Active and Collaborative Learning

Quick and powerful ACL techniques

Liang Niestemski
Jennifer Mallory

Adapted from faculty of Lawrence Technological University
Active and Collaborative Learning

Anyone? Anyone?

https://youtu.be/uhiCFdWeQfA
Active and Collaborative Learning

Quick and powerful ACL techniques: Informal

Level 1 – easy, high-impact, low-effort

• Think Pair Share
• Think Pair Write Share
• Quick Thinks
• Minute Paper/Muddiest Point
• Random Calling
Level 1 - Informal ACL

- Can be used at any time in any class
- Typically short duration
- Provides an opportunity for students to process material they have been listening to (Cognitive Rehearsal)
- May be used to break up a long lecture - "book ends" procedure
Level 1 - Informal ACL
1) If an activity doesn’t appeal to you, don’t use it! (faculty comfort level!)
2) Don’t make these activities a chore or burden!
3) Don’t try activities on students before you try on yourself (or other faculty)!
4) Allow for more time than you think you need to carry out and respond
5) Make sure to “close the loop” – let students know results/changes
ACL Activities

- Think Pair Share (formal or informal ACL)
- Write Pair Share (formal or informal ACL)
- Quick Thinks (individual or informal ACL)
- Minute Papers (individual ACL)
Think-Pair-Share

- Pose a question
- Give **time** for students to THINK
  - This is very hard for faculty to do!!
- Have students **PAIR** up
  - Can be informal pairs (neighbors) or formal
- They discuss their answers – compare
  - Try to decide on common answer
  - Variation – have them find someone that disagrees with them!
- **SHARE** their answers with class
  - You could randomly call on one of the pairs
How could you call on students?

1. **Common:** Ask the question – pause – call on a student (randomly?) – pros/cons?
2. **Directed:** Call on a student (randomly) – pause – ask the question - pros/cons?
3. **Volunteer:** Ask the question – pause – (wait for a raised hand) - pros/cons?
4. **Jump ball:** Ask the question – pause – “Anybody?” - pros/cons?
5. **Choir:** Ask the question – pause – “Everybody” - pros/cons?
Random Calling

- Keep students focused – know they could be called on randomly
  - Avoids having “best/loudest/outgoing” students dominating with answers
- Multi-sided dice
- Facts (birth months, drive time, hometown, etc.)
- Random Generator (excel)
  - CTL Resource (add student names – CTRL-F9 to reshuffle)
- Popsicle sticks with names on one end
  - Have container – sticks go in, names down
  - After choosing stick – leave out, or return?
- Ask question first – then pick student!!
Think-Pair-Share variations

- Clickers
- Letter cards
  - Show vote to YOU, not to others in class
  - Not “anonymous” – maybe take more care?
  - Quick and low-tech! (Color?)
- Colored Index cards
- Fingers

Based on % correct – go on, or go back?
A curtain hangs straight down in front of an open window. A sudden gust of wind blows past the window; and the curtain is pulled out of the window. Which one of the following statements is the best explanation for this observation?

A) The air pressure outside the window is more than the air pressure inside, pulling the curtain out.
B) The air pressure outside the window is less than the air pressure inside, pulling the curtain out.
C) The curtain would be pushed in, not pulled out.
D) The air pressure inside the house is more than the air pressure outside, pushing the curtain out.
E) The wind pulls the curtains out as it moves by.
Think-Pair-Share Students Feedback

94% students agree that the in-lecture clicker questions add to their understanding and interest in the course.
Think-Pair-Share variations

• polleverywhere
https://www.polleverywhere.com/

What Are Possible Types of ThinkPairShare questions?
Possible Types of ThinkPairShare questions

• Multiple choice (clicker questions)
  – Hopefully more discussion needed

• Ranking tasks (RT) (maybe only w/ calculations?)
  – Who is more to blame? Who is more honorable?

• Conflicting Contentions Task (CCT)
  – Give possible answers to question – students decide which answer is best

• What if anything is Wrong Task (WWT)
  – Show a solution/conclusion/hypothesis – is it correct, if not what is flawed?
Think-Pair-Share variations

- Learning catalytics

https://learningcatalytics.com/

Confidence  Many Choices  Composition Sketch  Data Collection (histogram)  Direction

Image Upload  Free Response  Ranking  Priority  Region

• The E field effort to push an electron across the distance of the wire.
• resistance of wires
• The internal resistance in the battery
• Internal resistance of the battery
Consider a window air conditioner placed on a table in a room and operated.

Will the room temperature increase, decrease, or remain the same? Why?

1. Think to yourself. Determine an answer.
2. Compare notes with the person next to you and justify your answer.
3. As a pair, conclude to a final answer and be prepared to share.
How to get TWPS questions?

• Search for “clicker” questions

• Textbook (FE exam questions)

• Make them up yourself!
Formulate/Share/Listen/Create

1. **Formulate** your answer to the question individually.
2. **Share** your answer with your partner.
3. **Listen** carefully to your partner’s answer. Note similarities and differences in your answers.
4. **Create** a new answer that incorporates the best of the ideas. Be prepared to present your answer if called upon.

Good for problems with multiple possible solutions

*Adapted from Johnson Johnson Smith (1991)*
Quick Thinks

• A very quick think – with feedback for the instructor
Quick Thinks

• Reorder the steps of a solution
• Paraphrase the idea
• Correct the error
• Support a statement

Quick Thinks

• **Example:** think of one ACL technique you can use in your own class. How you would implement it?

• Be prepared to explain your example to the audience.
Minute Paper

• What was the most useful or meaningful thing you learned during this session?
• What question(s) remain uppermost in your mind as we end this session?
• What was the “muddiest” point in this session?
• Give an example or application
• Explain in your own words . . .

Minute Paper

• Example:
  – What was the most useful thing you learned during this session?
  – What question(s) remain uppermost in your mind as we end this session?
Five Minute Paper

• Time at end of class – or before next class
  – Index cards? Slips of paper? Bb tools?
• Prompt with question:
  – "What was the most important thing you learned during this class? List 3 items."
  – or synthesize... “Who does What? To Whom, When, Where, How, and Why [WDWWWWHHW]?
  – Or specific : “How could you prove that momentum and energy are both conserved in a collision?
• Collect slips – then what?

Adapted from Classroom Assessment Techniques, Angelo and Cross
Muddiest Point

• What is the muddiest point in ______?
• Students jot down a short answer
  – Mechanism to collect in class – review?
    • How might that be done?
  – An example of “Just In Time” teaching
• Maybe at end of the class – collect
  – Start next class going over problem-areas
• Easy to do – harder to respond (faculty)
  – Can’t just give the same “lecture” again
  – Possibly use another activity to help?

Adapted from Classroom Assessment Techniques, Angelo and Cross
KEEN Summer Workshop

**Active Collaborative Learning**

**Problem Based Learning**

**Entrepreneur-ial Minded Learning**

**What:** KEEN Summer Workshop on ACL, PBL and EML

**When:** May 23-26, (3.5 days)

**Where:** On Campus at WNE

**Compensation Stipend:**
- $750 paid upon completion of May Workshop 2016
- $1000 paid upon completion of report-outs (meetings and written report)

**Contacts:**
- Rob Gettens (Engineering)
- Jennifer Mallory (Engineering)
- Lanny Spotts (Business)
- Marilyn Pelosi (Business)
- Liang Niestremski (A&S)