Cooperative Problem-Based Learning
Constructive Controversy

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Overall Goals

- Design courses to increase student learning
- Implement practices to improve student learning
- Build your knowledge of Evidence-Based Teaching Practices and your implementation repertoire
Reflection and Dialogue

- Individually reflect on effective strategies for helping students learn new material. Think/Write for about 1 minute
  - What are some effective ways of helping students learn new conceptual, procedural, or theoretical material?
  - What helps you learn new material?

- Discuss with your neighbor for about 3 minutes and record a list

Expertise Implies:

- a set of cognitive and metacognitive skills
- an organized body of knowledge that is deep and contextualized
- an ability to notice patterns of information in a new situation
- flexibility in retrieving and applying that knowledge to a new problem

Acquisition of Expertise

- Cognition: Learn from instruction or observation what knowledge and actions are appropriate
- Associative: Practice (with feedback) allowing smooth and accurate performance
- Automaticity: “Compilation” or performance and associative sequences so that they can be done without large amounts of cognitive resources

“The secret of expertise is that there is no secret. It takes at least 10 years of concentrated effort to develop expertise.”
Herbert Simon


Learning Sciences

deliberate
distributed
practice
Key Implications

Deliberate

Attention must be paid
- Attention and processing power = cognitive load (bandwidth)
  - LIMITED – need to be careful how one uses the learner’s bandwidth
    - Link to Curricular Priorities
  - Continuous partial attention
- Reflection is needed
  - Need for feedback
    - Link to assessment

Key Implications

Distributed

- Repetition over time
  - Spaced vs. massed practice*
  - Spiral curriculum
- Multiple modes of input
  - Visual
  - Audio
  - Kinesthetic
  - Self-explanation
  - Explaining to others

Key Implications

**Practice** what you want to learn

- Active – doing something
- Constructive – adding to your prior knowledge
- Interactive – working with others to add to your prior knowledge


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Active Learning: Cooperation in the College Classroom

- **Informal** Cooperative Learning Groups
- **Formal** Cooperative Learning Groups
- Cooperative **Base** Groups

Notes: Cooperative Learning Handout (CL-College-814.doc)  
[CL-College-814.doc]
Instructor’s Role in Formal Cooperative Learning

1. Specifying Objectives (Academic and Social/Teamwork)
2. Making Decisions
3. Explaining Task, Positive Interdependence, and Individual Accountability
4. Monitoring and Intervening to Teach Skills
5. Evaluating Students' Achievement and Group Effectiveness

Formal Cooperative Learning – Types of Tasks

1. Problem Solving, Project, or Presentation
2. Jigsaw – Learning new conceptual/procedural material
3. Group Tests
4. Review/Correct Homework
5. Peer Composition or Editing
6. Reading Comprehension/Interpretation
7. Constructive Controversy
Reflection

Think about a time you observed conflict in your classroom in a group activity.

- What happened?
- How was it resolved?
- What if your students knew how to embrace and respectfully engage in conflict?

What is Constructive Controversy?

“Constructive [academic] controversy is an instructional procedure that combines cooperative learning (in which students work together in small groups to develop a report on an assigned topic, for example) with structured intellectual conflict (in which students argue the pro and con positions on an issue in order to stimulate problem-solving and reasoned judgment).” (p. 30)

Why Constructive Controversy?

- ABET criteria include requirements for graduates:
  - who can function on multidisciplinary teams,
  - who can communicate effectively, and
  - who are educated sufficiently broadly to understand how engineering solutions have impact in global, economic, environmental and societal context.

- Constructive Controversy can help students develop the skills to:
  - contribute to engineering team discussions/negotiations
  - develop and articulate positions on issues
  - recognize and consider perspectives of multiple stakeholders
  - respectfully and successfully navigate group conflict

Theory and Evidence

**Theory:** Processes through which intellectual conflict leads to positive outcomes has been theorized by developmental, cognitive, social, personality, communication, and organizational researchers (Johnson & Johnson, 2009)

**Evidence:** 39 studies (41% Higher Ed), meta-analysis
- Achievement, Retention, and Quality of Decision Making and Problem Solving – Effect Size, ES = 0.70 (concurrence seeking), 0.62 (debate), 0.76 (individualistic)
- Cognitive and Moral Reasoning – ES = 0.84 (concurrence seeking, 1.38 (debate), 1.10 (individualistic)
- Similar ES’s for Perspective Taking, Open-Mindedness, Creativity, Task Involvement, Motivation to Improve Understanding, Attitude Change on the Issue, Attitudes toward Controversy and Toward the Task, ...
Controversy with Civility – recognize that differences of viewpoint are inevitable and that such differences must be aired openly but with civility. Civility implies respect for others, a willingness to hear about each other’s viewpoints, and the exercise of restraint in criticizing the views and actions of others. Controversy can often lead to new, creative solutions to problems, especially when it occurs in an atmosphere of civility, collaboration, and common purpose.


Notes on Skilled Disagreement

- Define Decision as a mutual problem, not as a win-lose situation.
- Be critical of ideas, not people (Confirm others' competence while disagreeing with their positions).
- Separate one's personal worth from others' reactions to one's ideas.
- Differentiate before trying to integrate.
- Take others' perspectives before refuting their ideas.
- Give everyone a fair hearing.
- Follow the canons of rational argument.
Who should get the penicillin?

One pair will argue for the victims of venereal disease

One pair will argue for the victims of battle wounds

Later each team will strive for agreement on who should get the penicillin

Constructive Academic Controversy Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Typical Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare (pairs, 10 min)</td>
<td>Our Best Case Is...</td>
</tr>
<tr>
<td>Present (pairs, 10 min tot)</td>
<td>The Answer Is...Because...</td>
</tr>
<tr>
<td>Open Discussion (group, 10 min)</td>
<td>Your Position is Inadequate Because...</td>
</tr>
<tr>
<td></td>
<td>My Position is Better Because...</td>
</tr>
<tr>
<td>Perspective Reversal (pairs,</td>
<td>Your Position Is...Because...</td>
</tr>
<tr>
<td>Up to 5 min tot, if time available)</td>
<td></td>
</tr>
<tr>
<td>Consensus Seeking (group, 15 min)</td>
<td>Our Best Reasoned Judgment Is...</td>
</tr>
<tr>
<td>Report out to larger group (10 min)</td>
<td></td>
</tr>
</tbody>
</table>
Preparing Positions (10 min)

- Summarize major points.
- Ensure both members present
- Use more than one medium.
- Present position strongly and sincerely whether you believe it or not.
- Save a few points for the discussion.

Presenting Positions (10 min)

Pair A: Present position sincerely and thoroughly

Pair B: Listen carefully, take notes

Pairs: Reverse presenting/listening roles
Discussing the Issue (10 min)

Present arguments forcefully, persuasively
- Present facts and rationale

Listen Critically
- Ask for Facts and Rationale

Present counter-arguments and rebuttals
Understand both (all) sides

If there is time:
Perspective Reversal (5 min)

- Pair A: Present opposite perspective as if it were your own
  - Be forceful and persuasive
  - Add arguments of your own

- Pair B: Correct errors in others’ presentation of your argument

- Reverse Roles
Reaching Consensus (15 min)

- Drop advocacy
- Summarize and synthesize best arguments
- Reach a consensus supported by facts (or summarize best arguments on all sides)
- Be sure each member can articulate arguments for both sides

Constructive Controversy Reflection

What was the hardest part about this activity?

What did you learn?

What are the benefits of learning this way?

Where might you be able to use Constructive Controversy in your classroom?
Controversy References


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Constructive Controversy Processing

<table>
<thead>
<tr>
<th>Things We Liked About It</th>
<th>Traps to Watch Out For</th>
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<tbody>
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Cooperative Learning is instruction that involves people working in teams to accomplish a common goal, under conditions that involve both positive interdependence (all members must cooperate to complete the task) and individual and group accountability (each member is accountable for the complete final outcome).

Key Concepts

- Positive Interdependence
- Individual and Group Accountability
- Face-to-Face Promotive Interaction
- Teamwork Skills
- Group Processing

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**Cooperative Lesson Planning Form**

Grade Level: __________ Subject Area: ____________________ Date:__________

Lesson: ________________________________________________________________

**Objectives**

Academic: _____________________________________________________________

Teamwork Skills: ______________________________________________________

**Preinstructional Decisions**

Group Size: __________ Method Of Assigning Students: ____________________

Roles: _________________________________________________________________

Room Arrangement: ____________________________________________________

Materials: _____________________________________________________________

○ One Copy Per Group  ○ One Copy Per Person

○ Jigsaw  ○ Tournament

○ Other: ______________________

**Explain Task And Cooperative Goal Structure**

1. Task: _________________________________________________________________

2. Criteria For Success: _________________________________________________

3. Positive Interdependence: ____________________________________________

4. Individual Accountability: ____________________________________________

5. Intergroup Cooperation: _____________________________________________

6. Expected Behaviors: _________________________________________________
Monitoring And Intervening
1. Observation Procedure: ______ Formal ______ Informal
2. Observation By: ______ Teacher ______ Students ______ Visitors
3. Intervening For Task Assistance: _____________________________________
4. Intervening For Teamwork Assistance: ___________________________________________
5. Other: __________________________________________________________

Evaluating And Processing
1. Assessment Of Members’ Individual Learning: _________________________
2. Assessment Of Group Productivity: _____________________________
3. Small Group Processing: ___________________________________________
4. Whole Class Processing: ___________________________________________
5. Charts And Graphs Used: __________________________________________
6. Positive Feedback To Each Student: _______________________________
7. Goal Setting For Improvement: _____________________________________
8. Celebration: _______________________________________________________
9. Other: ___________________________________________________________

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