# Techniques to Engage Your Students in the Classroom (And Why Student Engagement Is Desired!)

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# Learning Outcomes

By the end of this presentation, participants will:

- Have unpacked *Active Learning (AL)* and *Lecturing*
- Be familiar with the effects of student engagement in the classroom, i.e., current research
- Be familiar with the different learning levels and their importance when designing/choosing AL techniques
- Be familiar with some techniques and models that facilitate AL

# Brainstorming

- List some goals that you have in your role as a teacher. In other words, what do you hope your students will gain by taking your course?

# Some Common Goals

- Develop critical thinking skills (in the subject)
- Facilitate mastery of a field:
  - Understanding of the subject/techniques
  - Long term retention of the material…
- Inspire students
- Help students find their own voice…
- (Gain knowledge/skills)

How to best achieve these goals?

- A growing body of research has made it clear that the overall quality of learning is improved (significantly) when students have ample opportunities to clarify, question, apply, and consolidate new knowledge.
- Using active learning techniques instructors create opportunities for students to engage new material.

# Lecture vs. Active Learning

- Waldrop, Mitchell. (2015, July 15) **Why we are teaching science wrong and how to make it right**. (Alternate title: The science of teaching science.) *Nature, 523*, 272-276.

- Natelson, Douglas. (2015, July 16) **Active learning vs. lecturing: the annual hectoring**. Retrieved from http://nanoscale.blogspot.com/2015/07/active-learning-vs-lecturing-annual.html

# Waldrop's Article

- "… an analysis of 225 studies of active learning in STEM found that active learning cut course failure rates by around one-third."
- " "At this point it is unethical to teach any other way," declares Clarissa Dirks, a microbiologist at the Evergreen State College in Olympia, Washington, and co-chair of the US National Academies Scientific Teaching Alliance, an initiative to reform undergraduate STEM education."

# Natelson's Post

- "…some lecturers can be outstanding, and the ones that engage the class in discussion and back-and-forth are blurring the line into active learning anyway; active learning definitely is a compromise in that the investment of personnel and time to achieve the benefits does mean leaving out some content; and different people learn best from different methods!"

# What *Is* Active Learning?!

- Write down how you define (or what you think of when you hear) – 1 minute
  - Active Learning
  - Lecturing
- In groups of 2 (or 3), take turns to share what you wrote down, and discuss – 2 minutes
- Be ready to share with everyone in ~ 2 mins

# Some Definitions

- "**Active learning** is a process whereby students engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class content." – CRLT at UMich

- "**Active learning** is a model of instruction that focuses the responsibility of learning on learners… to learn, students must do more than just listen: They must read, write, discuss, or be engaged in solving problems." – Wikipedia

- "Interactive Engagement methods are those designed at least in part to promote conceptual understanding through interactive engagement of students in heads-on (always) and hands-on (usually) activities which yield immediate feedback through discussion with peers and/or instructors…" – R. Hake (Am. J. Phys, **66**, 64, 1998)

# Active Learning "Works"… What Are We Measuring?

- Factual knowledge
- Transferable problem solving skills
- Relevant skills
- Students' attitudes
- Student retention

# Broad Empirical Support

- Periodic student activity in the traditional classroom.
- Cooperation is more effective than competition for promoting a range of positive learning outcomes
- Collaboration "works" for promoting a broad range of student learning outcomes.

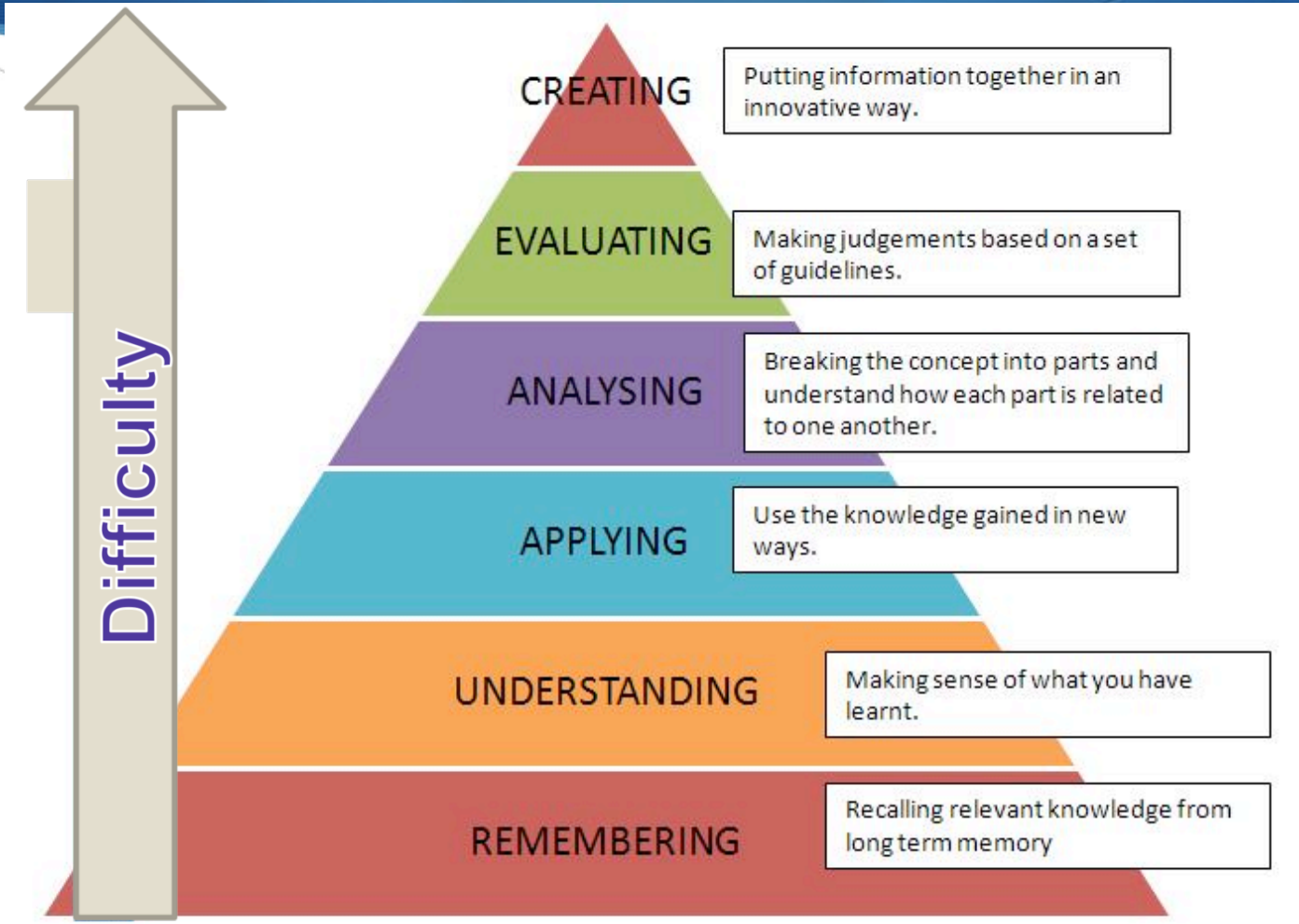
# However…

- Some studies found no correlation between implementation of AL and increased student performance!

Andrews, T.M. (2011). Active Learning Not Associated with Student Learning in a Random Sample of College Biology Courses. *Life Sciences Education, 10*, 394-405.

- Simply introducing activity into the classroom fails to capture an important component of active learning… good activities develop deep understanding of the important ideas to be learned.

# Levels of Learning: Bloom's (Revised) Taxonomy




* Modified and adapted from http://www.empowernetwork.com/pamschmidt

# (When) Can Active Learning Be Ineffective?

- Instructor's background
- Classroom culture
- Instruction does not address misconceptions
- Poor design of questions/strategies/activities

# Challenges to Implementing Active Learning

- Students resistance to participation (e.g. stop coming to class, start discussing their weekend plans)
- Expectations of content coverage
- Lack of instruction/instructor time
- Class size, or room layout
- Influence on teaching evaluations → systemic and institutional change
- Additional time for curriculum (re)design

# Some Simple Methods

- Teach students how to learn (average 20% of course time)!
  - Note taking
  - Breaks
  - Cramming vs. (long-term retention) learning
  - Learning logs
  - Writing and summarizing

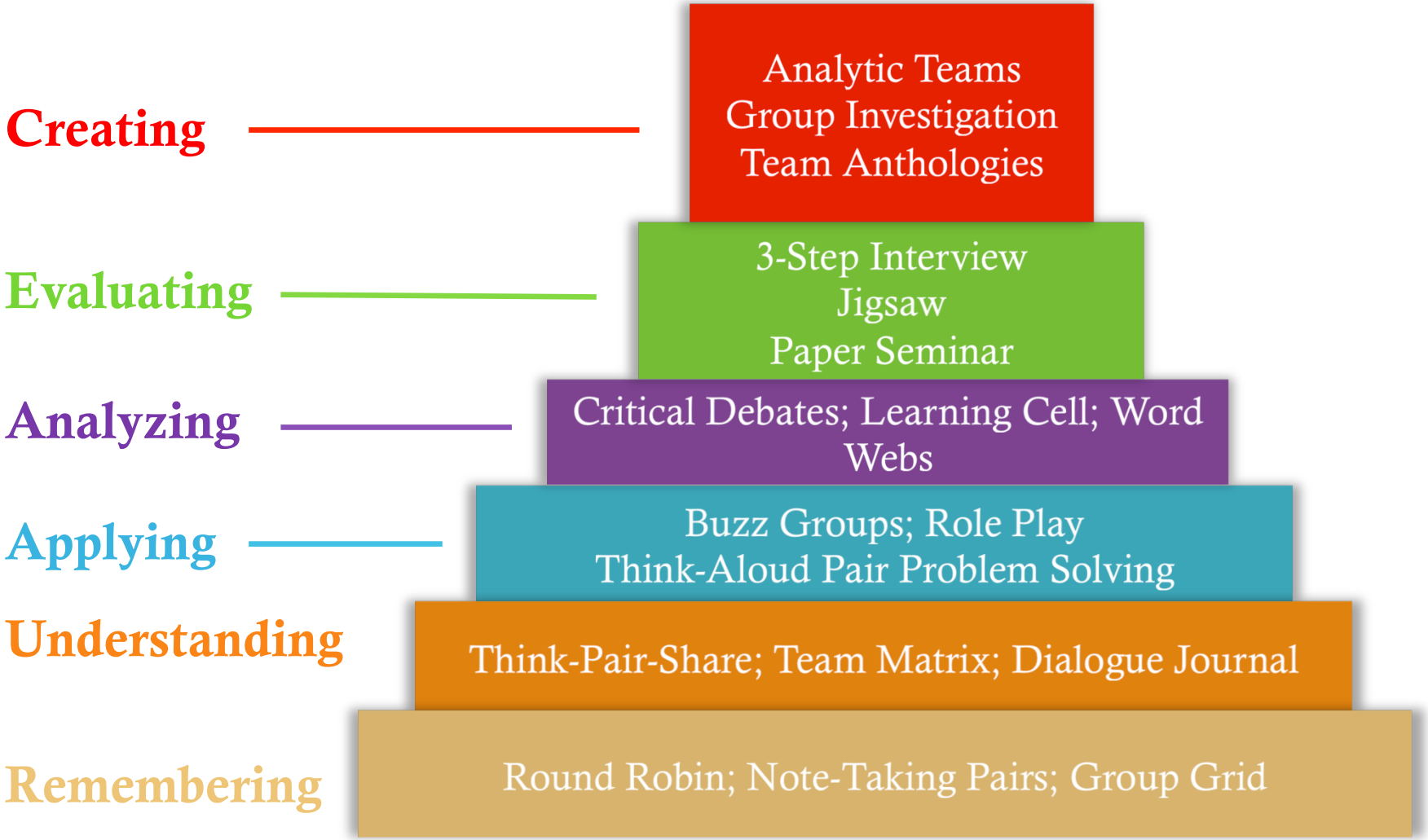
- Organize lectures to promote active learning
  - Background survey (so you meet them where they are) and direct misconceptions
  - 20-15-15
  - Test their knowledge frequently (forces recall)
  - Inverted classroom
  - Pause periodically for students to clarify their notes with a partner (2mins/15 mins), and/or
  - Introduce (Neurobics) exercise/break every 15-20 mins

- Create sense of community:
  - Reduce anonymity: Ice-breakers
  - Subdivide class in groups

# Question Cues for Each Learning Level

| Remember | Understand | Apply | Analyze | Evaluate | Create |
|---|---|---|---|---|---|
| Describe | Explain | Complete | Compare Contrast | Justify | Plan |
| Name | Compare | Use | Examine | Assess | Invent |
| Find | Discuss | Examine | Explain | Prioritize | Compose |
| List | Predict | Illustrate | Identify | Recommend | Design |
| Relate | Outline | Classify | Categorize | Rate | Construct |
| Write | Restate | Solve | Investigate | Decide Choose | Imagine |

*http://maasd.edublogs.org/2012/04/26/linking-ipads-blooms-taxonomy/


Creating
Analytic Teams
Group Investigation
Team Anthologies
Evaluating
3-Step Interview
Jigsaw
Paper Seminar
Analyzing
Critical Debates; Learning Cell; Word Webs
Applying
Buzz Groups; Role Play
Think-Aloud Pair Problem Solving
Understanding
Think-Pair-Share; Team Matrix; Dialogue Journal
Remembering
Round Robin; Note-Taking Pairs; Group Grid

# More Easy-To-Implement Techniques

- Active Review and Summaries:
  - Superlatives
  - Thirty Five
  - Twos and Threes
- Interspersed Tasks
  - Intelligent Interruptions
- Integrated Quizzes:
  - Clickers
  - Bingo
  - Team Quiz
- Confused; FAQ and Fakes

Thiagarajan, S. (2005). *Thiagi's Interactive Lectures*. Newton, IL: ASTD Press

# Conclusions

- Defining of terms.
- Mindful of what is being measured.
- When designing/choosing activities, make sure that they tie in with *your* learning outcomes.
- Activities designed around important learning outcomes and promote thoughtful engagement on the part of the student.
- Assess based on your learning outcomes!