Adding Active Learning to your Lecture (including Group Work)

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What is your picture of teaching?

Describe your class session.
Effective Teaching

Lecture

Discussion or Participation

In-class Activities

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(Raghav Gupta, http://raghavgupta.wordpress.com)
Outline

- Data on Learning and Memory
- Structure of Class Session
- Examples of Active-Learning Activities
- Strategies for Incorporation into Class
- Incorporating Group Work into Class
Limits: Attention and Memory

- How many chunks of information can a person process at once?
  - 3-5 units of information
  - FBICIAIRS

- How do students gather information?
  - Independent processing streams
  - Dual process is better than single channel
  - Describe new topics multiple ways and introduce new topics different ways
Limits: Attention and Memory

• Is visual or verbal information easier to remember?

• How long is a typical attention span?
  ○ Depends on time-of-day, motivation, enjoyment, emotion

Organize session to help students to listen effectively and remember new ideas
• Retrieval practice as a form of active learning
  ○ Associated with long term retention of information and better learning than elaborative study.

• Build on prior knowledge
  ○ Better memory for new information with previous exposure to key issues, concepts or theories.

• Better learning is achieved through more in-class engagement
Studies about Learning

- Amount of new material per lecture
  - No more than 50%
  - Rest of class time should be devoted to activities to reinforce the new material

- Use of In-class exercises (group or individual)
  - Over 10 year period, Calculus. Average of 16% increase in pre/post exam scores over no in-class exercises
Organization of Content

- For entire semester
  - Determine the course goals and plan the content
  - Organize overall course content with a theme or storyline (narrative)
- For each class session
  - Have a learning objective
    - What do you want the students to go away with today?
  - Provide a structure for each class
    - Have an introduction, the body, and a conclusion
  - Provide an outline at the beginning
  - Build in questions and activities
Structuring Your Class Session

- Write an outline on the board at the beginning of class
- Use brief lectures to introduce complex topics or to clarify the larger concepts
- Intersperse mini-lectures/brief discussions with active-learning exercises
- Write summary ideas on the board at appropriate points during the session
Detail of Structure

- Present and explain the new material
- Subdivide the material into mini-lectures
  - Each mini-lecture focuses on one major topic/concept
  - A mini-lecture should last 10-15 minutes
  - A student activity lasting 2-15 minutes should separate mini-lectures
- Each student activity should elucidate the major point just discussed in the prior mini-lecture
Examples of Activities (small groups or individual)

- Answer questions
- Write questions about reading or mini-lecture
- Answer questions about reading
- Write or answer a short question or problem
- Solve a problem
- Discuss main idea with a peer; write a “one-minute paper”
- Note/homework comparison/sharing
- Identify the “muddiest” point or the most important idea

Angelo & Cross, 1993; Middendorf & Kalish, 1996
Techniques – Some First Steps

- **Beginning of class**
  - Reading or Review “quiz” with voting
  - Clarification questions – determined by group work
- **Clarification after mini-lecture**
  - Work a problem together; give a problem to solve
  - Clarification “quiz” with voting
  - Clarification questions – determined by group work
- **Throughout class**
  - Questions with voting
  - Student summary of another student’s answer
Incorporation into Class – First Day

• Start on the first day of class and use continually

• Explain on the first day of class your philosophy of active learning and participation

• Create a comfortable, non-threatening (but challenging) environment
  ○ Explain the rules of participation and discussion
  ○ Encourage students to think aloud

• Be confident in the use of active-learning exercises and group exercises
Group Work - Providing Direction

Organizing the Groups

- Decide how the groups will be formed
  - Self-selected versus instructor-formed
- Select group size
  - Groups of 3-4 work best for in-class groups
  - Pairs also can work well
- Decide if groups will remain together or change with activity
- Give group roles
Group Work - Small Group Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
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<tbody>
<tr>
<td>Facilitator (group manager)</td>
<td>Keeps the group focused on the activity and ensures that all members participate and understand.</td>
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<tr>
<td>Recorder/Scribe</td>
<td>Keeps notes of what the group has done in consultation with the others.</td>
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<tr>
<td>Spokesperson (or presenter)</td>
<td>Presents reports and discussion to the class.</td>
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<tr>
<td>Questioner</td>
<td>Questioner: Determines if group members have questions; collects questions group has for the instructor</td>
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Note. Small group roles should change
Group Work - Providing Direction

During Group Work

- Check students
  - Ask students about what their “role” is in the group
- Be an “active listener”
  - Listen for “peaks” and “valleys” in the discussion
- Be a facilitator
  - Let students know how much time they have to work in small groups
  - Give a 1-minute warning
  - Provide additional activities for groups that finish early
- Constant monitoring without interfering
Group Work - Bringing the Groups Back Together

- Provide structure
  - e.g., 1 group provides 1 idea or piece of information
  - Write ideas on the board
- Ask the group to explain their reasoning
  - “Why does your group think that?”
- Promote participation and elaboration on ideas
  - “Would someone like to add on?”
- Use wait time
  - Let students have 3-5 seconds to think before they answer
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