

# Flipping the Classroom: From Passive to Active



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# OUTLINE

What is active learning?

Components of the flipped class

Group exercise

Discussion different types of active learning/flipped classrooms

# Learning Objectives

- Describe the basic components of a flipped classroom.
- Discuss the rationale for “flipping classes”.
- List components of active learning methods.
- Describe the roles of the facilitators and students in flipped-classroom settings.

2 types of learning:  
Active and Passive

# 1. Passive: Students are fed information



# Lectures are class passive learning methods

“Teacher-centered”

- What this teacher does matters most

## 2. Active

- Classrooms in which students engage in an activity—“learn by doing”
  - Students are mentally and physically active
  - Seek out information
  - Reflect upon ideas

# Active Learning Classes are Student-centered

- What the students are doing matters most
- The focus is on learning, not teaching



# Focus on Learning

- Learning is **Constructed**
  - Learning is constructed through creation of mental models
  - Old-models replace new models
  - New ideas are linked to old mental models
- Learning is improved by students **learning together.**
  - Meta-analysis (Johnson et al.) <http://www.cooperation.org/what-is-cooperative-learning/>
  - Students talk together, articulate answers, ask and answer questions.
- Learning is facilitated by **methods involving error correction.**

# The Active Learning Movement in Science Education in the US

*Public understanding of science is appalling. The major contributor to society's stunning ignorance of science has been our educational system. The inability of students to appreciate the scope, meaning, and limitations of science reflects our conventional lecture-oriented curriculum with its emphasis on passive learning. The student's traditional role is that of a passive note-taker and regurgitator of factual information. What is urgently needed is an educational program in which students become interested in actively knowing, rather than passively believing.*

# The Active Learning Movement in Science Education in the US

1984 *“A Nation at Risk: the Imperative for Reform”*  
--the National Commission on Excellence in  
Education

1985 Association of American Medical Colleges  
called for significant reform in Medical Education

2003 National Research council called for change in  
undergraduate biology teaching

# Benefits of Active Learning

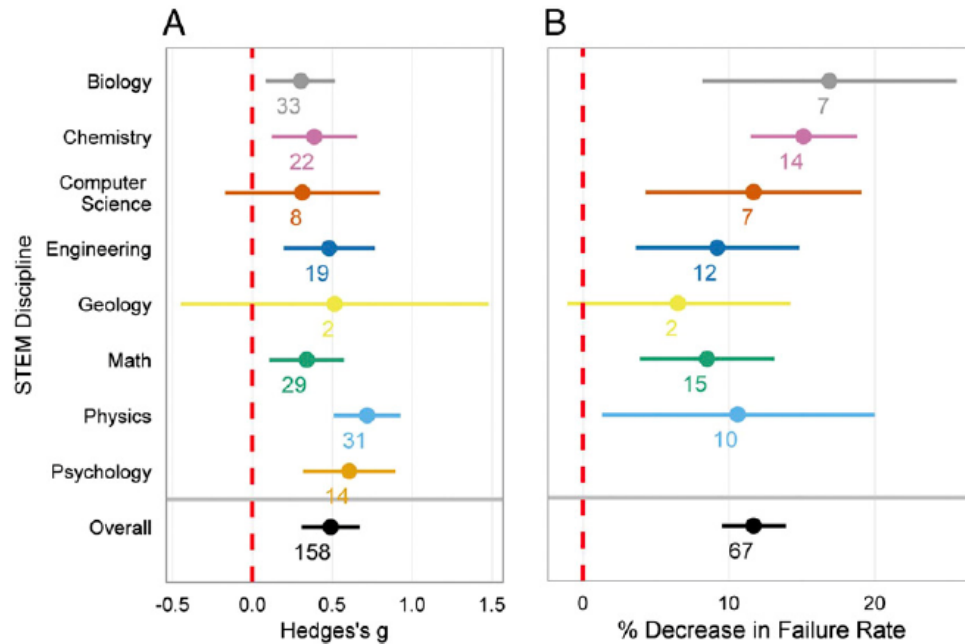


Fig. 2. Effect sizes by discipline. (A) Data on examination scores, concept inventories, or other assessments. (B) Data on failure rates. Numbers below data points indicate the number of independent studies; horizontal lines are 95% confidence intervals.

Failure RR= 1.5 in traditional classroom compared to active learning.

→ *Students in lecture classroom 1.5 times more likely to fail.*

Exam scores ↑ on average by 6%

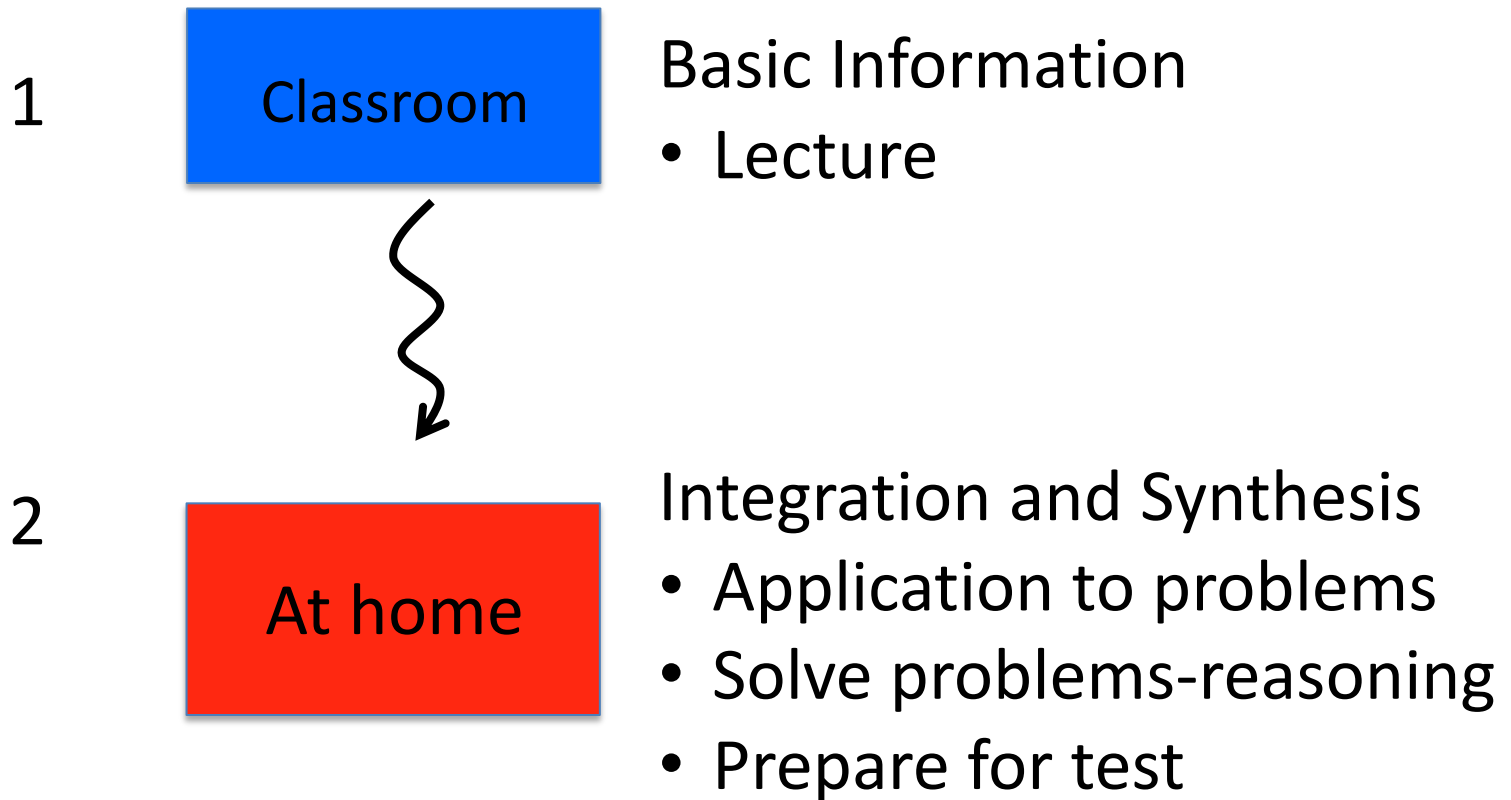
Conclusion is that students learn better with active learning

Freeman et al. Active Learning increases student performance in science, engineering and mathematics, *PNAS* 2014.

[www.pnas.org/cgi/doi/10.1073/pnas.1319030111](http://www.pnas.org/cgi/doi/10.1073/pnas.1319030111) (meta-analysis of 225 studies on undergraduate and high school STEM)

# The Flip to Active Learning

## Enables higher-order learning



# Flipped Classroom enables

- Opportunities to emphasize higher order learning in the classroom
  - Reasoning
  - Synthesis
  - Application
- Opportunities to develop
  - Good communication
  - Accountability
  - Team skills
- Lifelong learning skills

# Components of Flipped classrooms

1. Preparation
2. Pre-test readiness
3. In-class problem-solving with facilitation
4. Integration/resolution
5. Feedback

# Materials for Flipped Classrooms

1. Prepare materials and directions so students prepare adequately
2. Create Good activities
  - Challenging
  - Promote participation of students
3. Understand the role of a facilitator



# Types

- Team-based Learning (TBL)
- Jigsaw
- Problem-based Learning
- Just-in-time Teaching (JiTT)

# Group Exercise

- Create Groups

# Group Exercise

## **PART 1: Readiness Assurance Test: Individual (iRAT)**

Please take about 3 minutes to answer these questions.

Direction:

Do not read your information sheet.

Work individually.

Circle the best answer.

## **PART 2: Readiness Assurance Test: Team (tRAT)**

Directions:

Work with the other members of your group to answer the questions.

Do not read the information sheet

Scratch off the answers you think are correct. Correct answers are identified by a star. ONCE you get a correct answer-STOP.

*Grading:*

*1 scratch: 4 points*

*2 scratches: 2 points*

*3 scratches: 1 point*

**PART 3: Group Activity.** Answer these questions in the next 15 minutes. You can use the Insomnia paper. Raise up the blue sheet when you are ready.

# TEAM-BASED LEARNING: large group

- Pre-reading or previewing by students
- Students placed into teams
- Pre-testing (individual and team) Readiness Assurance tests (iRAT and tRAT)
- Clinically important cases with peer discussion and teaching
- Preceptor synthesis (mini-lecture or wrap-up of main points)

## Advantages:

Competition is fun

Can spend more time on more difficult problems

Fewer faculty needed—diversity of teaching not a problem

# Creating and Facilitating Small Groups: What do teachers need to know?

Pose challenging, clinically important cases/  
questions

Make clear rules/expectations and stick to them

Spend more time listening/observing than talking

Ask questions (and try not to answer them!)

Build a non-threatening learning environment

Enforce involvement and appropriate group  
interactions

Guide and synthesize discussion

Be familiar with learning objectives for session

Become comfortable with loss of complete control over  
the session

Use feedback

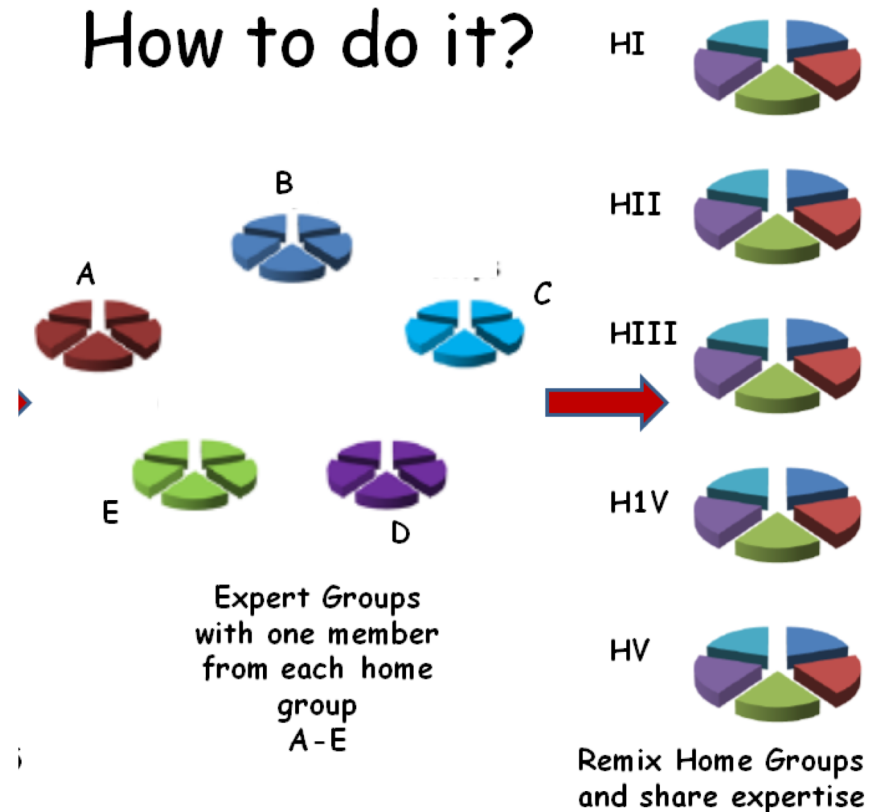
# WORKING IN TEAMS-what students need to know

1. Arrive on time
2. Be prepared
3. Work on reaching consensus
4. Be respectful
5. Disagree in an agreeable manner!
6. Provide references and resources to back your claims
7. Articulate and educate other members of the group
8. Ask for clarification if necessary

# JIGSAW: small group

- Pre-reading or previewing by students
- Pre-testing
- Small-group discussion of clinically important cases or skills
- Peer discussion and teaching
- Preceptor facilitation
- Preceptor synthesis

## How to do it?



## Advantages:

Emphasis on peer-teaching

Each member of the team accountable

# PROBLEM-BASED LEARNING: small group

## e.g. Case-based Learning

- Clinically important cases provided
- Peer discussion, assignment of responsibilities and peer teaching
- Extended cases: (“triggers”) from professor.
- Students determine learning needs (self-directed learning)
  - Team members read, investigate, learn.
  - Return to class and teach each other.

### Advantages:

Teaches students how to identify learning needs

Teaches students how to find answers to questions

Adapted to the information explosion

Incorporates collaborative learning



# JUST IN TIME TEACHING (JiTT): large group

- Pre-reading or assignments by students “warm-ups”
- Pre-testing (individual and group), based on these warm-ups
  - answers handed in prior to meeting
- Professor uses pre-test to adapt lesson
  - Mini-lectures
  - Demos
  - Clicker activities
- Clinically important cases
- Audience feedback (clickers with anonymity)
- Professor uses feedback to adjust teaching points
- Preceptor synthesis

## **Advantages (similar to TBL):**

Competition

Good faculty-student interaction

Can spend more time on more difficult problems

Professor (expert) can teach to the problems

# Homework for *Communicating Science* Students

- Reflection: Describe (1 paragraph) something that you have learned through lecture, that would have been better served using an active learning method.
- Describe the activities that would be included in an active learning approach to the same topics (1 paragraph).

# Resources

1. Michaelsen LK et al. (2008) *Team-based Learning for Health Professions Education*. Sterling, Virginia: Stylus.
2. **(TBL ideas, information, videos):** Team-based Learning Collaborative Website <http://www.teambasedlearning.org>.
3. **Wright State University School of Medicine Team-based Learning Website, with a bibliography of references related to testing the efficacy of TBL and active learning methods, and resources for designing activities and providing feedback.** <http://www.med.wright.edu/aa/facdev/tbl/ArticleTheory>
4. **(Just in Time resources)** Just in time Teaching Website: <http://jittdl.physics.iupui.edu/jitt/>

# Additional References

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3. Kamei RK et al (2012) *21<sup>st</sup> Century Learning in Medicine: Traditional Teaching vs. Team-based learning*. Medical Science Educator 2012; 22(2): 57-64.
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9. Prober CG, Heath C. Lecture halls without lectures—a proposal for medical education. *N Engl J Med*. 2012;366(18):1657–9.
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11. Thistlethwaite JE et al. (2012) The effectiveness of case-based learning in health professional education. A BEME systematic review: *BEME Guide* No. 23. Wong TH et al. Pharmacy students’ performance and perceptions in a flipped teaching pilot on cardiac arrhythmias. *Am J Pharm Educ*. 2014;10(78):6.
12. McLaughlin JE et al. Pharmacy student engagement, performance, and perception in a flipped satellite classroom. *Am J Pharm Educ*. 2013;77(9):8.