TEAM-BASED LEARNING IN ECONOMICS

- Simkins, Ruder, and Maier: Getting the Incentives Right: Learning Science and Team-Based Learning in Economics
- Green: TBL Fridays: Using Policy Applications for Effective Team-Based Learning in an Introductory Class
- Clerici-Arias: Underrepresented Groups in the Economics Major: The Impact of Using Team-Based Learning in the Principles Course
- Silz-Carson: Results of a Multi-Site Evaluation of Team-Based Learning

Allied Social Science Associations Meetings | January 4, 2020
ASSA 2020 Presentation materials: **https://bit.ly/2tfFjIS**

North Carolina Agricultural and Technical State University
Glendale Community College
Pacific University Oregon

Supported by NSF Grant
DUE 1712295

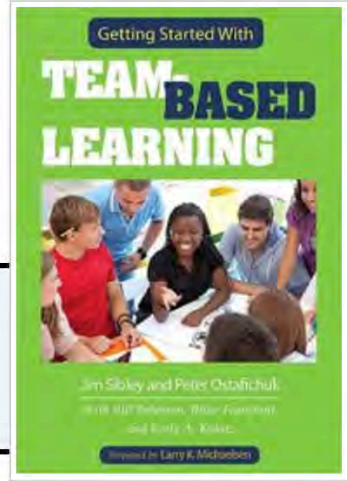
NSF

TEAM-BASED LEARNING (TBL) OVERVIEW

What is Team-Based Learning?

Team-Based Learning (TBL) is a highly structured, evidence-based small group instructional strategy designed around a sequence of learning modules, each incorporating a "readiness assurance process" (RAP) followed by a series of classroom-based "application activities" (AEs) requiring teams to make specific choices and report out solutions to relevant, significant problems. A TBL-based course typically includes 5-7 TBL modules, each 1-2 weeks in length, developed around important course concepts and student learning outcomes.

> At its core, team-based learning (TBL) is about intentional course design aimed at improving student learning through the systematic use of student teams interacting regularly in structured learning activities. As Jim Sibley, one of the leading TBL advocates, notes, TBL is a "coherent framework for building an entire course experience."



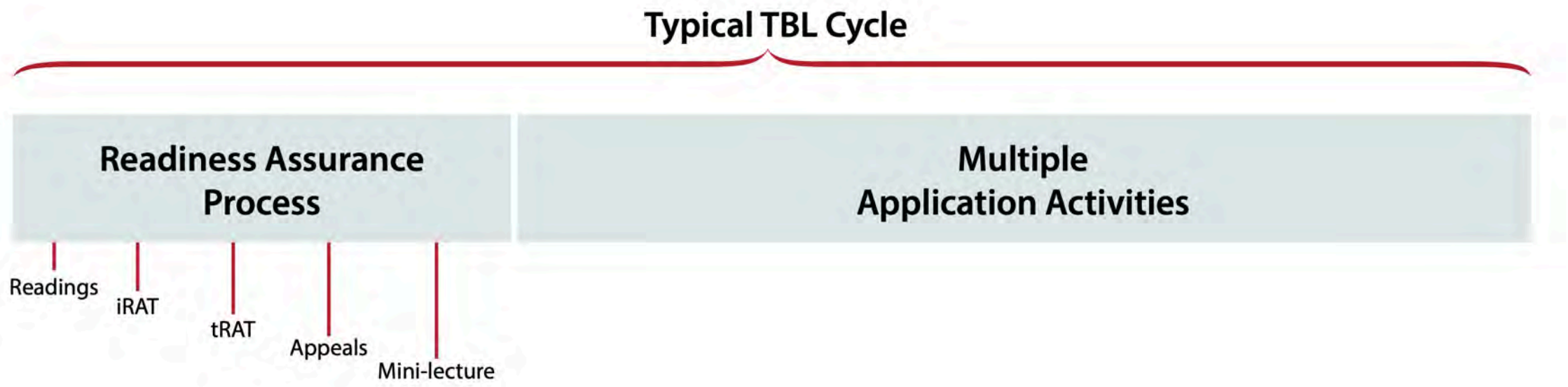
Getting Started with TBL Book Cover

Valuable Resources for Getting Started with TBL:

- Getting Started with Team-Based Learning (Stylus, 2014), by Jim Sibley and Peter Ostafichuk, provides a pragmatic, instructor-focused introduction to Team-Based Learning (TBL). The book not only provides an overview of TBL, but lays out the "nuts and bolts" of implementing TBL in your courses. Much of the content below is derived from this book.
- The LearnTBL website, developed and maintained by Jim Sibley, a generous TBL expert and highly-respected faculty developer at the University of British Columbia, provides a wealth of *free* TBL resources, including in-depth step-by-step instructions on building an entire TBL course. Many of the illustrations and ideas used here come from Jim's work and are used with his permission.

▶ Show The Origins of TBL

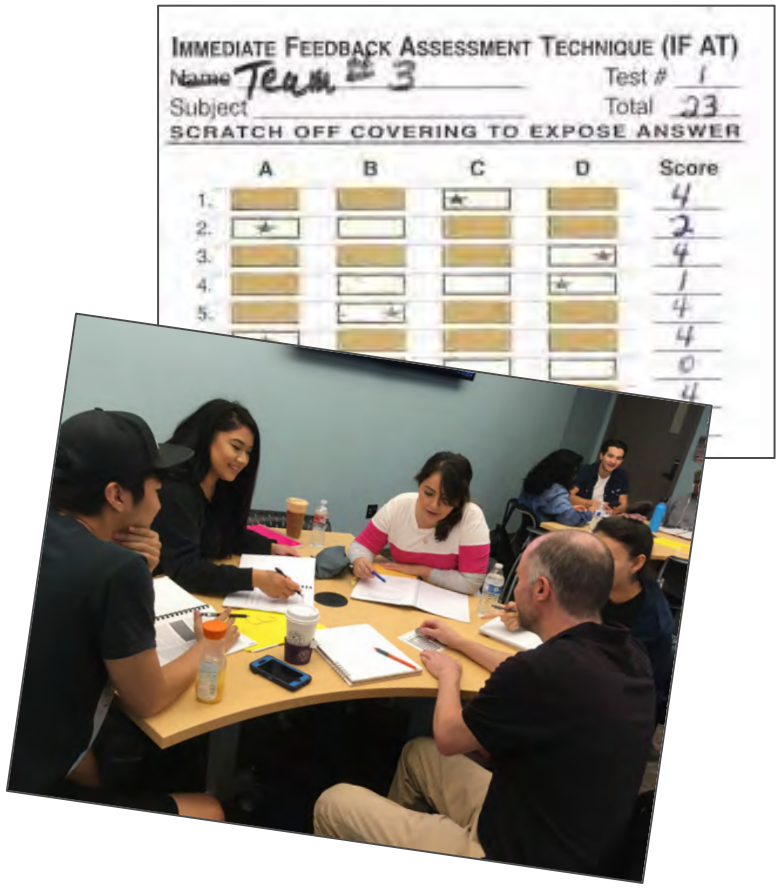
THE TEAM-BASED LEARNING FRAMEWORK



Source: Sibley and Spiridonoff (2014); used with permission.
https://learntbl.ca/wp-content/uploads/2014/06/TBL-handout_February_2014_lettersize.pdf

STEP 1: READINESS ASSURANCE PROCESS

- Begins with out-of-class preparation – reading, video, etc. (+ JiTT questions, possibly)
- Individual quiz with no feedback (online or in class) – iRAT
- In-class team-based quiz, same quiz as iRAT, using IF-AT forms
- Incentive-based scoring (tRAT and overall RAT score)
- Follow up with mini-lecture



RAT QUIZ QUESTION EXAMPLE

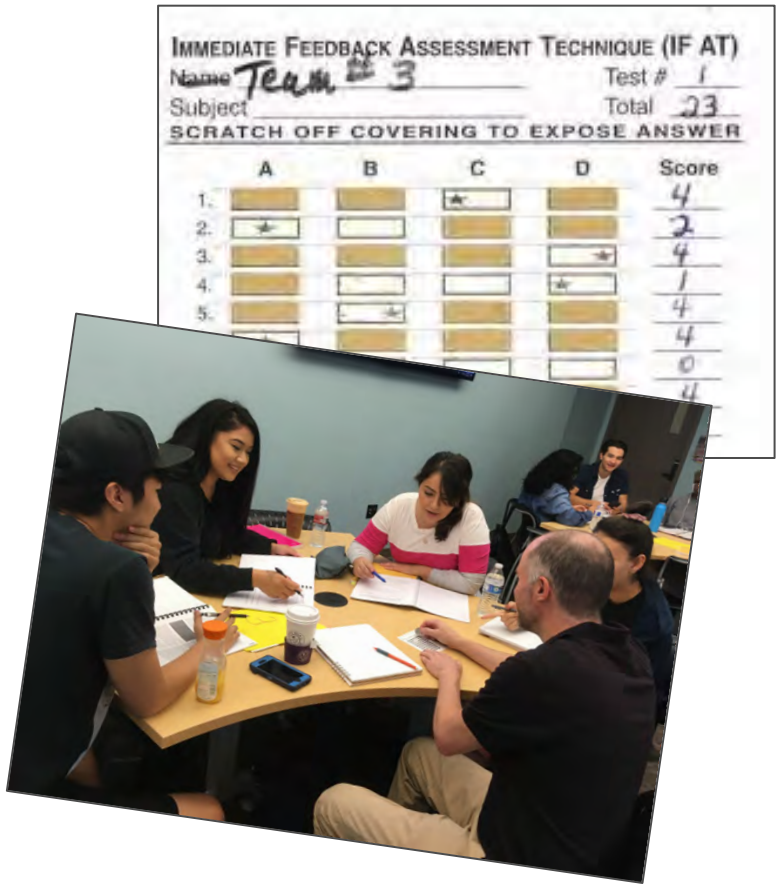
Compared to a fixed percentage reduction (command and control) regulation, a tax on pollution encourages:

a. firms that can more cheaply reduce pollution to make larger reductions.

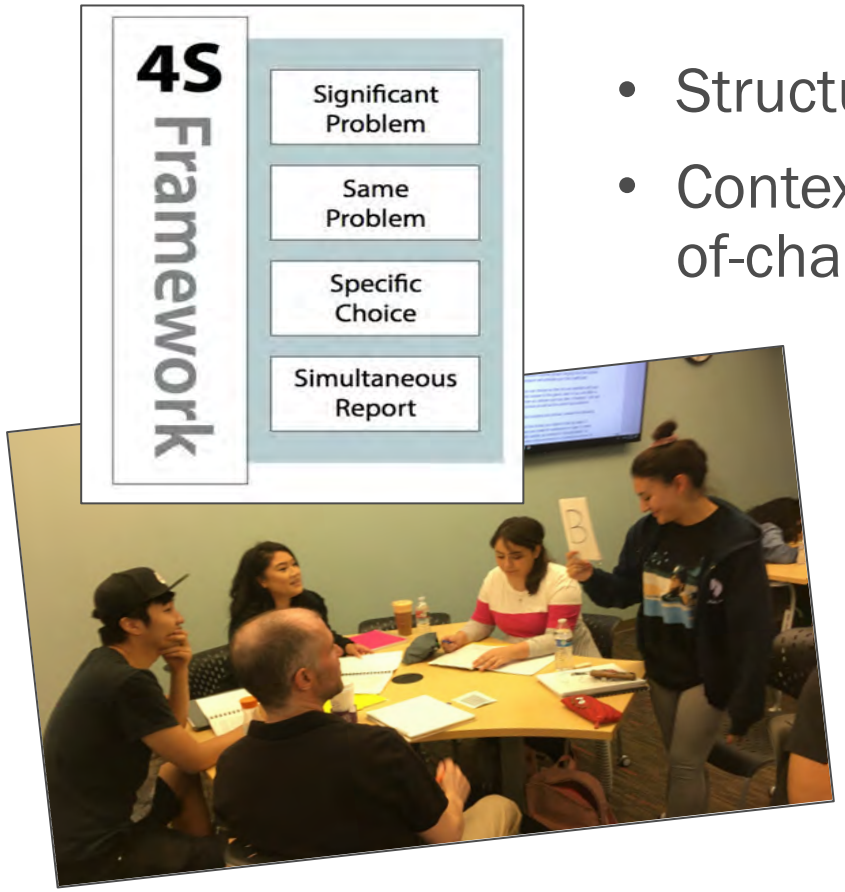
b. firms to reduce pollution by the same percent.

c. firms to use the same technology to reduce pollution.

d. big firms to make larger reductions because they can more easily afford it.



STEP 2: APPLICATION EXERCISES



- Structured around 4S Framework
- Context-rich problems that are different than typical "end-of-chapter" problems
  - Students select from among a limited number of choices
  - All team members need to be ready to explain the reasoning behind their choice
  - Learning from the teams' cross-talk after displaying team selections

Water Pollution and Drinking Water in Des Moines, IA

Consider the issue of nitrate pollution by farms in Iowa fouling the Raccoon and Des Moines Rivers, the sources of drinking water for the City of Des Moines, IA.

What policy measure should be enacted to remedy the problem?

A. Require substantial reductions in nitrate use of all farms.

B. Tax each ton of nitrate applied to farmland.

C. Assign property rights over the river water clearly to the City of Des Moines.

D. Assign property rights over the river water clearly to farmers.

(*Note: student reporters should be prepared with the appropriate analysis of this issue using the basic externality framework for this case in their notes*.)

Starting Point TBL AE Library

Starting Point:
Teaching and Learning Economics

- Starting Point: Teaching and Learning Economics
  - Teaching Methods
  - Classroom Experiments
  - Classroom Response Systems
  - Context-Rich Problems
  - Cooperative Learning
  - Documented Problem Solving
  - Interactive Lecture Demonstrations
  - Interactive Lectures
  - Interdisciplinary Approaches to Teaching
  - Just in Time Teaching
  - Quantitative Writing
  - Service Learning
  - Teaching with Simulations
  - Teaching with Spreadsheets
  - Teaching with the Case Method
  - Team-Based Learning
    - What is Team-Based Learning?
    - Why Use Team-Based Learning?
    - How to Use Team-Based Learning
    - Application Exercises
    - Application Exercise Submission Form

Application Exercises

search

Help

Results 1 - 10 of **123 matches**

Refine the Results↓

Economics Topics

Microeconomic Topics 69 matches
Macroeconomic Topics 38 matches
Additional Topics 39 matches

Price Discrimination

Siny Joseph, Kansas State University

Students will read a WSJ article prior to class and be able to identify and distinguish types of price discrimination.

Economics Topics: Additional Topics:Discrimination

Fiscal Policy

Siny Joseph, Kansas State University

Students will be able to evaluate the implications of government spending versus tax cuts to shift the AD curve in response to the 2007-2009 recession.

Economics Topics: Macroeconomic Topics:Fiscal policy

Price Controls

Siny Joseph, Kansas State University

Students will answer questions related to a Planet Money podcast "Big Government Cheese" and reinforce their understanding of implications of price controls and market outcomes.

Economics Topics: Additional Topics:Other

Taxes

GETTING THE INCENTIVES RIGHT: LEARNING SCIENCE AND TEAM-BASED LEARNING IN ECONOMICS

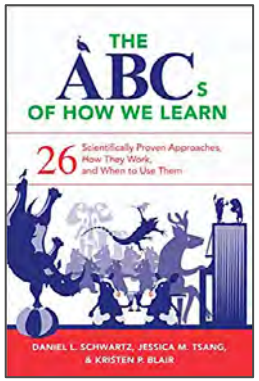
- Scott Simkins, North Carolina A&T State University
- Mark Maier, Glendale Community College
- Phil Ruder, Pacific University

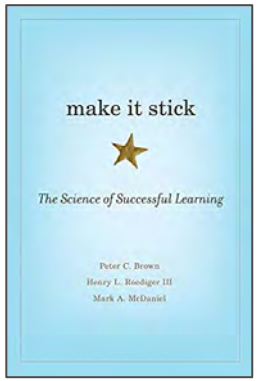
Allied Social Sciences Associations Meetings
January 4, 2020

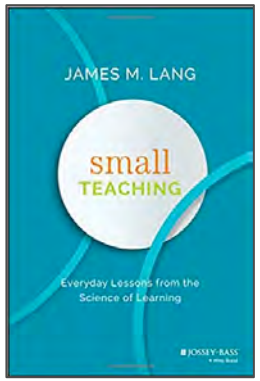
Supported by NSF Grant
DUE 1712295

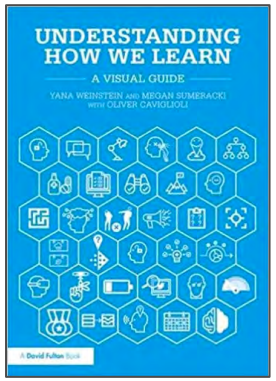
LEARNING SCIENCES RESEARCH & TEACHING/LEARNING

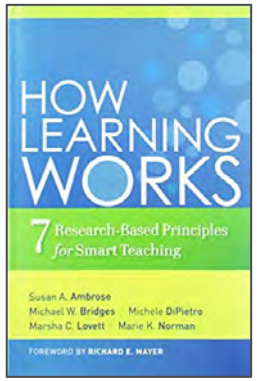
- *How People Learn,* 2000 (learning with understanding)
- Scientific Approach to Teaching (applying science principles to teaching)
- *National Academies of Science*, 2012 & 2015 (discipline-based educ. research)
- Evidence-based Teaching Resources

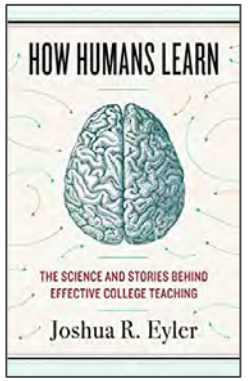


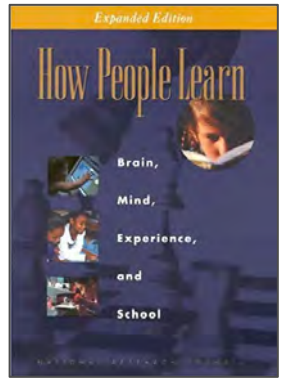












INCENTIVES FOR LEARNING

HOW DOES TBL INCENTIVIZE LEARNING?

- RA Process
  - tRATs facilitate team cohesion
  - Promotes preparedness and accountability to team – points are on the line
- 4S AE Framework
  - **Significant Question** - Promoting relevance and value of course material via application in specific contexts; intrinsically interesting
  - **Same Problem** – Tightly constrains team discussions; teams motivated to compare/defend their thinking with others
  - **Single Choice** – Focus team thinking on a single choice, backed by evidence (e.g. policy action)
  - **Simultaneous Report** – Accountability for team answer, focused feedback from other teams
- At each step, TBL promotes expert-like thinking, engagement and accountability

WHY TBL IN ECONOMICS?

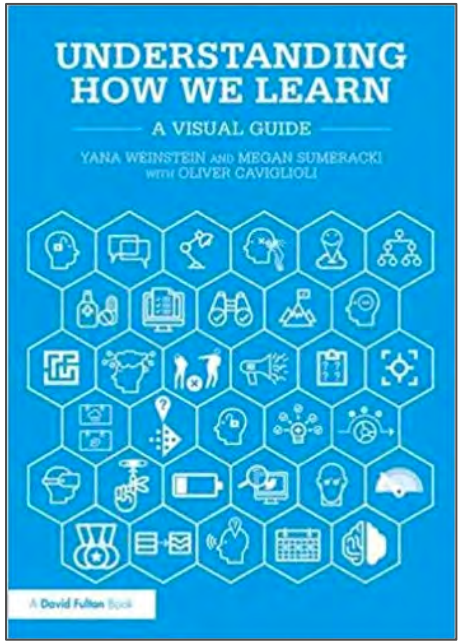
WHY TBL IN ECONOMICS?

- "Limited Learning" with traditional methods (in economics and physics)
  - Evidence-based teaching increases learning: Boyle and Goffe (2018)
- Moving Students to Higher-Order Learning
  - Promoting "economic thinking skills"
  - Focus on conceptual learning
- Connecting Real-World Phenomena to Abstract Concepts/Models
- Pedagogy with Support from Learning Sciences Research
  - Intentional, systematic whole-course approach
  - Reinforces evidence-based practices throughout

LEARNING SCIENCES RESEARCH AND TEAM-BASED LEARNING

OVERVIEW

- TBL Promotes Six Key Learning Sciences-Related Strategies
  - Retrieval practice
  - Spaced/distributed practice
  - Elaboration
  - Use of concrete examples
  - A time for telling
  - Effective group work



KEY ELEMENTS OF TBL AND LEARNING SCIENCES PRINCIPLES

TBL Element	Learning Sciences Principles Involved
1. Readiness Assurance Process	
• iRAT quiz	Retrieval practice, spaced practice
• tRAT quiz	Retrieval practice, spaced practice, elaboration
• Team Appeals	Elaboration
• Mini-lecture	A time for telling
2. Application Exercises	Retrieval practice, spaced practice, concrete examples, elaboration
• AE Debriefing	A time for telling
3. Instructor-selected fixed teams and formal peer evaluations	Promoting effective group work; reinforces and enhances the effect on student learning of each TBL element

RETRIEVAL PRACTICE

- Repeated Testing of Memory – Key Elements
  - Spacing of testing
  - Desirable difficulties (cognitive effort)
  - Immediate feedback
- TBL Implementation (cycles of effortful retrieval w/feedback and accountability)
  - Unique: TBL builds in methods for holding students *accountable* for retrieval
    - Readiness Assurance Process (RAP): iRATs, tRATs (basic knowledge)
    - AEs: ”Transforming abstract understanding into applied reasoning and evidence” (Roberson and Sibley, 2019) for reporting/discussion (testing) process (understanding)

SPACED/DISTRIBUTED PRACTICE

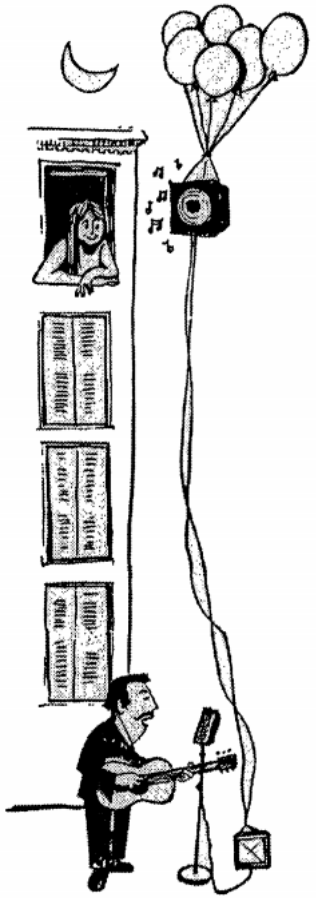
- Spaced vs. Massed Practice (implications for long-term learning)
- TBL Implementation (spacing, spiraling)
  - TBL structure spaces out encoding/retrieval process throughout each module and across modules
  - Moving to conceptually more challenging levels of learning (retrieval, elaboration) throughout a module

ELABORATION/CONCRETE EXAMPLES

- Promotes Understanding (deep learning) and Transfer
- Connecting New Information to Pre-existing Knowledge
- Asking ”How” and “Why” Questions (deep vs. surface learning)
- TBL Implementation (“elaborative interrogation” via AEs)
  - Built around interesting concrete, real-world examples connected to abstract concepts and models
  - Teams need to answer “why” and “how” to support chosen answer
  - Increasingly complex AEs used across module

A TIME FOR TELLING

- Explore Topic via Active Learning First, *Then* Direct Instruction
- Develops Motivation and Engagement for Learning (greater attention)
- Also: Prediction Before Telling Improves Learning (Crouch, C., Fagen, A. P, Callan, J. P. & Mazur, E., 2004)
- TBL Implementation (AEs in particular)
  - Teams make predictions, discuss with other teams, followed by discussion among teams, and then direct instruction (mini-lecture)
  - Provide formative assessment on student understanding and learning gaps, which can be targeted in direct instruction



EFFECTIVE GROUP WORK

- Instructor-created Permanent Teams
  - Increase likelihood of diversity of skills and knowledge needed for effective teamwork
- Group-worthy Tasks
  - Promotes collective knowledge-building (whole > sum of individuals)
- Explanation to Peers
  - Promotes self-explanation and elaboration
  - Builds metacognition via immediate feedback
- TBL implementation (framing and accountability)
  - TBL frames/focuses these group discussions to promote learning for all students
  - **Peer feedback** (formative and summative) central to reduce free-rider issues

GETTING STARTED WITH TBL

WAYS TO GET STARTED

- Group Quizzes and IF-AT Forms
  - Easily incorporated in “traditional” classes
  - Motivates engagement and accountability for all team members
- Application Exercises
  - Can be effectively used in “traditional” classes
  - Context-rich problems that prompt higher-order learning
  - Starting Point AE Library reduces MC of using these (> 120 AEs, ready to use)
- Fixed, Instructor-Selected Teams
  - More likely to lead to diverse teams with complementary skills/knowledge
  - Semester-long teams promote effective teamwork in and out of class, especially with structured formative feedback and summative assessment

SUMMARY/FINAL THOUGHTS

KEY ELEMENTS OF TBL AND LEARNING SCIENCES PRINCIPLES

TBL Element	Learning Sciences Principles Involved
1. Readiness Assurance Process	
• iRAT quiz	Retrieval practice, spaced practice
• tRAT quiz	Retrieval practice, spaced practice, elaboration
• Team Appeals	Elaboration
• Mini-lecture	A time for telling
2. Application Exercises	Retrieval practice, spaced practice, concrete examples, elaboration
• AE Debriefing	A time for telling
3. Instructor-selected fixed teams and formal peer evaluations	Promoting effective group work; reinforces and enhances the effect on student learning of each TBL element

OUTSTANDING RESEARCH QUESTIONS

- Is whole-course adoption of TBL necessary?
- How to assess TBL impact on student learning?
  - Are AE's the key?
  - What about instructor effects?
- Additional assessment issues
  - Recall or transfer?
  - The role of concept inventories – for economics?