


Society for College & University Planning



Breakfast Seminar

Linking Insights from How People Learn to the Process of Planning Undergraduate Learning Spaces

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Concordia University – St. Paul – October 22, 2010

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21st Century Learning Outcomes

- Non-routine problem-solving
- Adaptability
- Complex social/communication skills
- Self-management/self-development
- Systems thinking

—Exploring the Intersection of Science Education and 21st Century Skills. NAS. 2010



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How People Learn

People learn best when they are:

- actively engaged in constructing their own knowledge
- situated in a social and supportive community
- able to reflect and build on prior knowledge
- involved with addressing problems that are relevant to their lives and work.



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Bureau of Labor Statistics

Occupational Outlook Handbook, 2008 – 2009

Teachers:

- ...act as facilitators or coaches.
- ...use a 'hands-on' approach...to help students understand abstract concepts, solve problems, and develop critical thought processes.
- ...encourage collaboration in solving problems by having students work in groups to discuss and solve problems.
- ...[understand that] to be prepared for success late in life, students must be able to interact with others, adapt to new technology, and think through problems logically.

5 5

Transparent Beauty By Robert L. Reid

*The 163,000 sq ft extension to the Massachusetts Institute of Technology's Media Lab provides a beautiful example of **how a building's design can promote interaction and collaboration** among the people working within its walls.*



Reflection and Dialogue

- Individually reflect on Building Design and Space Planning Practices that support and foster Interaction and Collaboration. Write for about 1 minute
- Discuss with your neighbor for about 3 minutes
 - Select one Practice, Insight, Success Story, Comment, Question, etc. that you would like to present to the whole group if you are randomly selected
- Whole group discussion

STEVEN JOHNSON WHERE GOOD IDEAS COME FROM THE NATURAL HISTORY OF INNOVATION

FROM THE BESTSELLING
AUTHOR OF EVERYTHING
BAD IS GOOD FOR YOU
AND THE INVENTION
OF AIR

This is a book about the space of innovation. Some environments squelch new ideas; some environments seem to breed them effortlessly (p. 19).

What kind of environment creates good ideas? The simplest way to answer it is this: innovative environments are better at helping their inhabitants **explore the adjacent possible** .. (p. 36).

Our thought shapes the spaces we inhabit, and our spaces return the favor. The argument in this book is that a series of **shared properties** and patterns recur again and again in unusually fertile environments (p. 20).

Where Good Ideas Come From

seven shared properties and patterns

- The adjacent possible
- Liquid networks
- The slow hunch
- Serendipity
- Error
- Exapation (type of borrowing – Stephen Jay Gould & Elisabeth Vrba, 1971, e.g., Gutenberg's printing press – classic combinatorial innovation, more bricolage than breakthrough)
- Platforms

It could well be that faculty members of the twenty-first century college or university will find it necessary to set aside their roles as teachers and instead become designers of learning experiences, processes, and environments.

James Duderstadt, 1999 [Nuclear Engineering Professor; Dean, Provost and President of the University of Michigan]



Student Engagement Research Evidence

- Perhaps the strongest conclusion that can be made is the least surprising. Simply put, the greater the student's involvement or engagement in academic work or in the academic experience of college, the greater his or her level of knowledge acquisition and general cognitive development ...(Pascarella and Terenzini, 2005).
- Active and collaborative instruction coupled with various means to encourage student engagement invariably lead to better student learning outcomes irrespective of academic discipline (Kuh et al., 2005, 2007).

See Smith, et.al, 2005 and Fairweather, 2008, Linking Evidence and Promising Practices in Science, Technology, Engineering, and Mathematics (STEM) Undergraduate Education - http://www7.nationalacademies.org/bose/Fairweather_CommissionedPaper.pdf

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

Cooperative Learning	
Positive Interdependence	Individual Accountability
<ul style="list-style-type: none"> • All members share resources • All members are responsible • All members are motivated to get involved • All members are motivated to help others • All members are motivated to help others • All members are motivated to help others 	<ul style="list-style-type: none"> • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning
Group Processing	Face-to-Face Interaction
<ul style="list-style-type: none"> • All members are motivated to get involved • All members are motivated to help others • All members are motivated to help others • All members are motivated to help others • All members are motivated to help others • All members are motivated to help others 	<ul style="list-style-type: none"> • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning • Each member is responsible for his or her own learning

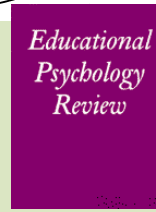
Cooperative Learning Research Support

Johnson, D.W., Johnson, R.T., & Smith, K.A. 1998. Cooperative learning returns to college: What evidence is there that it works? *Change*, 30 (4), 26-35.

- Over 300 Experimental Studies
- First study conducted in 1924
- High Generalizability
- Multiple Outcomes

Outcomes

1. Achievement and retention
2. Critical thinking and higher-level reasoning
3. Differentiated views of others
4. Accurate understanding of others' perspectives
5. Liking for classmates and teacher
6. Liking for subject areas
7. Teamwork skills



Active and 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. Gabriela Socola
by SARA FARRER
Published: January 12, 2009

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,

COMMENTS (0)
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SIMPLE PAGE

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

EDUCATION

Farewell, Lecture?

Eric Mazur

Discussions of education are generally predicated on the assumption that we know what education is. I hope to convince you otherwise by recounting some of my own experiences. When I started teaching introductory physics to undergraduates at Harvard University, I never asked myself how I would educate my students. I did what my teachers had done—I lectured. I thought that was how one teaches. Look around anywhere in the world and you'll find lecture halls filled with students and, at the front, an instructor. This approach to education has not changed since before the Renaissance and the birth of scientific inquiry. Early in my career I received the first hint that something was wrong with teaching in this manner, but I had ignored it. Sometimes it's hard to face reality.

When I started teaching, I prepared lecture notes and then taught from them. Because my lectures deviated from the textbook, I provided students with copies of these lecture notes. The infuriating twist was that on my end-of-semester evaluation—which were quite good at first—many of students complained that I was "lecturing straight from (the) lecture notes." What was I supposed to do? Develop a set of lecture notes different from the ones I "handed out"? I decided to prove the students' complaints.

A few years later, I discovered that the students were right. My lecturing was ineffective, despite the high evaluations. Early on in the physics curriculum, week 2 of a typical introductory physics course—the Laws of Newton—was emphasized. Every student in such a course can recite Newton's third law of

motion, which states that the force of object A on object B is an interaction between two objects is equal in magnitude to the force of B on A—sometimes is known as "action is reaction." One day, when the course had progressed to more complicated material, I decided to test my students' understanding of this concept not by doing traditional problems, but by asking them a set of basic conceptual questions (Fig. 2). One of the questions, for example, required students to compare the forces that a heavy truck and a light car exert on one another when they collide. I expected that the students would have no trouble tackling such questions, but much to my surprise,

half a minute after the test began, one student asked, "How should I answer these questions?" According to what you might me or according to the way I usually think about these things?" To my dismay, students had great difficulty with these conceptual questions. That was when it began to dawn on me that something was amiss.

In hindsight, the reason for my students' poor performance is simple. The traditional approach to teaching reduces education to a transfer of information. Before the industrial revolution, when books were not yet mass commodities, the lecture hall was the only way to transfer information from one generation to the next. However, education is so



Click here. Students continually discuss concepts during, therefore, and with the instructor during class. Discussions are spurred by multiple-choice conceptual questions that students answer using a clicker device. See supporting online text for examples of such "clicker" questions.

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2 JANUARY 2009 VOL. 323 SCIENCE www.sciencemag.org

January 2, 2009—Science, Vol. 323
www.sciencemag.org

Calls for evidence-based promising practices

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Physics Education Research Group

About the SCALE-UP Project..

This research was supported, in part, by the U.S. Department of Education's Fund for the Improvement of Post-Secondary Education (FIPSE), the National Science Foundation, Hewlett-Packard, Apple Computer, and Texas Scientific. Opinions expressed are those of the authors and not necessarily those of our sponsors.



The primary goal of the Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) Project is to establish a highly collaborative, hands-on, computer-rich, interactive learning environment for large-enrollment courses.

Educational research indicates that students should collaborate on interesting topics and be deeply involved with the material they are studying. We promote active learning in an enlarged classroom of 30 students or more. (Of course, smaller classes can also benefit.) We believe the SCALE-UP Project has the potential to radically change the way large classes are taught at colleges and universities. The social interactions between students and with their teachers appear to be the "active ingredient" that make the approach work. As more and more instruction is handled virtually, via technology, the relationship-building capability of face and voice interactions becomes even more important. The pedagogical methods and classroom management techniques we design and disseminate are general enough to be used in a wide variety of classes at many different types of colleges.

Classes are split primarily on "interest" and "socioeconomic". Essentially these are hands-on activities, simulations, or interesting questions and problems. There are also some hypothesis-driven labs where students have to write detailed reports. (The classes are more sophisticated than most, but shows what the best students are capable of doing.) Students sit in three groups of three students at 6 or 7 foot diameter round tables. Instructors circulate and work with teams and individuals, engaging them in Socratic-style dialogues. Each table has at least three networked laptops. The setting is very much like a banquet hall, with lively conversations nearly all the time. Many other colleges and universities are adopting (adapting) the SCALE-UP with science and pedagogy. Engineering schools are especially pleased with the course structure, which fits well with the requirements for ABET accreditation.

Materials developed for these courses were incorporated into what became the leading introductory physics textbooks used by more than 1/2 of all science, math, and engineering students in the country.

Impact

Rigorous evaluations of learning have been conducted in parallel with the curriculum development effort. Besides hundreds of hours of classroom video and audio recordings, we also have conducted numerous interviews and focus groups, conducted many conceptual learning assessments (using nationally recognized instruments in a pretest/posttest paradigm), and collected portfolios of student work. We have data comparing nearly 15,000 traditional and SCALE-UP students. Our findings can be summarized as the following:

- Ability to solve problems is improved
- Conceptual understanding is improved
- Attitudes are improved
- Failure rates are drastically reduced, especially for women and minorities
- "At risk" students do better in later engineering statics classes

Details

A chapter describing the approach and its underpinnings is available. An author discussion is posted on the PERL website, or you can view an article describing the project from the proceedings of the Sigma Xi Forum on Reforming Undergraduate Education. The Fulbright Award in International experience also has a discussion of the project. The very successful pilot project was described in the first issue of Physics Education Research's supplement to Am. J. of Physics. See our publication page for more information.

More than 50 colleges and universities across the US have adopted the SCALE-UP approach to their own institutions. In all cases, the basic idea remains the same: get the students working together to examine something interesting. That frees the instructor to roam about the room, asking questions and stirring up debates. Classes in physics, chemistry, math, engineering, and even literature have been taught this way. If you want more information, please contact Dr. Robert Beichner.

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

The American College Teacher:

National Norms for 2007-2008

Methods Used in "All" or "Most"	All – 2005	All – 2008	Assistant - 2008
Cooperative Learning	48	59	66
Group Projects	33	36	61
Grading on a curve	19	17	14
Term/research papers	35	44	47

<http://www.heri.ucla.edu/index.php>

High Performance Teams



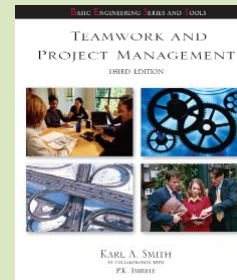
Top Three Main Engineering Work Activities

Engineering Total

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

Civil/Architectural

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



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How Should Colleges Prepare Students To Succeed In Today's Global Economy?

Based On Surveys Among Employers And Recent College Graduates

Conducted On Behalf Of:
The Association Of American Colleges And Universities

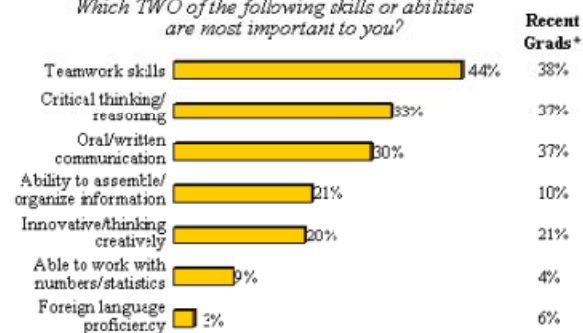
By Peter D. Hart Research Associates, Inc.

December 28, 2006

Peter D. Hart Research Associates, Inc.
1724 Connecticut Avenue, NW
Washington, DC 20009

Most Important Skills Employers Look For In New Hires

Which TWO of the following skills or abilities are most important to you?



* Skills/abilities recent graduates think are the two most important to employers

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

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Design team failure is usually due to failed team dynamics

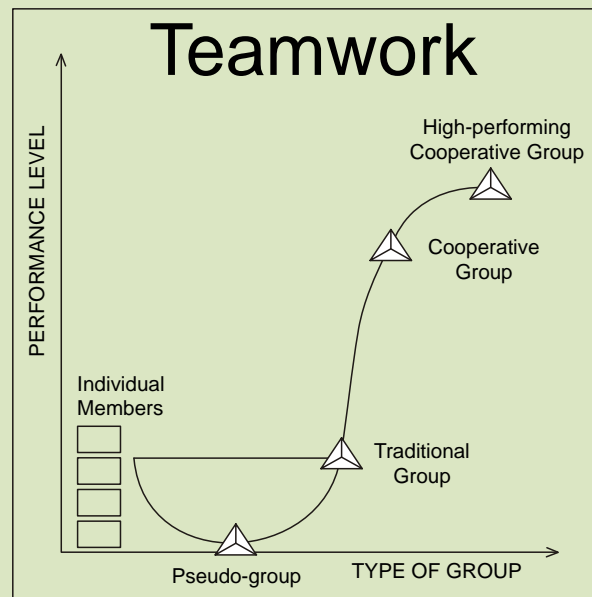
(Leifer, Koseff & Lenshow, 1995).

It's the soft stuff that's hard, the hard stuff is easy

(Doug Wilde, quoted in Leifer, 1997)

Professional Skills

(Shuman, L., Besterfield-Sacre, M., and McGourty, J., "The ABET Professional Skills-Can They Be Taught? Can They Be Assessed?" Journal of Engineering Education, Vo. 94, No. 1, 2005, pp. 41–55.)



Characteristics of High Performing Teams

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- ?

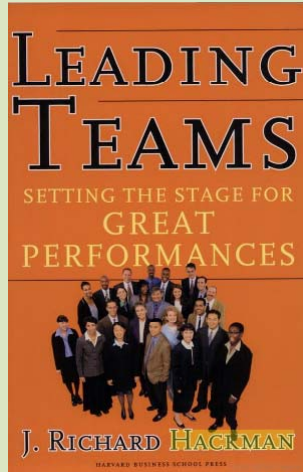
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A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable

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

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

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

Cooperative Learning

Positive Interdependence	Individual Accountability
Goal Interdependence (essential) <ol style="list-style-type: none"> 1. All members show mastery 2. All members improve 3. Add group member scores to get an overall group score 4. One product from group that all helped with and can explain 	Ways to ensure no slackers: <ul style="list-style-type: none"> • Keep group size small (2-4) • Assign roles • Randomly ask one member of the group to explain the learning • Have students do work before group meets • Have students use their group learning to do an individual task afterward • Everyone signs: "I participated, I agree, and I can explain" • Observe & record individual contributions
Role (Duty) Interdependence Assign each member a role and rotate them	
Resource Interdependence <ol style="list-style-type: none"> 1. Limit resources (one set of materials) 2. Jigsaw materials 3. Separate contributions 	
Task Interdependence <ol style="list-style-type: none"> 1. Factory-line 2. Chain Reaction 	Ways to ensure that all members learn: <ul style="list-style-type: none"> • Practice tests • Edit each other's work and sign agreement • Randomly check one paper from each group • Give individual tests • Assign the role of checker who has each group member explain out loud • Simultaneous explaining: each student explains their learning to a new partner
Outside Challenge Interdependence <ol style="list-style-type: none"> 1. Intergroup competition 2. Other class competition 	
Identity Interdependence Mutual identity (name, motto, etc.)	
Environmental Interdependence <ol style="list-style-type: none"> 1. Designated classroom space 2. Group has special meeting place 	
Fantasy Interdependence Hypothetical interdependence in situation ("You are a scientific/literary prize team, lost on the moon, etc.")	
Reward/Celebration Interdependence <ol style="list-style-type: none"> 1. Celebrate joint success 2. Bonus points (use with care) 3. Single group grade (when fair to all) 	

Karl A. Smith
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 ksmith@umn.edu
 http://www.ce.umn.edu/~smith
 Skype: kasmithce

Face-to-Face Interaction

Structure:

- Time for groups to meet
- Group members close together
- Small group size of two or three
- Frequent oral rehearsal
- Strong positive interdependence
- Commitment to each other's learning
- Positive social skill use
- Celebrations for encouragement, effort, help, and success!

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

Teamwork Skills

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

Cooperative Teamwork Skills	Teaching Cooperative Skills
Forming Skills Initial Management Skills <ul style="list-style-type: none"> • Move into Groups Quickly • Ask With the Group • Use Group Minutes • Take Turns • Use Names, Look at Speaker • No "Who-Does" 	Teaching Cooperative Skills <ol style="list-style-type: none"> 1. Help students see the need to learn the skill. 2. Help them learn how to do it (I can). 3. Encourage them to practice the skill daily. 4. Help them reflect on progress & make note. 5. Help them generalize until skill is automatic.
Norming Skills Group Management Skills <ul style="list-style-type: none"> • Share Ideas and Opinions • Give Directions to the Group's Work, some assignment purposes, provide time limits, offer procedures • Encourage Everyone to Participate • Ask for Help or Clarification • Express Support and Acceptance • Offer Feedback Clearly • Paraphrase Others' Contributions • Energize the Group • Describe Feelings When Appropriate 	Monitoring, Observing, Intervening, and Processing Monitor to promote academic & cooperative success Observe for appropriate teamwork skills; praise them; use self-monitored students to use them if requested Intervene if necessary to help groups solve academic or teamwork problems Process so students continuously analyze how well they are doing and compare in order to continue successful strategies and improve when needed
Performing Skills Formal Methods for Processing Interests <ul style="list-style-type: none"> • Summarize as Our Last Comments • Seek Accuracy by Cross-checking to Summaries • Help the Group Find Clear Ways to Remember • Check Understanding by Demanding Clarification • Ask Others to Plan for Being Teaching Our Last 	Ways of Processing Positive Feedback <ol style="list-style-type: none"> 1. Have volunteer students tell the class something their partners did which helped them learn 2. Have all students tell their partners something the partners did which helped them learn today 3. Tell the class helpful behaviors you saw today Group Analysis <ol style="list-style-type: none"> 1. Name 3 things your group did today which helped you learn and work well together 2. Name 1 thing you could do even better next time Cooperative Skill Analysis <ol style="list-style-type: none"> 1. Rate your use of the target cooperative skill. 2. Give a "Praise Card" - "Good work" 3. Decide how you will encourage each other to practice the target skill next time Start: "Did your partners say he/she did it well?" End: "Did your partners say he/she did it well?"

Interaction Book Company
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 www.interaction.org

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

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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. _____

32 4. _____

Group Processing Plus/Delta Format

Plus (+) Things That Group Did Well	Delta (Δ) Things Group Could Improve

Design and Implementation of Cooperative Learning – Resources

- Design Framework – How People Learn (HPL) & Backward Design Process
 - Creating High Quality Learning Environments (Bransford, Vye & Bateman) -- <http://www.nap.edu/openbook/0309082927/html/>
 - Pellegrino – Rethinking and redesigning curriculum, instruction and assessment: What contemporary research and theory suggests. <http://www.skillscommission.org/commissioned.htm>
 - Smith, K. A., Douglas, T. C., & Cox, M. 2009. Supportive teaching and learning strategies in STEM education. In R. Baldwin, (Ed.). Improving the climate for undergraduate teaching in STEM fields. [New Directions for Teaching and Learning, 117](#), 19-32. San Francisco: Jossey-Bass.
- Content Resources
 - Donald, Janet. 2002. Learning to think: Disciplinary perspectives. San Francisco: Jossey-Bass.
 - Middendorf, Joan and Pace, David. 2004. Decoding the Disciplines: A Model for Helping Students Learn Disciplinary Ways of Thinking. New Directions for Teaching and Learning, 98.
- Active and Cooperative Learning - Instructional Format explanation and exercise to model format and to engage workshop participants
 - Cooperative Learning (Johnson, Johnson & Smith)
 - Smith web site – www.ce.umn.edu/~smith
 - Smith (2010) Social nature of learning: From small groups to learning communities. New Directions for Teaching and Learning, 2010, 123, 11-22 [[NDTL-123-2-Smith-Social Basis of Learning-pdf](#)]
 - Smith, Sheppard, Johnson & Johnson (2005) Pedagogies of Engagement [[Smith-Pedagogies of Engagement.pdf](#)]
 - Cooperative learning returns to college: What evidence is there that it works? Change, 1998, 30 (4), 26-35. [[CLReturnstoCollege.pdf](#)]
- Other Resources
 - University of Delaware PBL web site – www.udel.edu/pbl
 - PKAL – Pedagogies of Engagement – <http://www.pkal.org/activities/PedagogiesOfEngagementSummit.cfm>
 - Fairweather (2008) Linking Evidence and Promising Practices in Science, Technology, Engineering, and Mathematics (STEM) Undergraduate Education - http://www7.nationalacademies.org/bose/Fairweather_CommissionedPaper.pdf

Skills: Hard Workers

From Boeing Aircraft Group Team Member Training Manual (Excerpts):

- EVERY member is responsible for the team's progress and success.
- Listen to and show respect for the contributions of other members; be an active listener.
- CONSTRUCTIVELY criticize ideas, not persons.
- Only one person speaks at a time.
- Everyone participates; no one dominates.
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- Ask questions when you do not understand.
- Attend to your personal comfort needs at any time, but minimize team disruption.
- HAVE FUN!!



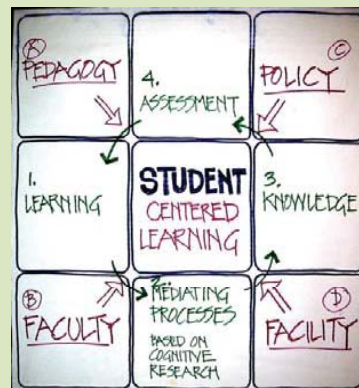
Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise...by interacting on an ongoing basis.

— Wenger, etal. Communities of Practice. 2002

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Skills: Systems Thinkers

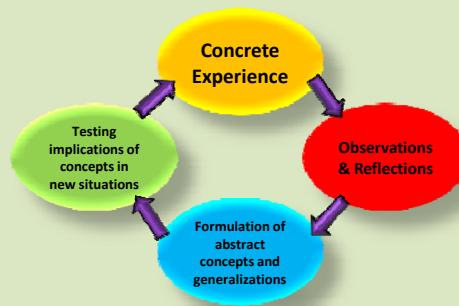
Leadership is present where we find people working together believing their cooperative efforts will lead to improvements in the system for everyone and to systemic change.



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Reflecting Communities

Kolb's Experiential Learning Cycle *An aid to reflection*

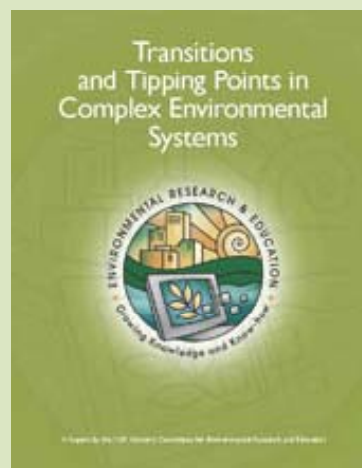
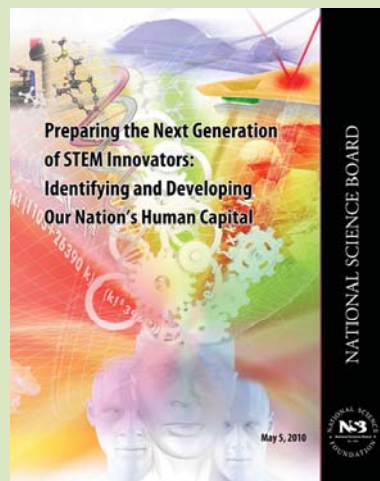


Consider the experience of dancing on a dance floor in contrast with standing on a balcony and watching other people dance... To discern the larger patterns on the dance floor...we have to stop moving and get to the balcony.

— Ronald A. Heifetz, *Leadership Without Easy Answers*. The Belknap Press of Harvard University Press, 1994.

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2009/2010 Reports



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What students are able to do

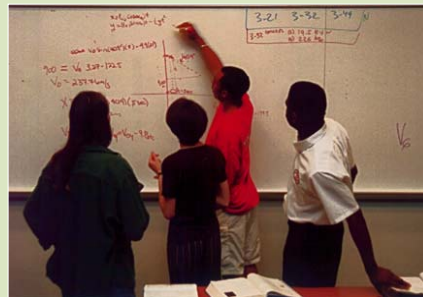
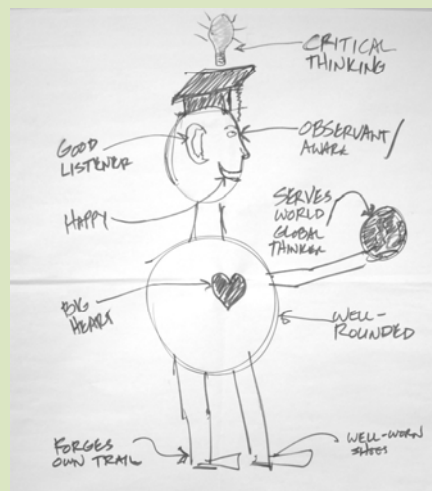
What students are able to be



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The PKAL Vision

The Ideal Learners



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