Supplementary Material for Loma Linda University
Using Cooperative Activities to Promote Deep Learning
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Cover Slide

Cartoon: Rapt and attentive faces

Slide: The Zen of Power Point

Slide: Goals
Participants will:

- Become familiar with some key research related to teaching and learning;
- Understand how cooperative learning—when carefully structured and monitored—supports the research on teaching and learning;
- Reflect on the nature of their own approaches to teaching and learning;
- Enjoy interacting with like-minded colleagues.

Slide: Agenda

- An Overview/Introduction to Cooperative Learning
- **Three-Step Interview**: Exploring Cooperative Learning
- **Roundtable**: Barriers to Cooperative Learning
- **Standup and Share**: A Rapid Report-Out Method
- Three Key Learning Principles: Number One
- Number Two
- What is Learning and Deep Learning
- Three Examples of Deep Learning Sequences:
    - In-class or online JIGSAW based on a character trait graphic organizer completed as homework.
    - **PRO-CON-CAVEAT GRID graphic organizer completed individually as homework and later as a team project. Teams compare their efforts.**
    - DOUBLE-ENTRY JOURNAL graphic organizer completed as homework and compared within pairs. The sequence continues.
- **Numbered Heads Together/Structured Problem Solving**: Solutions to barriers
- **Three Stay One Stray**: A Rapid Report Method
- Third Key Learning Principle
- Conclusion

Slide: Warning!

Slide: My Discipline-Specific Applications

Cartoons (Five): Lecture, Pouring, Spilling, Mr. Hanson, Dancing

Slide: What is Cooperative Learning?

Slide: A structured form of

- small group problem solving that
- incorporates the use of heterogeneous teams,
- maintains individual accountability,

- promotes positive interdependence,
- instills group processing, and
- sharpens social (leadership) skills

Slide: IDEA paper: Enhancing Learning—and more!—Through Cooperative Learning
http://www.idea.ksu.edu/papers/Idea_Paper_38.pdf

Cartoon: Social animals

Slide: The Quiet Signal
The teacher signals for quiet, often with a raised hand.
Students complete their sentences.
Students raise their hands and alert classmates to the signal.

Slide: The Three-Step Interview
A interviews B for the specified number of minutes, listening attentively and asking probing questions.
At a signal, they reverse roles with B interviewing A for the same number of minutes with the same question(s).
At another signal, each pair turns to another pair, forming a group of four (quad). Each member of the quad introduces his or her partner, highlighting the most interesting points.

Slide: The Three-Step Interview Questions
Name and courses taught or other responsibilities?
How familiar are you with cooperative learning? To what extent do you use it in your classes? In what ways?
**********Extra time?**********
What are your greatest strengths as a teacher?
What could you improve?

Slide: Sponge or Extension Activity
Always provide an extra activity, issue, or problem for students to address when they finish the initial assignment. This practice keeps studnets on task and also challenges high-functioning groups

Slide: First Things First
Always explain the task to students before they can begin it.

Two Cartoons: Take turns, Igor

Slide: Monitoring
When you assign group work where issues are discussed, you can easily gain in-depth insights into your students' learning and attitudes. Often comments you have overheard as you move from group to group can be integrated into a mini-lecture taking into account what you have learned about your students' learning.

Slide: Three-step Interview: Applications in Various Disciplines
- Should Nora in *The Doll House* have left her husband?
- What are the most important qualities of an effective leader?
- Was the United States justified in dropping the atomic bomb on Nagasaki?
- Should wolves be reintroduced into Yellowstone National Park?

- Should the United States adopt a flat tax system?
- What are some of the ethical or societal issues related to human gene theory? What is your opinion about any of these issues?
- How has the current business environment affected managerial accounting?

Slide: Group Formation

- Students Self-Select

- Random

- Teacher-selected

Slide: Individual Identity: Typical Student Team Roles

Students have an individual team identity linked to roles that rotate each week within each group. Their playing card (heart, diamond, spade, club) within their team (Aces, Twos, Threes, etc.) remains the same.

- Leader or Facilitator
- Recorder or "Scribe"
- Reporter or Spokesperson
- Folder Monitor

These roles typically rotate once a week. For some activities you will announce that whoever is called on will serve as the team's spokesperson.

A Rapid Report-out Method: Luck of the draw

Slide: e-learning: Groups in Course Management Systems

- Course management systems allow students to participate in group activities;
- Each group can participate in their own discussion board and virtual classroom;
- Each group can file share and e-mail each other.

Slide: Roundtable

- The teacher poses an open-ended question.

- Each group has one piece of paper and one pen.
- The first student writes one response, saying it out loud.
- He or she passes the paper to the left where a second student writes a response, etc.
- The "brainstorm" continues until time elapses.
- Students may say "pass"

Cartoon: Brain drizzle

Slide: What are some barriers to cooperative learning?

- Your own misgivings?
- Student concerns?
- Departmental barriers?
- Institutional?

Cartoons (Five): Holding up end, Building a lion, Small groups, Shared ignorance, Calvin

Slide: I should get a refund of my tuition. I had to teach myself.
Repeat directions

Slide: Roundtable: Various Discipline Applications

- Have students brainstorm topics for a comparison/contrast composition.
- Have students predict the possible repercussions of a UN invasion of North Korea.
- Have students summarize the causes of the Civil War.
- Have students identify the characteristics of an ideal teacher/student.
- Have students list the components of the human respiratory system: as they pass the paper again, they add their functions.
- Have students brainstorm items that might be found in a manufacturing overhead.

Slide: Stand up and Share

- The teacher calls out the number/suit/color of the person who will serve as each team's spokesperson.
- That person rises and in rapid roundrobin fashion, each team shares its ideas.
- Several rotations may occur.
- The teacher changes the spokesperson by calling another "identity."
- When a team's ideas have been fully shared, the spokesperson sits down.

Slide: Linking Cooperative Learning to the Research on How People Learn

Applications in Various Disciplines

Slide: How People Learn
How People Learn:
Brain, Mind, Experience, and School
John D. Bransford, Ann L. Brown, and Rodney R. Cocking, *editors*
Committee on Developments in the Science of Learning
Commission on Behavioral and Social Sciences and Education
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C. 1999

http://www.nap.edu/html/howpeople1/notice.html

Slide: Three Findings
Three findings . . . have a solid research base to support them and strong implications for how we teach.
—Bransford, Brown, & Cocking, Eds. *How People Learn: Brain, Mind, Experience, and School*.

Slide: Three Key Learning Principles

- Prior Knowledge: Students construct new knowledge based on what they already know (or don't know);
- Deep Foundational Knowledge: Students need a deep knowledge base and conceptual frameworks;
- Metacognition: Students must identify learning goals and monitor their progress toward them.

Slide: Learning Principle Number One

The contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe.

Slide: Teaching and Learning Implications from Learning Principle Number One
Find out what students know and don't know, including their misconceptions

Cartoon: Misconceptions

Slide: Run, Forrest, Run!

Slide: Classroom Assessment Techniques (CATs)
can help teachers learn what students know or don't know or misunderstand.

- Learner-Centered
- Teacher-Directed
- Mutually Beneficial
- Formative
- Context-Specific
- Ongoing
- Rooted in Good Teaching Practice
  --Angelo, T. & Cross, P. (1993) *Classroom Assessment Techniques. 2nd Ed.* San Francisco: Jossey-Bass.

Slide: Background Knowledge Probe: (A Quiz)

Purposes

- (For students) BKP's highlight key information to be studied, offering both a preview of material to come and a review of prior knowledge;
- (For teachers) BKP's help determine the best starting point and the most appropriate level for a lesson;
- (For both) BKP's can be used for pre and post-lesson assessment of learning.

Slide: Assessing Prior Knowledge
What do you want to learn about? What questions do you have?

- Prior to new chapter, students submit questions / preconceptions about upcoming material.

Slide: How Familiar Are you with *Classroom Assessment Techniques*?

5 = Know it well and use CATs
4 = Know it
3 = I've heard of CATs and like the idea of them
4 = I've heard of CATs
1. News to me!

Slide: Student Information Sheet
Law 220 Bio Sheet (from Capt Ratna Contractor, US Air Force Academy)

- Name: _____
- How you would like me to address you: _____
- Hometown:_____
- Finish the following sentence: I came to this institution because _____ _____.
- Career field choice once you graduate: _____.
- Extra Curricular Activities (my goal is to try and get our and watch each of my students doing "their thing"—I'm not always successful, but what are you doing that I should come to watch): _____
- Favorite book & movie: _____
- The best teacher I've had at this institution did these three things:_____ _____
- One thing I would like to learn about is: _____

Slide: Focused Listing-Metacognition

Jot down everything you know about this term. What does metacognition mean? How is it related to learning? Why is it important?

Slide: Focused Listing

- Purpose: This tool helps determine what learners recall about a specific topic, including the concepts they associate with the central point. Working in pairs can help students build their knowledge base and clarify their understanding. This technique can be used before, during, or after a lesson.
- Steps: Ask students to write the key word at the top of a page and within a set time limit (usually 2-3 minutes) to jot down related terms important to understanding that topic.

Assessment: Compare students' lists with a master one you have generated, looking at both the quantity and quality of their responses. Categorize responses into "related" or "unrelated" or "appropriate" or "inappropriate" stacks. Consider compiling a master list and having students then sort them by categories.

Focused Listing Applications in Various Disciplines

- Antenna
- Symbolism
- Astronaut
- Myth
- Reinforcement
- Corporation
- Random Distribution
- Electrical Circuits

- Momentum
- Bonding

Slide: Other Low Preparation CATS

Directed Paraphrasing

- Students put into their own words key concepts or parts of a lesson for a specific audience or purpose (e.g., Explain the concept of "corporation" to high school students; Explain an "irrevocable trust" to a group of retirees);
- The responses can be sorted as "confused," "minimal," "adequate," or "excellent."

Slide: Application Cards

- Students give one or more real-world applications for an important principle, generalization, theory, or procedure.

  Examples:

  – (Business) Stephen Covey recommends "Win-win performance agreements": give two specific applications, one related to current news and one related to your own life.
  – (Government) Give a concrete example of the concept "due process."
- The responses can be sorted as "unacceptable," "marginal," "adequate," or "excellent."

Slide: John Hertle's Key Principle and Restating

Slide: Applications: Focused Listing, Directed Paraphrasing, Application Cards, John Hertle's "Key Principle and restating"

Slide: What is Learning?

Ambrose, Susan, Bridges, Michael W., DiPietro, Michele, Lovett, Marsha C., Norman, Marie K. (2010). *How Learning Works: Seven Researched-Based Principles for Smart Teaching*. San Francisco, CA: Jossey-Bass.

Any set of learning principles is predicated on a definition of learning. In this book, we define learning as a *process* that leads to *change*, which occurs as a result of experience and increases the potential for improved performance and future learning (adapted from Mayer, 2002). There are three critical components to this definition:

- Learning is a process, not a product. However, because this process takes place in the mind, we can only infer that it has occurred from students' products or performances.
- Learning involves *change* in knowledge, beliefs, behaviors, or attitudes. This change unfolds over time; it is not fleeting but rather has a lasting impact on how students think and act.
- Learning is not something done *to* students, but rather something students themselves do. It is the direct result of how students interpret and respond to their experiences—conscious and unconscious, past and present.

Slide: Learning Principle Number Two

To develop competence in an area of inquiry, students must:

(a) have a deep foundation of factual knowledge;
(b) understand facts and ideas in the context of a conceptual framework;
(c) organize knowledge in ways that facilitate retrieval and application.

Slide: Deep Learning

- Motivational Context: Students' motivation is intrinsic, and they experience a need to know something.
- Active Learning: Students are actively involved, rather than passive.

- Interaction with Others: There are opportunities for exploratory talk.
- A Well-Structured Knowledge Base: Content is taught in integrated wholes and related to other knowledge, rather than presented in small separate pieces. —Oxford Center for Staff Development

See IDEA Paper #47, *Promoting Deep Learning*, at
http://www.theideacenter.org/sites/default/files/IDEA_Paper_47.pdf

Slide: Motivational Context
We learn best what we feel we need to know. Intrinsic motivation remains inextricably bound to some level of choice and control.

Cartoons (Three): Children won't eat vegetables; Sandwiches; Fabio

Slide: Active Learning
Deep learning and "doing" travel together. Doing in itself isn't enough.

Cartoon: "Awake"

Slide: Interaction with Others
"The teacher is not the only source of instruction or inspiration."
--Noel Entwistle

Cartoon: Igloo

Slide: The best answer to the question
"What is the most effective method of teaching?" is that it depends on the goal, the student, the content, and the teacher. But the next best answer is.

Slide: Students teaching other students.
McKeachie, Pintrich, Lin, & Smith:
Teaching and Learning in the College Classroom:
A Review of the Research Literature.

Cartoon: "Tootering"

A Well-structured Knowledge Base
This doesn't just mean presenting new material in an organized way. . . . Deep approaches, learning for understanding, are integrative processes. The more fully new concepts can be connected with students' prior experience and existing knowledge, the more likely it is they will be impatient with inert facts and eager to achieve their own syntheses.

Cartoon: Rocket Science

Slide: Three Sequenced Activities to Promote Deep Learning
1. Homework using a graphic organizer processed through an in-class jigsaw
2. Homework Pass using a graphic organizer to focus discussion
3. Homework using a graphic organizer (a double entry journal) processed in class through pair work.

Slide: Character trait graphic organizer

Slide: Charlotte's Web: Charlotte, Wilbur, Fern, Templeton

Slide: A different format for the graphic organizer

Slide: The sequence promotes deep learning.

- Motivating homework gets students into the knowledge base. (Completing the graphic organizer on their own)
- The homework is used for interaction and active learning (Jigsaw where experts from each team who worked on the same character convene face-to-face or online to compare their work and produce the best graphic organizer.)
- In the home teams, students teach each other about their respective characters

Slide: Jigsaw: Various discipline applications

Pharmacy, Nursing, Health Sciences, or Medicine

Medication for Seasonal Allergies

- Antihistamine
- Decongestant
- Cromolyn sodium nasal spray
- Corticosteroid nasal spray (Rx)

Cholinesterase Inhibitors Used to Treat Alzheimer's Disease

- Donepezil
- Tacrine
- Rivastigmine
- Galantamine

An Accounting Jigsaw: Four methods of depreciation

- Straight-line
- Units-of-production
- Sum-of-the year's-digits
- Double declining balance

Psychology: Underpinnings of Childhood Moral Development

- Cognitive
- Social
- Emotional
- Biological

Botany: Major Plant Groups

- Nonvascular land plants
- Seedless vascular plants
- Vascular plants with "naked seeds" (gymnosperms)
- Vascular plants with flowers and protected seeds (angiosperms)

Slide: Pro-Con-Caveat Grid

Slide: Critical Review of Other Team's Work

Pass your Pro-Con-Caveat Grid to another team. In your team, read the responses on the paper you receive. Do you agree or disagree with the pros and cons? Discuss similarities, differences. Do you particularly like something? Do you disagree with anything?

Slide: The sequence promotes deep learning

- Motivating homework gets students into the knowledge base. (Completing the Pro-Con-Caveat grid on their own)
- The homework is used for interaction and active learning (Students in teams compare their P-C-C grids, preparing a composite one based on all ideas.)
- Each team passes the P-C-C grid to another team who discusses it, noting similarities, differences, things that surprised them, or things they disagree with
- Reports occur as appropriate

Slide: Bloom's Taxonomy of Educational Objectives

Slide: Double-Entry Journal

Sequence activities for repetition and to build in deep learning

Slide: The sequence determines deep learning

Motivating homework getting students into the knowledge base:

(1) The students read the article/chapter or hear the guest lecturer

(2) The students review the article or chapter or their notes from the guest lecture to complete the Double-Entry Journal on their own)

Active Learning and Interaction

(3) The DEJ is used for interaction and active learning (Students pair to discuss each others' DEJ)

Repetition

(4) The teacher marks—but does not grade—each DEJ, encouraging students to review it again

(5) The teacher projects an "ideal" DEJ, ostensibly to coach students for the next DEJ on a different article, chapter, or guest speaker

Slide: Learning is defined as stabilizing through repeated use, certain appropriate and desirable synapses in the brain.

Slide: Your Class Applications:

Jigsaw
Pro-Con-Caveat Grid
Double Entry Journal

Slide: The Keys to Deep Learning:

- Structured assignments
- Careful sequencing to build on learning incrementally and intentionally: Offer motivating homework (to get students into the knowledge base) that is processed through active learning and student interactions (cooperative learning
- Repetition without rote.

Slide: Structured Problem-Solving/Numbered Heads Together

- Each student has an assigned identity within a team/group: a number, playing card suit, color, etc.
- The students complete a task together.
- The group prepares to respond, making certain that each group member can serve as the spokesperson.
- Responses occur by number, suit, or color.

Slide: Structured Problem-Solving Activity
Review the list your team generated about the barriers to cooperative learning, selecting a problem you want to solve. Working together, come up with as many solutions as possible. (Sponge: Solve a second problem if time permits.) Review them, making certain that each team member can serve as the spokesperson.

Slide: A Rapid Report-Out Method: Three Stay, One Stray

Slide: Gallery Walk

Slide: Learning Principle Number Three: Metacognition

A "metacognitive" approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.

Teaching Implications: "The teaching of metacognitive skills ["thinking about thinking"] should be integrated into the curriculum in a variety of ways."
—Bransford, Brown, & Cocking, Eds. *How People Learn: Brain, Mind, Experience, and School*.

Metacognitive approaches use strategies such as "teaching and modeling the process of generating alternative approaches, . . . evaluating their merits in helping to attain a goal, and monitoring progress toward that goal."
--Bransford, Brown, & Cocking, Eds. *How People Learn: Brain, Mind, Experience, and School*.

"One of the most valuable actions we could take to improve learning—and thus the productivity of both our students and our institutions—would be to teach our students how to learn."
—Gardiner, L. (1994), *Redesigning Higher Education: Producing Dramatic Gains in Student Learning*

Cartoon: Aorta

Slide: Metacognition and Studying

Son, L.K., & Metcalfe, J. (2000). Metacognitive and control strategies in study-time allocation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26*, 204-221.

In a perfect world, one would hope that:
- Students spend the bulk of their time studying the most difficult material (after all, that is the material that will be hardest to get!)

Under real-world constraints students allocate study time strategically:
- Students spend disproportionate amounts of time studying the easiest material;
- Students also spend more time studying material rated as "interesting" rather than material rated as less interesting;
- Students get the maximum accomplished in the smallest amount of time.

Slide: Paired Talk-Aloud Problem Solving
- Have students pair.
- A student takes a difficult problem and talks through it, going into his/her thought process.
- The second student does the same with a second problem.

Slide: Punctuated Lectures

- How fully and consistently were you concentrating on the lecture during these few minutes? Did you get distracted at any point? If so, how did you bring your attention back into focus?
- What were you doing to record the information you were receiving? How successful were you?
- What were you doing to make connections between this "new" information and what you already know?
- What did you expect to come next in the lecture and why?

Slide: Minute Paper

- What was the most important thing you learned during this session?
- What important question remains unanswered?

Slide: Use Quizzes for Assessment and to Promote Deep Learning

Three unique ways:

- Scratch-off Quizzes
- Clickers
- Visible Quizzes

(Ways that students find less intimidating than traditional individual quizzes. Group quizzes are a powerful way to promote learning)

Slide: IF AT form

Slide: Scratch-Off Quizzes

Slide: Clicker Technology: Use Pair Work

The two most commonly used clickers are probably Turning Point and I-clicker.

A new free (to educators) software called poll everywhere could make clickers obsolete
http://www.polleverywhere.com/?gclid=CJHzgOCSjp4CFYdd5Qod3zurog

Slide: Visible Quiz

Slide: The Good News

"There is no universal best teaching practice. If, instead, the point of departure is a core set of learning principles, then the selection of teaching strategies . . . can be purposeful."
—Bransford, Brown, & Cocking, Eds. *How People Learn: Brain, Mind, Experience, and School*

Cartoons (Six): "Hook a whale, Organize, Students buy in, Model, Take risks, Do it.

The End

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