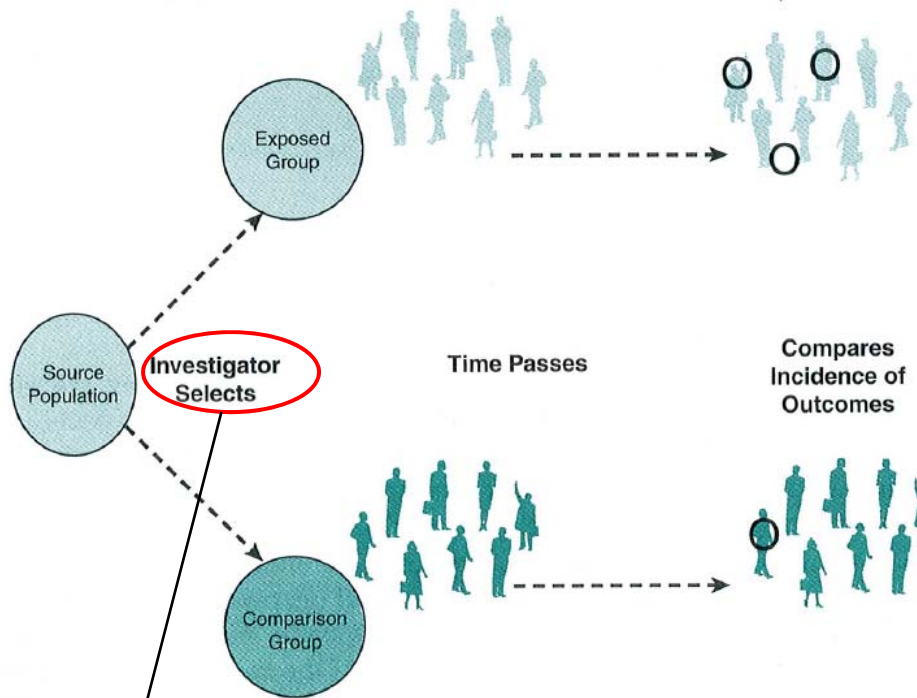
Non clerkship			
Koles 2005 RCT 83 m2s	Path/c bgd	No sig diff overall, better long term in lowerst quartile – LOOK UP	peer?
Koles 2010	Retro/ mixd	5.9% overall for TBL, lowest quartile data	
Nieder 2005	NCCle cture	No change av exam scores; reduced failure rate	Lectures used to deliver some
Zgheib			Used in only two sessions
Thomas&B 2011			
Levine 2004			

# Study Design: RCTs & NRCTs



**FIGURE 7-1.** Schematic Representation of Experimental Study Implementation

# Study Design: Cohort Studies



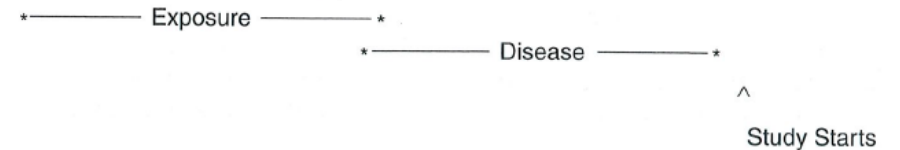
**FIGURE 8-1.** Schematic Representation of Cohort Study Implementation

Cohort studies are observational.

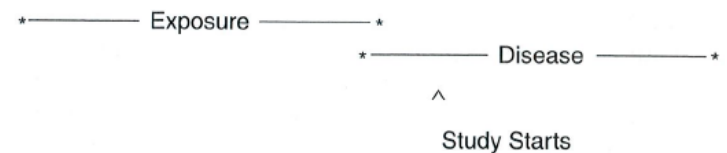
## Prospective Cohort Study



## Retrospective Cohort Study



## Ambidirectional Cohort Study



Time

**FIGURE 8-2.** Timing of Cohort Studies



# Findings: UME

Comparator	Name/Year	Course	Summary of Findings
Traditional Lecture	Levine et al. 2004	Psychiatry	Significant increase in NBME psychiatry subject exam scores between the TBL cohort and lecture cohort (72.9% vs. 69.6%, $p < 0.05$ ).
	Nieder et al. 2005	Anatomy	No difference in average scores; less variation in scores. There was a significant decrease in the number of exam failures after the implementation of TBL compared to the lecture group (1 vs. 6, $p < 0.001$ ).
Blended Learning	Koles et al. 2010	Pathology	TBL-related questions were answered correctly an average of 5.9% more often than than TBL-unrelated questions. Within the lowest academic quartile, TBL-related questions were answered correctly more often than in the highest academic quartile (7.9% vs. 3.8%, $p = 0.001$ ).