Active Learning

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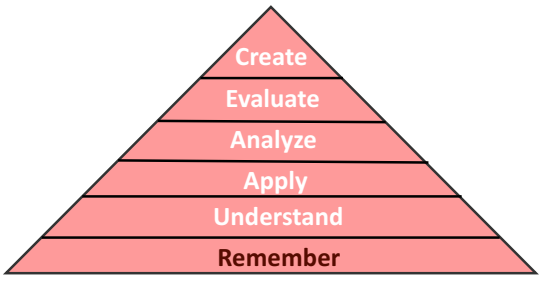
What we already know for centuries…

Laurentius de Voltolina, School of Bologna, 14th century

What we traditionally emphasize in lecture



Modified Bloom's Taxonomy

Traditional Lecture Model

In class	At home
Presentation →	Learning

- Instructor lectures
- Students listen (do they learn?)
- Students take notes (do they learn?)

Student
- Reviews
- Memorizes
- Problem solves?
- Uses other resources?

↓

Assessment

Active Learning: Choosing the Best Method for your Educational Setting WS
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Critiques of the traditional lecture model

- Why is a lecture better than a good book?
- Is a teacher responsible for assisting student learning, or just presenting facts?
- What is the best use of students' limited curricular time?
- How does the lecture accommodate millenial students, who are used to finding facts on their own?

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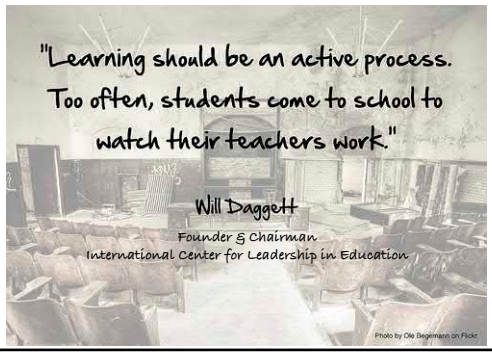
We have an idea about how it should be…



Let's exercise…

What is one word that comes to your mind when we say 'active learning'?

https://padlet.com/ferhan_sagin/Kaunas

Active learning

'anything that **involves students** in **doing things** and **thinking about** the things they are doing'

Bonwell & Eison, 1991

Educational research shows us the way…

"Learning is not a spectator sport. Students do not learn much by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers.
They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives."

Chickering and Gamson

What we know from educational research….

"Higher Level of Thinking" pyramid
Kaur, Singh, and Kaur

Active Learning

- Engaged lecture
- Flipped classroom
- Team-based learning
- Problem-based learning

Engaged Lecture Model

- Each individual student is actively involved
- It can be accomplished in a small amount of time (i.e. a 50- minute lecture)
- It can be facilitated by one faculty member
- It doesn't require a lot of resources (i.e. funding, staff, technology, etc.).

Engaged Lecture Model

In class

Presentation → Learning

+

Learning

Instructor → Instructor + student
- Lectures
- Listen
- Discuss
- Problem solve
- Write in class

At home

Learning

Student
- Reviews
- Memorizes
- Problem solves
- Uses other resources

↓

Assessment

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Engaged Lecture Model

- Shifting the focus from the teacher to the learner
- Active engagement with the course content
- Techniques that promote higher-order cognitive tasks (e.g. critical thinking)
- Peer collaboration and learning-teaching

Roles in Engaged Lecture Model

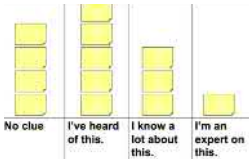
- Teacher
  - monitors students work
  - monitors classroom discussion
  - poses good and aligned questions
  - gives opportunities for students to work

- Students
  - work in pairs, groups or individually
  - share work/explain work to others
  - take active role in developing the scoring criteria, self-evaluation, and goal setting

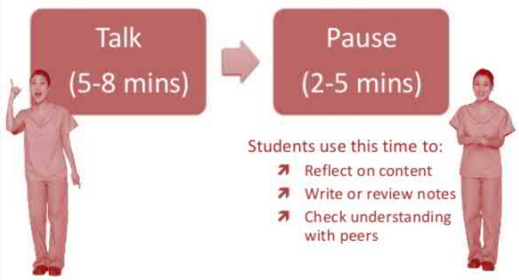
Ideas for Informal Engaged Learning in Class

- Background knowledge probe (Pre and formative)
  - Designed to collect specific and useful feedback on students' prior learning
  - Short, simple activities for use at the beginning of a course / a new unit / before introducing an important topic

	Agree	Disagree
1. Fungi must form spores to reproduce. Support it:		
2. All mushrooms are safe for us to eat. Support it:		
3. Yeast is a form of fungus. Support it:		
4. Penicillin is made from a fungus. Support it:		



Ideas for Informal Engaged Learning in Class



Active Learning: 3 Easy Ways for Higher Education Lectures
Janet Corral, Faculty, Educational Informatics

Ideas for Informal Engaged Learning in Class

- Pausing during lecture works (Ruhl et al. 1987; Cain et al, 2009; Gulpinar & Yegen, 2005; Di Vesta & Smith, 1977; Ruhl & Suritsky, 1995)
- Ruhl et al, 1987:
  - 72 students

	Pause	No Pause
Short-term recall	108 correct facts	80 correct facts
Long-term recall	89.4%	80.9%

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Directed paraphrasing

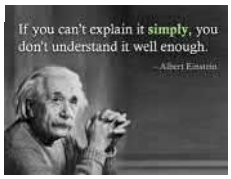
- Select an important theory, concept, or argument that students have studied in some depth
- Identify a real audience to whom your students should be able to explain this material in their own words (e.g., a grants review board, a vice president making a related decision)
- Provide guidelines about the length & purpose of the paraphrased explanation

In your own words, put to paper and then explain simply to a 10-year old kid what active learning means

One-sentence summary

- Challenge students to answer the questions "Who does what to whom, when, where, how, and why?" - follows WDWWWWHS pattern - about a given topic
- Ask them to synthesize those answers into a simple informative, grammatical, and long summary sentence

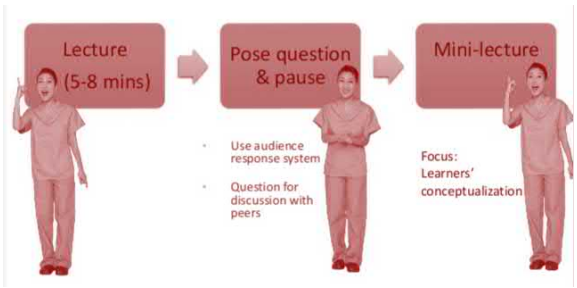
An example to one-sentence summary



Application cards

- Pass out index cards and ask students to write down at least one possible, real-world application for what they have just learned
- Students are forced to link new information with prior knowledge

Ideas for Informal Engaged Learning in Class



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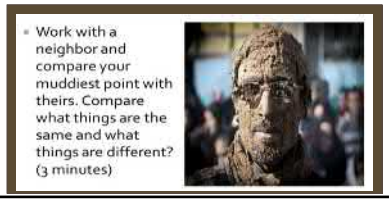
Checks for understanding

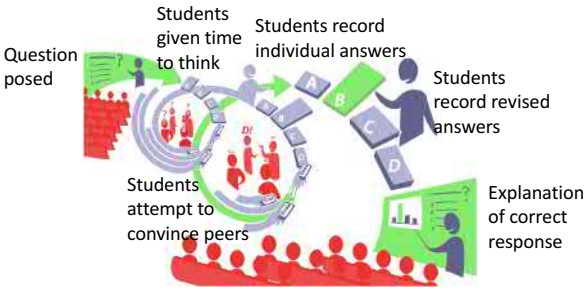
- Pose questions about a given lecture/discussion/assignment
- Give students 2-3 min to write a response on an index card
- Form small groups and ask students to share their answers and seek clarification from each other for their 'muddiest points'



Think/Pair/Share

- Give students an issue to think about or a question to answer
- Then ask them to partner with another student
- Give the students a few minutes to discuss their ideas with their partner
- Ask the pairs of students to share their answers with the rest of the class

Peer Instruction Model



Eric Mazur, Peer Instruction: A User's Manual

Keep the Question Going

- Ask a question to a student and then ask another student if that answer seems reasonable or correct
- Then, ask the third student for an explanation of why there is an agreement or not

Fish Bowl

- Provide students with slips of paper or index cards
- Ask students to write down a question they had from reading / assignments, or have them write a question at the end of a lecture
- Have students deposit their questions into the fish bowl (or hat or other suitable item)
- Begin by drawing one question at a time, clarifying for the students the concept, or having other students in the class answer the question

Student-generated test questions

- Give general guidelines about the kinds of questions you plan to ask on the exam
- Ask your students to write and answer 1-2 questions like those

Agreement circles

- Students form a circle
- Teacher gives a statement (e.g. ethical issues in stem cell research)
- Students evaluate… if they agree or disagree?
- Agree—move to center; Disagree—stay on the outside
- They discuss in groups
- Students check if their position is still the same?

However with large classes, it's not easy to…

- actively engage students
- efficiently deliver in-class quizzes

Classroom Response System (CRS)

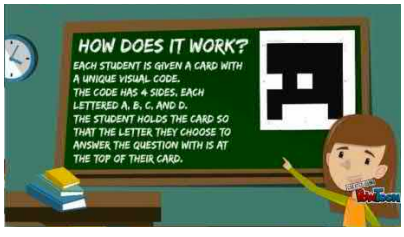
- Interactive technology that enables instructors to pose questions and immediately collect responses
- The system automatically tallies the responses and instantaneously projects the results in a graphical format for the entire class to see
- Also called Classroom Response Technologies, Classroom Polling Systems, Clickers or Student/Audience Response Systems

Possible costs…

- Time to learn to use the system & manage its data
- Time to revise and/or develop appropriate questions
- Possibility of technical problems
- Financial costs to students of the remote control transmitter (around $25)
- Need for flexibility in the content and quantity of material you cover in a classroom session and thus a potential loss of some predictability and control

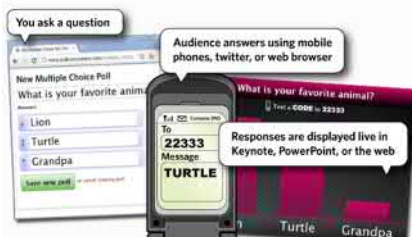
Plickers

It is a powerfully simple tool that lets teachers collect real-time formative assessment data without the need for student devices



Poll Everywhere

It is a simple application that works well for live audiences using mobile devices like phones



Let's exercise with Poll Everywhere…

https://pollev.com/ferhansagin480

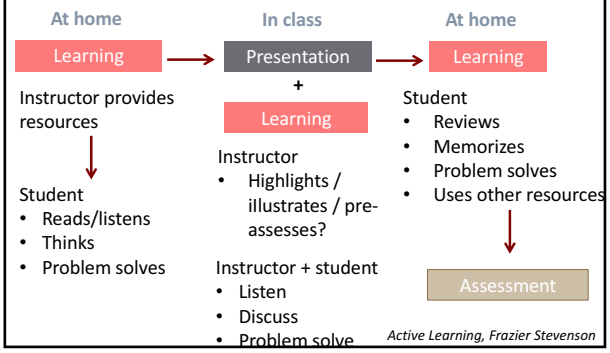
Let's exercise with Poll Everywhere…

There is also Google Doc's…

- Register for a Google account
- Access Google Drive (https://drive.google.com)
- Create a document and modify the settings to "anyone with the link can edit"
- Send link to students
- Project Google Doc onto the screen during the lecture
- Use Google Doc to monitor student progress on prompts

Flipped Classroom

Flipped Classroom



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Some issues to discuss about Flipped Classroom

- Student readiness (need for pre-assessment)
- Challenges for different type of learning styles (intuiting vs. sensing thinkers)
- Difficult conceptual material
- Faculty development (how to get excellent lecturers to stop)

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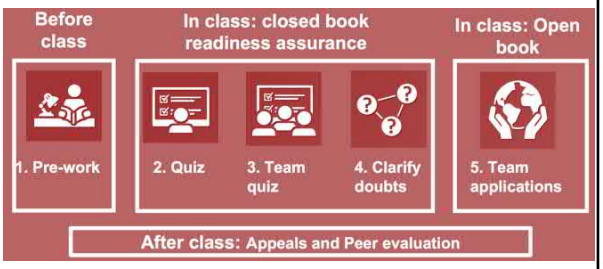
Team-based Learning (TBL)



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Some issues to discuss about TBL

- How does the daily quiz affect the learning environment?
- Challenges for introverted and extroverted students?
- What about "bad" groups?
- Does student peer feedback improve group dynamics?
- Introverted instructors/faculty development/what to do with impulse to lecture to the students. ?
- Students can still arrive ill-prepared if they are willing to accept a poo iRAT score and lower peer evaluations
- Some students may not expend significant effort when providing pee feedback

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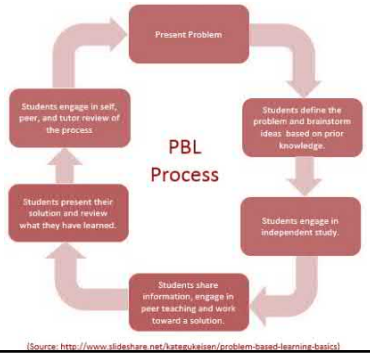
Problem-based Learning (PBL)



(Source: http://www.slideshare.net/kategukaisen/problem-based-learning-basics)

Some issues to discuss about PBL

- Group vs. individual?
  - How should students be held individually accountable (besides learning issue presentation)?
  - Assessment: group vs. individual?
- Challenges for introverted and extroverted students?
- What about "hard" topics that students get wrong?
- Instructor skills/faculty development
- Follow-up observation (instructors start well then lapse into lecture)

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Some active learning challenges

- Conceptually hard topics (e.g. physio, renal, statistical analysis) - PBL challenging, as instructor guidance is more needed: consider supplementary resources or lectures
- Detailed topics (anatomy, biochemistry) - Harder to write good "thought" questions since many students lack detailed knowledge
- Students - Expect initial negative student reviews (students are conservative about curriculum)
- Faculty & Peers - Have them observe a good model session of what you are seeking

But of course...

Conditions + Implementation = Outcome

Educational research shows us it works

"there is considerable neurobiological evidence that functional changes in neural circuitry that are associated with learning occur best when the learner is actively engaged"

Friedlander et al.

"Tell me and I forget,
teach me and I may remember,
involve me and I learn."

Ben Franklin

Final words for active learning strategies... research tells us...

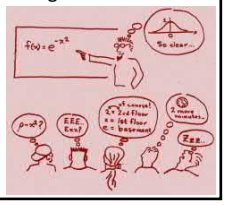
- All methods have strengths and intrinsic flaws
- Not every technique is appropriate for every class/teacher
- Changing too much within a lecture should be avoided (max. of 4-5 times / class)
- Changing all your lecture to a new format at once is not a good idea
- All students can participate with appropriate guidance

Take home messages...

- Start small - pick just a couple of new strategies to implement
- Pick a topic you have taught many times before
- Always double-check your answer key
- Focus to **enhance interactive teaching** and **critical thinking**
- Make sure that **peer-discussion** and **cooperative learning** is going on
- If you will give marks, keep them small (a higher percentage leads to anxiety and students become focused on getting the answer right)
- Keep an intermediate level of difficulty in questions
- Regularly use the system but monitor for engagement in class - when students are not engaged, do something to change it

Take home messages...

- Active Learning:
  - engages students in the content
  - develops skills for problem-solving as well as team skills, communication, negotiation, peer assessment of performance
  - opens lines of discussion for further thinking
  - provides timely feedback
  - motivates learners
  - makes student thinking visible
  - creates greater instructor satisfaction



Now is the time for...

What was the most important thing you learned today?

What was the most confusing topic today?

What important question remains unanswered?

Thanks…