Formal Cooperative Learning – Design, Implementation and Assessment

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Teaching and Learning Center

King Fahd University of Petroleum and Minerals

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Session Layout

- Welcome & Overview
- Pedagogies of Engagement – Cooperative Learning and Challenge Based Learning
  - Informal Cooperative Learning – Bookends on a Class Session
  - **Formal Cooperative Learning**
- Design and Implementation

Participant Learning Goals (Objectives)

- Describe key features of Cooperative Learning
- Explain rationale for Pedagogies of Engagement, especially Cooperative Learning & Challenge Based Learning
- Describe key features of the Understanding by Design and How People Learn
- Apply cooperative learning to classroom practice
- Identify connections between cooperative learning and desired outcomes of courses and programs

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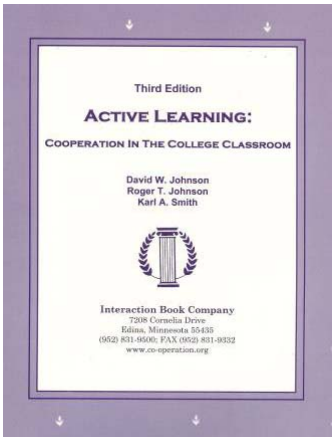
Reflection and Dialogue

- Individually reflect on your practice of Formal Cooperative Learning, especially Challenge-Based Learning (Case, Problem, Project). Write for about 1 minute
  - Key ideas, insights, applications – Success Stories
  - Questions, concerns, challenges
- Discuss with your neighbor for about 2 minutes
  - Select one Insight, Success Story, Comment, Question, etc. that you would like to present to the whole group if you are randomly selected

Pedagogies of Engagement

Active Learning: Cooperation in the College Classroom

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



See Cooperative Learning Handout (CL College-804.doc)

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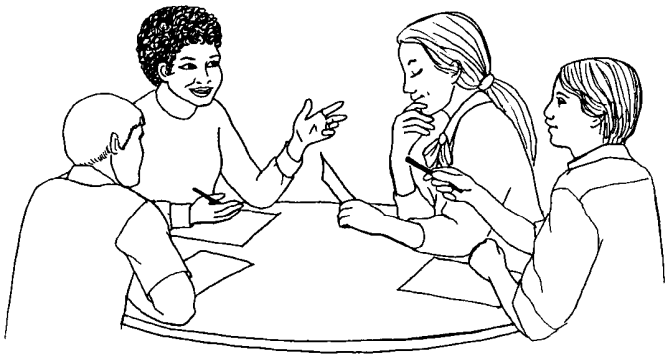
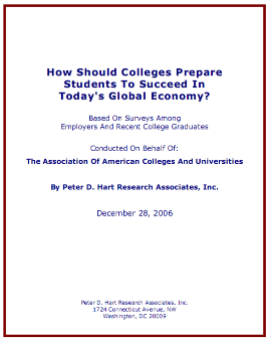
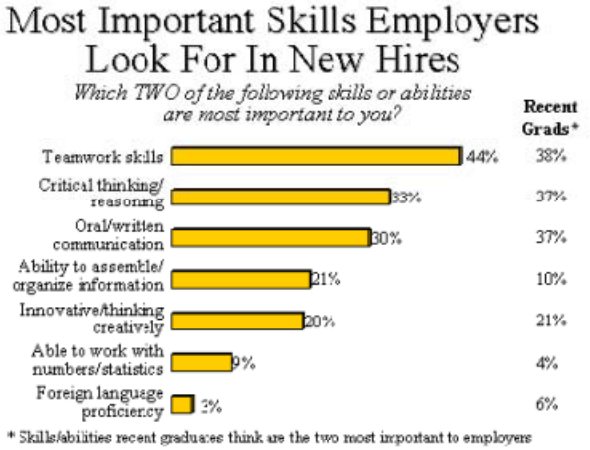
Formal Cooperative Learning Task Groups







http://www.aacu.org/advocacy/leap/documents/Re8097abcombined.pdf

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Teamwork Skills

- Communication
  - Listening and Persuading
- Decision Making
- Conflict Management
- Leadership
- Trust and Loyalty

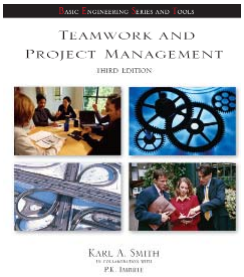
Top Three Main Engineering Work Activities

Engineering Total

- Design – 36%
- Computer applications – 31%
- Management – 29%

Civil/Architectural

- Management – 45%
- Design – 39%
- Computer applications – 20%



Burton, L., Parker, L, & LeBold, W. 1998. U.S. engineering career trends. *ASEE Prism*, *7*(9), 18-21.

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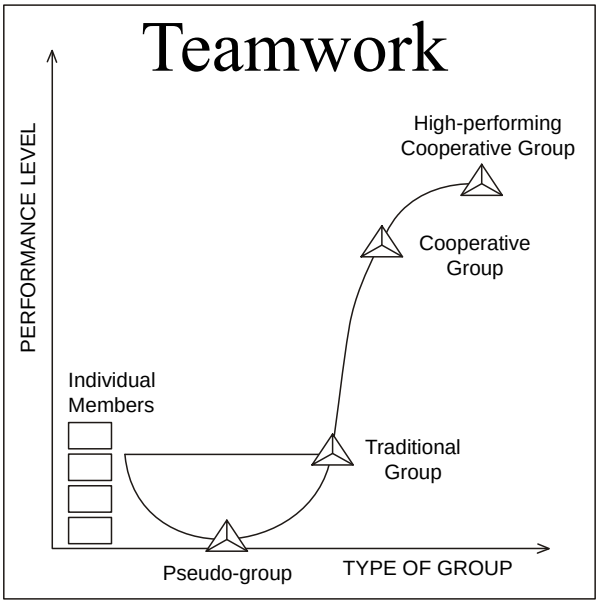

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Characteristics of Effective Teams?

•?

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A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable

- SMALL NUMBER
- COMPLEMENTARY SKILLS
- COMMON PURPOSE & PERFORMANCE GOALS
- COMMON APPROACH
- MUTUAL ACCOUNTABILITY

--Katzenbach & Smith (1993)
The Wisdom of Teams

Six Basic Principles of Team Discipline

- Keep membership small
- Ensure that members have complimentary skills
- Develop a common purpose
- Set common goals
- Establish a commonly agreed upon working approach
- Integrate mutual and individual accountability

Katzenbach & Smith (2001) *The Discipline of Teams*

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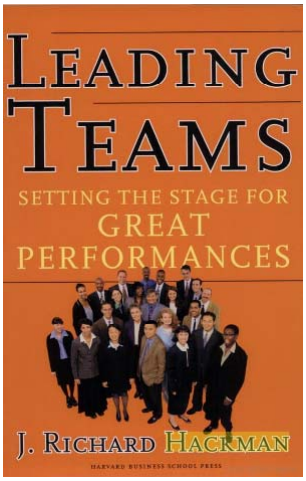
Cooperative Learning is instruction that involves people working in teams to accomplish a common goal, under conditions that involve both *positive interdependence* (all members must cooperate to complete the task) and *individual and group accountability* (each member is accountable for the complete final outcome).

Key Concepts

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

http://www.ce.umn.edu/~smith/docs/Smith-CL%20Handout%2008.pdf

Hackman – Leading Teams



- Real Team
- Compelling Direction
- Enabling Structure
- Supportive Organizational Context
- Available Expert Coaching

Team Diagnostic Survey (TDS)

https://research.wjh.harvard.edu/TDS/

Real Team

- clear boundaries
- team members are interdependent for some common purpose, producing a potentially assessable outcome for which members bear collective responsibility
- at least moderate stability of membership

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Compelling Direction

- Good team direction is:
  - challenging (which energizes members)
  - clear (which orients them to their main purposes)
  - consequential (which engages the full range of their talents)

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Enabling Structure

- Key structural features in fostering competent teamwork
  - Task design: The team task should be well aligned with the team's purpose and have a high standing on "motivating potential."
  - Team composition: The team size should be as small as possible given the work to be accomplished, should include members with ample task and interpersonal skills, and should consist of a good diversity of membership
  - Core norms of conduct: Team should have established early in its life clear and explicit specification of the basic norms of conduct for member behavior.

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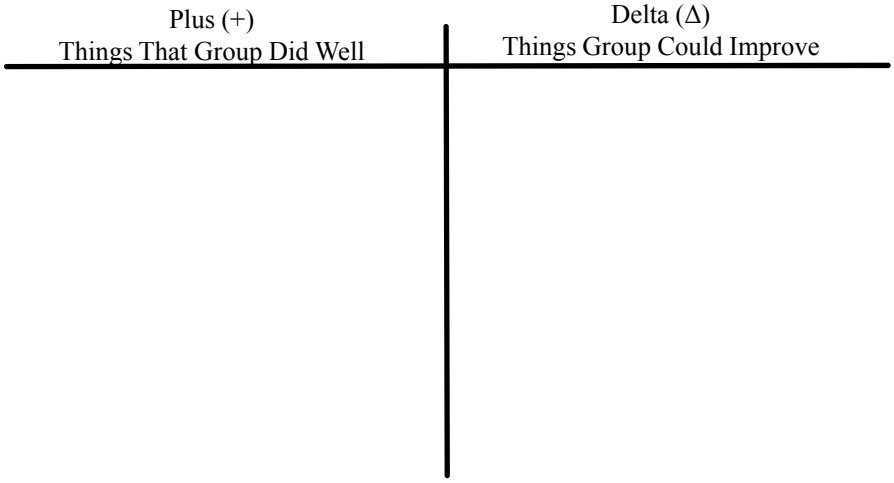
Group Task and Maintenance Roles

Group Task Roles	Group Maintenance Roles
Initiating	Encouraging
Seeking Information	Expressing Feelings
Giving Information	Harmonizing
Seeking Opinions	Compromising
Giving Opinions	Facilitating Communications
Clarifying	Setting Standards or Goals
Elaborating	Testing Agreement
Summarizing	Following

Group Processing
Plus/Delta Format



Team Charter

- Team name, membership, and roles
- Team Mission Statement
- Anticipated results (goals)
- Specific tactical objectives
- **Ground rules/Guiding principles for team participation**
- Shared expectations/aspirations

Code of Cooperation

- •EVERY member is responsible for the team's progress and success.
- •Attend all team meetings and be on time.
- •Come prepared.
- •Carry out assignments on schedule.
- •Listen to and show respect for the contributions of other members; be an active listener.
- •CONSTRUCTIVELY criticize ideas, not persons.
- •Resolve conflicts constructively,
- •Pay attention, avoid disruptive behavior.
- •Avoid disruptive side conversations.
- •Only one person speaks at a time.
- •Everyone participates, no one dominates.
- •Be succinct, avoid long anecdotes and examples.
- •No rank in the room.
- •Respect those not present.
- •Ask questions when you do not understand.
- •Attend to your personal comfort needs at any time but minimize team disruption.
- •HAVE FUN!!
- •?

Adapted from Boeing Aircraft Group Team Member Training Manual

Ten Commandments: An Affective Code of Cooperation

- • Help each other be right, not wrong.
- • Look for ways to make new ideas work, not for reasons they won't.
- • If in doubt, check it out! Don't make negative assumptions about each other.
- • Help each other win, and take pride in each other's victories.
- • Speak positively about each other and about your organization at every opportunity.
- • Maintain a positive mental attitude no matter what the circumstances.
- • Act with initiative and courage, as if it all depends on you.
- • Do everything with enthusiasm; it's contagious.
- • Whatever you want; give it away.
- • Don't lose faith.
- • Have fun

Ford Motor Company

Team Charter Examples & Research

- Team Charter – Developed by Vivian Corwin and Marilyn A. Uy for COM 321 (Organizational Behaviour) Gustavson School of Business, University of Victoria
- Group Ground Rules Contract Form – Developed by Deborah Allan, University of Delaware
- Mathieu, John E. & Rapp, Tammy L. 2009. Laying the foundation for successful team performance trajectories: The role of team charters and performance strategies. *Journal of Applied Psychology, 94*(1), 90-103

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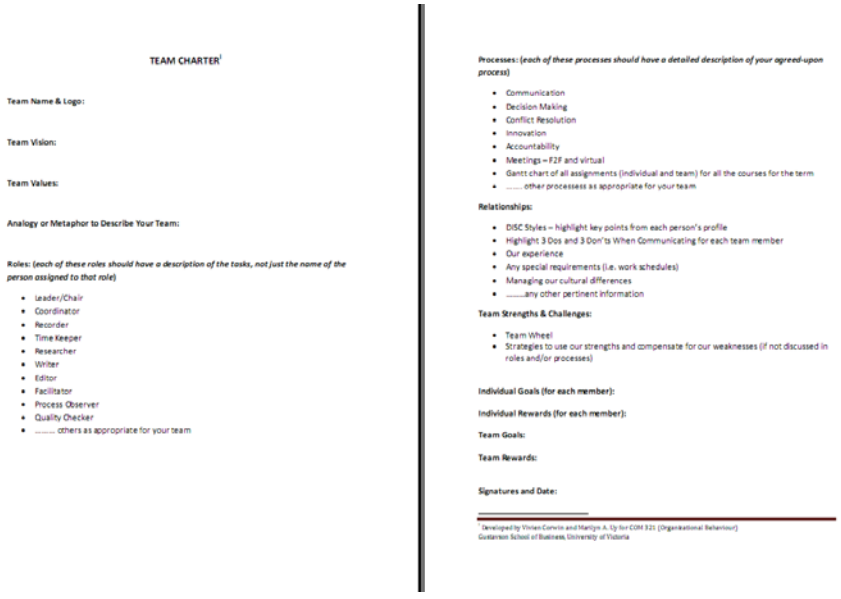

TEAM CHARTER[1]

Team Name & Logo:

Team Vision:

Team Values:

Analogy or Metaphor to Describe Your Team:

Roles: ***(each of these roles should have a description of the tasks, not just the name of the person assigned to that role)***

- Leader/Chair
- Coordinator
- Recorder
- Time Keeper
- Researcher
- Writer
- Editor
- Facilitator
- Process Observer
- Quality Checker
- ……. others as appropriate for your team

Processes: ***(each of these processes should have a detailed description of your agreed-upon process)***

- Communication
- Decision Making
- Conflict Resolution
- Innovation
- Accountability
- Meetings – F2F and virtual
- Gantt chart of all assignments (individual and team) for all the courses for the term
- ……. other processes as appropriate for your team

Relationships:

- DISC Styles – highlight key points from each person's profile
- Highlight 3 Dos and 3 Don'ts When Communicating for each team member
- Our experience
- Any special requirements (i.e. work schedules)
- Managing our cultural differences
- ……..any other pertinent information

Team Strengths & Challenges:

- Team Wheel
- Strategies to use our strengths and compensate for our weaknesses (if not discussed in roles and/or processes)

Individual Goals (for each member):

Individual Rewards (for each member):

Team Goals:

Team Rewards:

Signatures and Date:

[1] Developed by Vivian Corwin and Marilyn A. Uy for COM 321 (Organizational Behaviour) Gustavson School of Business, University of Victoria

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Group Ground Rules Contract Form
(Adapted from a form developed by Dr. Deborah Allen, University of Delaware)

Project groups are an effective aid to learning, but to work best they require that all groups members clearly understand their responsibilities to one another. These project group ground rules describe the general responsibilities of every member to the group. You can adopt additional ground rules if your group believes they are needed. Your signature on this contract form signifies your commitment to adhere to these rules and expectations.

All group members agree to:

1. Come to class and team meetings on time.
2. Come to class and team meetings with assignments and other necessary preparations done.

Additional ground rules:

1.

2.

If a member of the project team repeatedly fails to meet these ground rules, other members of the group are expected to take the following actions:

Step 1: (fill in this step with your group)

If not resolved:
Step 2: Bring the issue to the attention of the teaching team.
If not resolved:
Step 3: Meet as a group with the teaching team.

The teaching team reserves the right to make the final decisions to resolve difficulties that arise within the groups. Before this becomes necessary, the team should try to find a fair and equitable solution to the problem.

Member's Signatures: Group Number:_____

1._____ 3._____

2._____ 4._____

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Appendix

The Team Charter

The Team Charter was a lengthy, structured exercise that was introduced and explained during class time. It was framed in terms of how the team would function to compete in the business simulation. It contained three major parts, as detailed below. Teams could complete it in any way they chose (methods ranged from completing it together in person to exclusive use of virtual communications). Teams had a week to complete the assignment outside of class time.

Part 1: Individual Preparation
(Each member completed separately)

Members were asked to detail, in writing, their personal characteristics in terms of their

personal background (whatever they chose to share; usually, it was where they grew up, major, hobbies, personality features);

contact information and preferred medium or mediums (e.g., text, e-mail, voice, face-to-face);

availability in terms of hours and days, as well as preferred work times;

individual business-related strengths and weaknesses, including factors such as content knowledge and work experiences;

preferred work styles, particularly as related to teamwork, and;

anything else they believe the team should know.

Part 2: Team Roles, Expectations, and Processes
(One version for the entire team)

Members were to meet and share their individual information from Part 1 and then to determine, as a team, how they would operate and what types of norms they wished to establish. They were provided with a series of questions to prompt such a discussion:

What are your goals for the simulation, performance and otherwise?

Who will be responsible for what activities (including, perhaps, backup roles)? and

What is your timetable for activities?

As for norms, they were prompted to address specific expectations regarding

meeting attendance;

task performance and quality;

idea contributions;

cooperation and attitudes; and

anything else they wanted.

Part 3: Rewards and Sanctions
(One version for the entire team)

Members also determined, as a group, how they would

Ensure expected contributions and performance levels;

Reward members and the team for successes; and

Manage or sanction poor performance (often tied to peer evaluations, which contributed to students' course participation grades).

Teams were required to circulate a single copy to all members and to incorporate any edits or changes that were warranted. The final integrated document was passed in for the team grade and was posted in their team web space.

Received January 27, 2006
Revision received May 9, 2008
Accepted June 2, 2008 ■

Mathieu, John E. & Rapp, Tammy L. 2009. Laying the foundation for successful team performance trajectories: The role of team charters and performance strategies. *Journal of Applied Psychology, 94*(1), 90-103

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Professor's Role in
Formal Cooperative Learning

1. Specifying Objectives
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

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Formal Cooperative Learning – Types of Tasks

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

Challenge-Based Learning

- Problem-based learning
- Case-based learning
- Project-based learning
- Learning by design
- Inquiry learning
- Anchored instruction

John Bransford, Nancy Vye and Helen Bateman. Creating High-Quality Learning Environments: Guidelines from Research on How People Learn

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Challenge-Based Instruction with the Legacy Cycle

https://repo.vanth.org/portal/public-content/star-legacy-cycle/star-legacy-cycle

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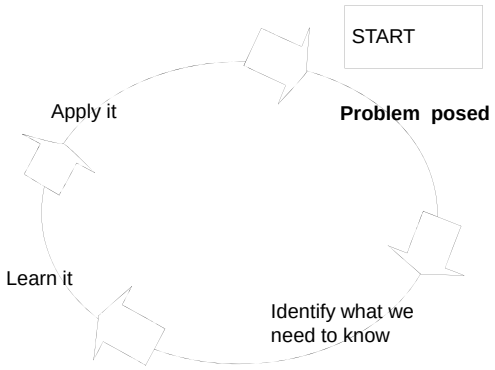
Problem-Based Learning



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Problem-Based Cooperative Learning

At M.I.T., Large Lectures Are Going the Way of the Blackboard

The Massachusetts Institute of Technology has changed the way it offers some introductory classes. Prof. Gabriella Sciolla at a class on electricity and magnetism.

By SARA RIMER
Published: January 12, 2009

COMMENTS (00)
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SINGLE PAGE

CAMBRIDGE, Mass. — For as long as anyone can remember, introductory physics at the Massachusetts Institute of Technology was taught in a vast windowless amphitheater known by its number,

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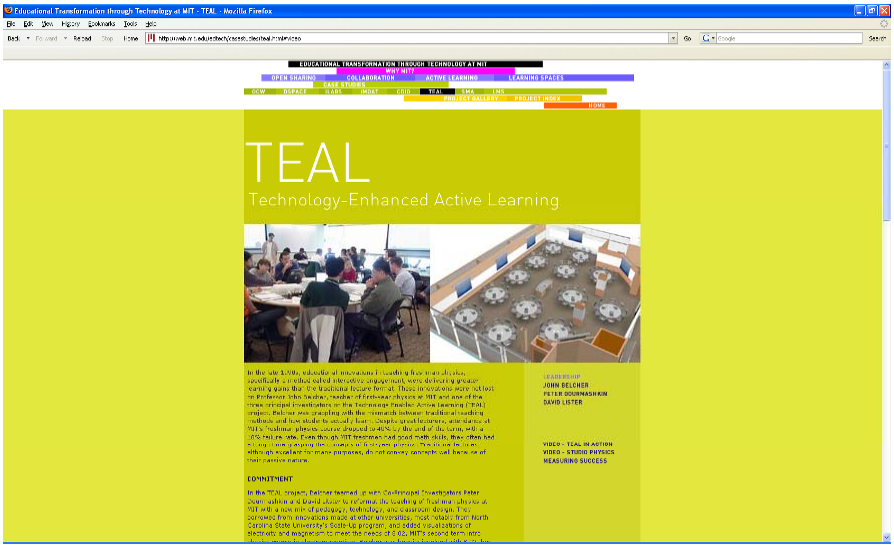
January 13, 2009—New York Times – http://www.nytimes.com/2009/01/13/us/13physics.html?em



http://web.mit.edu/edtech/casestudies/teal.html#video

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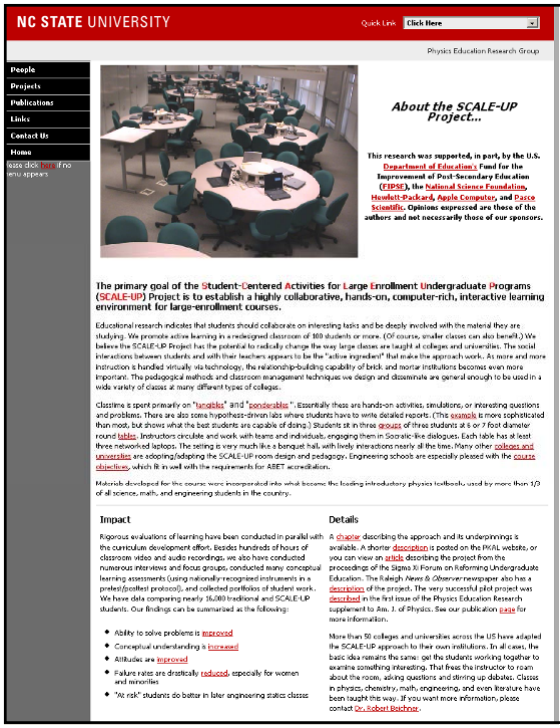

http://www.ncsu.edu/PER/scaleup.html

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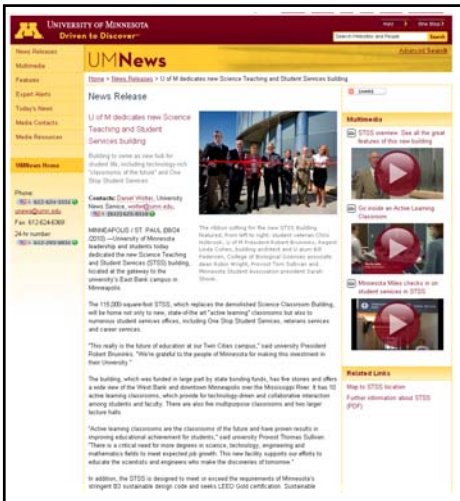

http://mediamill.cla.umn.edu/mediamill/embed/78755

http://www1.umn.edu/news/news-releases/2010/UR_CONTENT_248261.html

http://www.youtube.com/watch?v=lfT_hoiuY8w

http://youtu.be/lfT_hoiuY8w

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http://www.udel.edu/inst/

http://www.youtube.com/watch?v=gW_M426V2E0&feature=related

Leading with TeamLEAD: An Innovative Curriculum at Duke-NUS

- Called TeamLEAD (learn, engage, apply, develop), the method is a radical departure from traditional lecture-based teaching formats. Instead, students are responsible for learning the bulk of the material before class, using recorded lectures from Duke University School of Medicine along with reading assignments from textbooks and medical journals.
- Once in class, they are tested both individually and in small groups, so instructors can focus the rest of the session on areas of weakness. The teams then work together, with "open-book" access to medical references, to solve clinically oriented questions related to the material.
- "The best doctor is no longer the doctor with the best memory," says Robert Kamei, MD, vice dean for education at Duke-NUS. "In an age when information is available anywhere, instantaneously, we want to provide students with the skills they'll need in the future -- the ability to find the latest information and apply it to clinical practice.
- To succeed at the highest level, they need to be able to both work in teams and provide leadership, so our curricular approach focuses on developing those abilities, not just rote memorization."
- Although the concept of team-based learning was introduced in business schools in the 1980s, TeamLEAD is the first time it has been adapted for medical education.

http://www.youtube.com/watch?v=BlVPLYGdBLg

Problem-Based Cooperative Learning

Karl A. Smith
Engineering Education – Purdue University
Civil Engineering - University of Minnesota
ksmith@umn.edu
http://www.ce.umn.edu/~smith

Estimation Exercise

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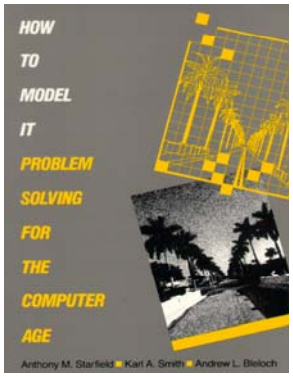
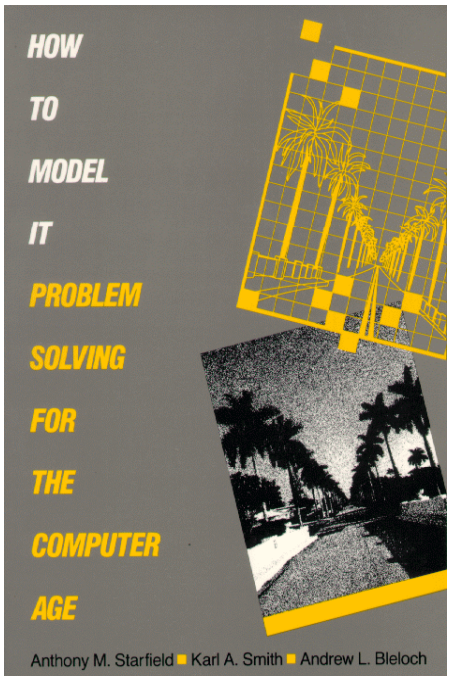
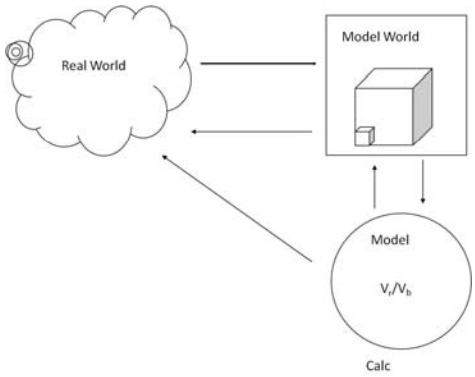
First Course Design Experience
UMN – Institute of Technology

- Thinking Like an Engineer
- Problem Identification
- Problem Formulation
- Problem Representation
- Problem Solving



Problem-Based Learning





*Based on First Year Engineering course – Problem-based cooperative learning *How to Model It* published in 1990.

Problem Based Cooperative Learning Format

TASK: Solve the problem(s) or Complete the project.

INDIVIDUAL: Estimate answer. Note strategy.

COOPERATIVE: One set of answers from the group, strive for agreement, make sure everyone is able to explain the strategies used to solve each problem.

EXPECTED CRITERIA FOR SUCCESS: Everyone must be able to explain the strategies used to solve each problem.

EVALUATION: Best answer within available resources or constraints.

INDIVIDUAL ACCOUNTABILITY: One member from your group may be randomly chosen to explain (a) the answer and (b) how to solve each problem.

EXPECTED BEHAVIORS: Active participating, checking, encouraging, and elaborating by all members.

INTERGROUP COOPERATION: Whenever it is helpful, check procedures, answers, and strategies with another group.

Cooperative Base Groups

- Are Heterogeneous
- Are Long Term (at least one quarter or semester)
- Are Small (3-5 members)
- Are for support
- May meet at the beginning of each session or may meet between sessions
- Review for quizzes, tests, etc. together
- Share resources, references, etc. for individual projects
- Provide a means for covering for absentees

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Designing and Implementing Cooperative Learning

- Think like a designer
- Ground practice in robust theoretical framework
- Start small, start early and iterate
- Celebrate the successes; problem-solve the failures

The Instructor's Role in Cooperative Learning

Make Pre-Instructional Decisions

Specify Academic and Teamwork Skills Objectives: Every lesson has both (a) academic and (b) interpersonal and small group (teamwork) skills objectives.

Decide on Group Size: Learning groups should be small (groups of two or three members, four at the most).

Decide on Group Composition (Assign Students to Groups): Assign students to groups randomly or select groups yourself. Usually you will wish to maximize the heterogeneity in each group.

Assign Roles: Structure student-student interaction by assigning roles such as Reader, Recorder, Encourager of Participation and Checker for Understanding.

Arrange the Room: Group members should be "knee to knee and eye to eye" but arranged so they all can see the instructor at the front of the room.

Plan Materials: Arrange materials to give a "sink or swim together" message. Give only one paper to the group or give each member part of the material to be learned.

Explain Task And Cooperative Structure

Explain the Academic Task: Explain the task, the objectives of the lesson, the concepts and principles students need to know to complete the assignment and the procedures they are to follow.

Explain the Criteria for Success: Student work should be evaluated on a criteria-referenced basis. Make clear your criteria for evaluating students' work.

***Structure Positive Interdependence:** Students must believe they "sink or swim together." Always establish mutual goals (students are responsible for their own learning and the learning of all other group members). Supplement, goal interdependence with celebration/reward, resource, role, and identity interdependence.

Structure Intergroup Cooperation: Have groups check with and help other groups. Extend the benefits of cooperation to the whole class.

***Structure Individual Accountability:** Each student must feel responsible for doing his or her share of the work and helping the other group members. Ways to ensure accountability are frequent oral quizzes of group members picked at random, individual tests, and assigning a member the role of Checker for Understanding.

***Specify Expected Behaviors:** The more specific you are about the behaviors you want to see in the groups, the more likely students will do them. Social skills may be classified as **forming** (staying with the group, using quiet voices), **functioning** (contributing, encouraging others to participate), **formulating** (summarizing, elaborating), and **fermenting** (criticizing ideas, asking for justification). Regularly teach the interpersonal and small group skills you wish to see used in the learning groups.

Monitor and Intervene

***Arrange Face-to-Face Promotive Interaction:** Conduct the lesson in ways that ensure that students promote each other's success face-to-face.

Monitor Students' Behavior: This is the fun part! While students are working, you circulate to see whether they understand the assignment and the material, give immediate feedback and reinforcement, and praise good use of group skills. Collect observation data on each group and student.

Intervene to Improve Taskwork and Teamwork: Provide **taskwork assistance** (clarify, reteach) if students do not understand the assignment. Provide **teamwork assistance** if students are having difficulties in working together productively.

Evaluate and Process

Evaluate Student Learning: Assess and evaluate the quality and quantity of student learning. Involve students in the assessment process.

***Process Group Functioning:** Ensure each student receives feedback, analyzes the data on group functioning, sets an improvement goal, and participates in a team celebration. Have groups routinely list three things they did well in working together an done thing they will do better tomorrow. Summarize as a whole class. Have groups celebrate their success and hard work.

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Cooperative Lesson Planning Form

Subject Area: _____ Date: _____

Lesson: _____

Objectives

Academic: _____

Social 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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Design and Implementation of Cooperative Learning – Resources

- Design Framework – How People Learn (HPL) & Backward Design Process
  - Streveler, R.A., Smith, K.A. and Pilotte, M. 2011. Aligning Course Content, Assessment, and Delivery: Creating a Context for Outcome-Based Education – http://www.ce.umn.edu/~smith/links.html
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