Creating Effective Small Group Learning (SGL)

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Terms Related to SGL

- Active Learning
- Collaborative Learning
- Cooperative Learning
- Engaged Pedagogy
- Problem-Based Learning (PBL)
- Case Study
- Project-Based Learning (PBL)
- Peer Instruction
- Team-Based Learning

Workshop Goals

1. Expand your SGL conceptual framework
   - Benefits of SGL
   - Types of SGL
   - Key elements of SGL
   - Implementing SGL in your course
     - Selecting groups
     - Designing tasks
     - Assessment
     - Common problems
       - Student resistance
2. Participants leave with something helpful

Principles for Learning Activity and Instructional Design (PLAID)

Source information:

- ?

= PLAID:

1. ?

Applying the Science of Learning to the University and Beyond

- Practice at retrieval promotes long-term retention.
- Varying the conditions results in better learning.
- Re-presenting information in alternative formats enhances learning.
- Learning depends on prior knowledge.
- Learning is influenced by our ideas about learning.
- Experience alone is a poor teacher.
- Lectures don't promote deep understanding.
- The act of remembering enhances the ability to remember.
- Understanding a few things well beats understanding a lot superficially when it comes to retention.
- How learning occurs determines how and when knowledge may be recalled.

Source: Halpern, D. & Hakel, M. (2003). *Change.*

Key findings in *How People Learn*

- Students come to the classroom with preconceptions that must be engaged or they will leave with the same conceptions.
- Competence results from: (a) a base of factual knowledge; (b) knowledge built in context of a conceptual framework; and (c) knowledge organized for retrieval.
- A metacognitive approach makes for better learning and better learners.

Source: National Research Council. (2000). *How People Learn.*

Principles for Learning Activity and Instructional Design (PLAID)

Source information:

- Learning is influenced by our ideas about learning.

Source: Halpern, D. & Hakel, M. (2003). *Change.*

= PLAID:

1. Take a little time to explain why group activity can help students achieve desired learning objectives. Be somewhat transparent regarding decisions that affect students' learning.

Source information:

- Students come to the classroom with preconceptions that must be engaged or they will leave with the same conceptions.

Source: National Research Council. (2000). *How People Learn.*

= PLAID:

1. Use knowledge probes to find out what students already know or think about a topic. Small groups can be safe and comfortable environments for discussing different perspectives and/or understanding of particular topics.

Principles for Learning Activity and Instructional Design (PLAID)

Source information:

- Experience alone is a poor teacher.

Source: Halpern, D. & Hakel, M. (2003). *Change.*

  - *"We do not learn from our experience, we learn from processing our experience."*

Source: John Dewey, cited in Small Group Instruction in Higher Education. (2003)

= PLAID:

Research

Meta-analysis of 305 studies

- Cooperative efforts promote greater liking among students.
- Students learning cooperatively perceive greater social support (academically and personally) from peers and instructors.
- Cooperation promotes higher self-esteem.
- Students in cooperative groups become more socially skilled.

Source: Johnson, Johnson, and Smith (1998).

Research

A meta-analysis of 168 rigorous studies, comparing efficacy of individualistic, competitive, and cooperative learning.

- CL promotes higher individual achievement.
- Students scoring at 50th percentile level when learning competitively will score in 69th with CL.
- Students scoring at 53rd percentile level when learning individualistically will score in 70th with CL.

Source: Johnson, Johnson, and Smith (1998).

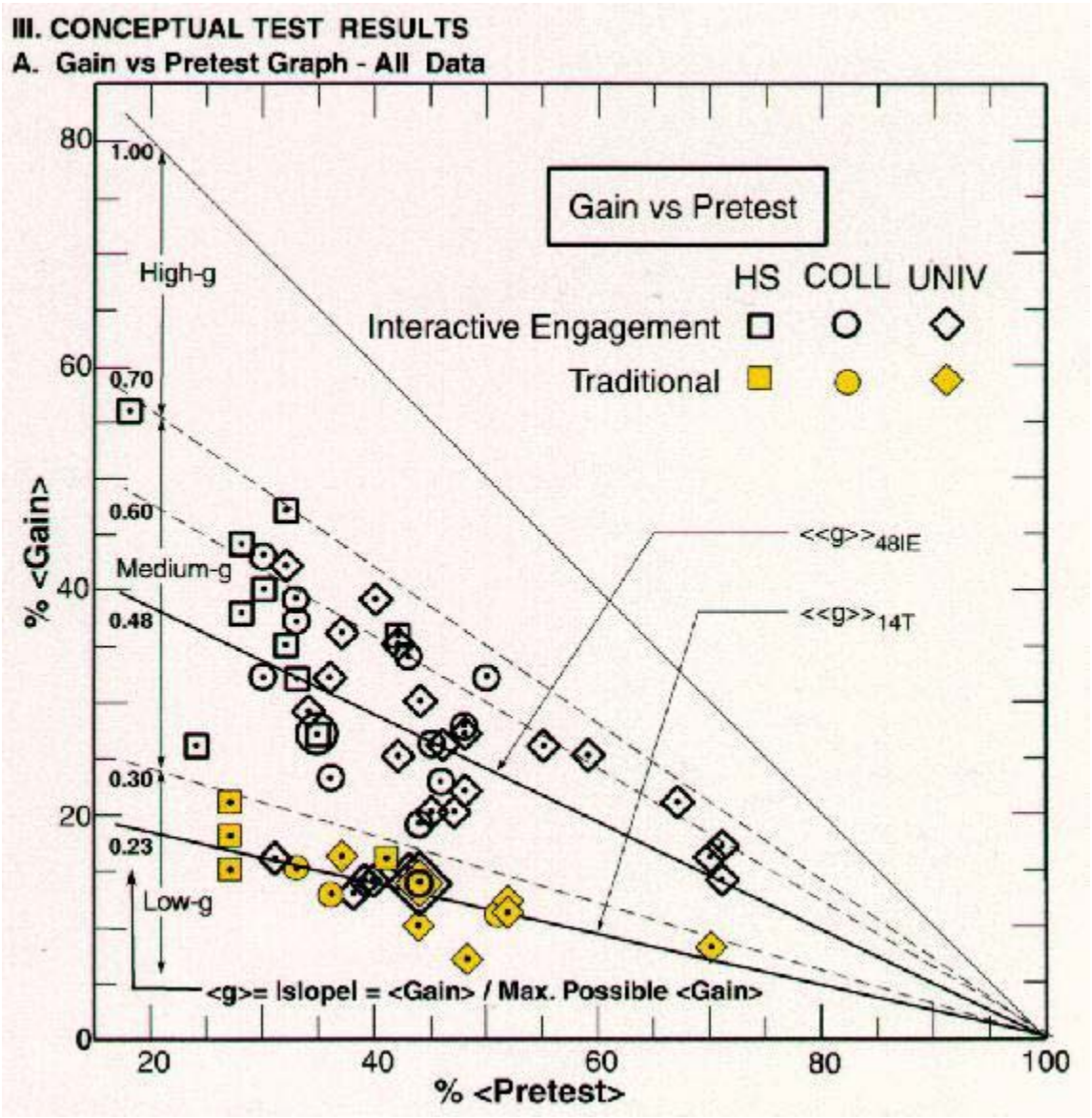


Figure 1. %<Gain> versus %<Pretest> scores on the conceptual *Mechanics Diagnostic* (MD) or *Force Concept Inventory* (FCI) tests for 62 courses enrolling a total N = 6542 students: 14 traditional (T) courses (n = 2084), which made little or no use of interactive engagement (IE) methods, and 48 IE courses (n = 4458), which made considerable use of IE methods. Slope lines for the average of the 14 T courses <<g>>14T = 0.23 ± 0.04 (SD) and the 48 IE courses <<g>>48IE = 0.48 ± 0.14 (SD) are shown. The negative-slope straight lines are lines of constant, normalized average gain <g>= <Gain>/maximum possible <Gain> = (<%post > – <%pre >) / (100 – <%pre>

Source: Hake, R.R. (2007). Design-based Research in Physics Education.

Small-Group Learning: Meta-analysis

Small-group learning in postsecondary science, mathematics, engineering, and technology (SMET). 383 reports from 1980 or later, 39 of which met the rigorous inclusion criteria for meta-analysis.

The main effect of small-group learning on achievement, persistence, and attitudes among undergraduates in SMET was significant and positive. Mean effect sizes for achievement, persistence, and attitudes were 0.51, 0.46, and 0.55, respectively.

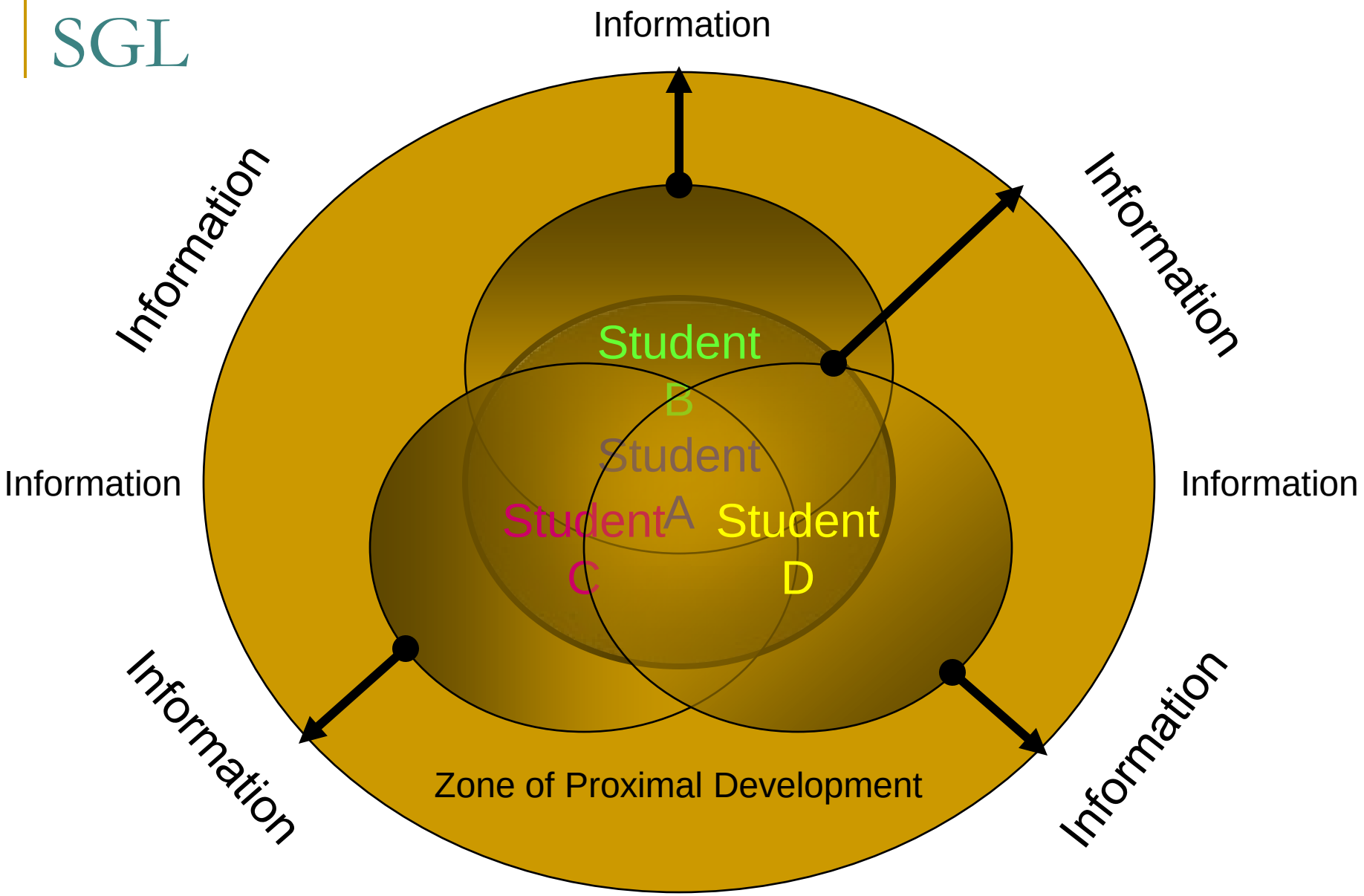
Source: Springer, Stanne, and Donovan (1999).

Outcomes: Gains

- Achievement and retention
- Critical thinking and higher-level reasoning
- Differentiated views of others
- Accurate understanding of others' perspectives
- Liking for classmates and teacher
- Liking for subject areas
- Teamwork skills

Source: Johnson, Johnson, and Smith (1998).

SGL


Information
Information
Information
Information
Information
Information
Student B
Student A
Student C
Student D
Zone of Proximal Development

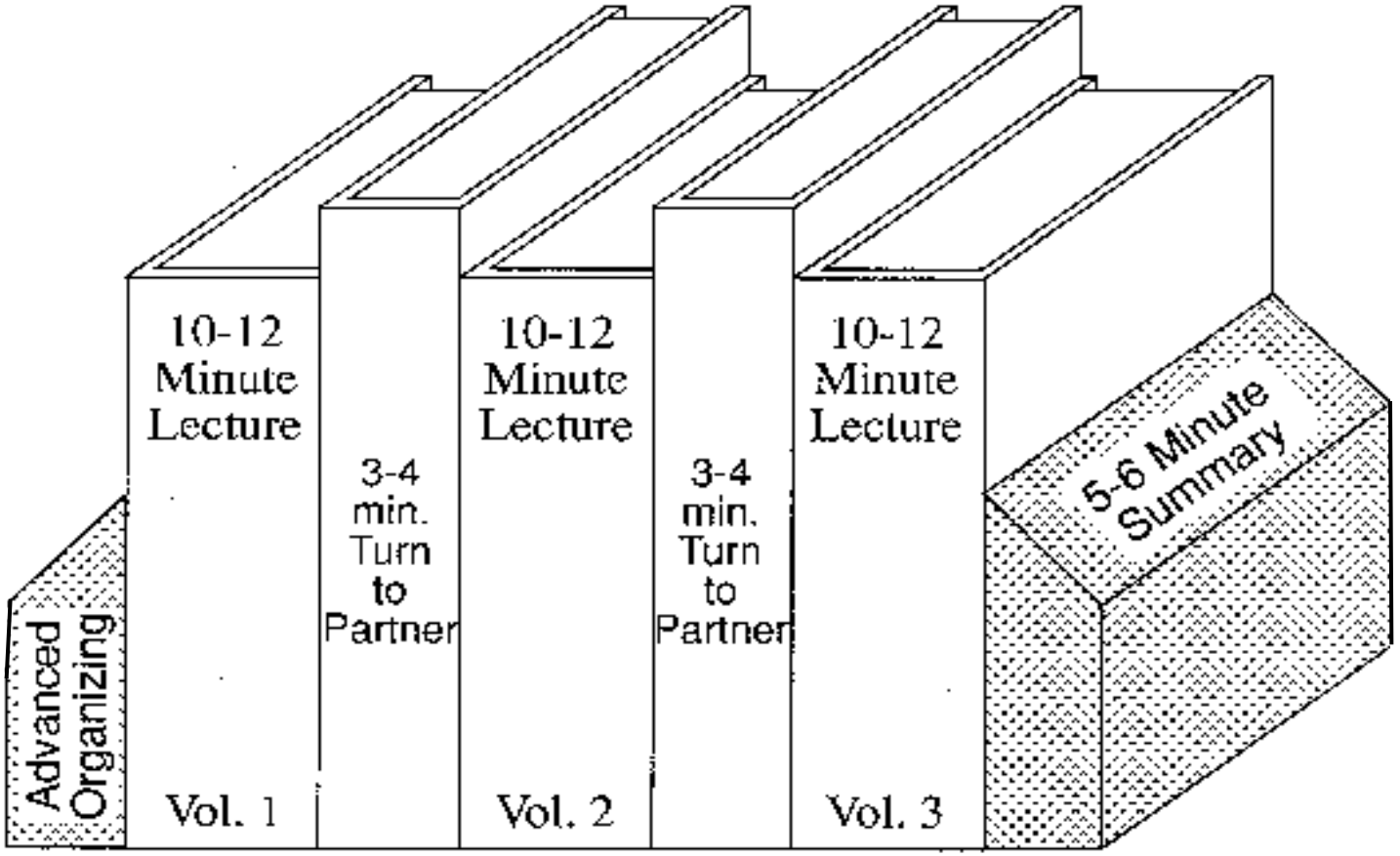
SGL Typologies

Types by Use	Fink (2004)	Johnson, Johnson & Smith (1998)	Characteristics
Casual & infrequent	Casual	Informal	Change of pace tool. 2-8 students
Structured & Frequent	Cooperative Learning	Formal	Well planned technique. 2-4 students
Intensive & Course Changing	Team-based Learning	Formal	Well planned strategy. 5-7 students
Long-Term out of class		Base Groups	Study support. 3-5 students

Informal SGL

- Used to break-up a lecture
- Used to counteract student passivity
- Can be used at any time
- Can be short term and ad hoc

Book Ends on a Class Session



Source: Smith, K. (2005).

Quick Thinks

- Reorder the steps
- Paraphrase the idea
- Correct the error
- Support a statement
- Select the response

Source: Johnston, S. & Cooper, J. (1997).

Two Student Activities

- Think Pair Share
  - Turn to your neighbor exercise
  - Works well in large classes
  - Allows rehearsal
- Cooperative Dyads
  - Collaborative reading method
  - Roles: Recaller & Listener

Sources: Millis, B.J.; Cottell P.G. (1995). *Cooper, J.; Robinson, P. (1994).*

Applying the Science of Learning

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Formal SGL

Structured activities that generally involve out-of-class work. Tasks often involve:

- Learning new conceptual/procedural material
- Peer Composition or Editing
- Reading Comprehension/Interpretation
- Problem Solving, Project, or Presentation
- Review/Correct Homework
- Constructive Academic Controversy
- Group Tests

Criteria for Effective Formal SGL

- Individual Accountability
- Positive Interdependence
- A Challenging Task
- Timely Feedback

SGL Structured Activities

- Jig Saw (I & II)
- Problem-based
- Case study
- Send a Problem
- Peer questioning
- Consensus groups
- Group quizzes

Jig Saw II

- Divide problem or task into parts with relatively equivalent difficulty/complexity
- If 4 parts then each home group has 4 members
- Each member leaves home group to work with a separate expert group.
- When expert groups have completed their part and practiced teaching strategies they reform home groups and share with teammates.

Source: Millis, Barbara. (2003).

Problem Based Learning (PBL) Format

- TASK: Solve the problem(s).
- 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.

Send a problem

- Multiple groups.
- Multiple problems related to a topic.
- Problems rotate.
- Each group solves, adds solution to envelope, and then sends a problem.
- Final group analyzes solutions for one problem and reports out.

Source: Millis, Barbara. (2003).

Guided Peer Questioning

- Teacher selects a set of question stems that encourage higher level thinking.
  - Why is X happening?
  - What is a counter-argument for X?
  - How could X be used to X?
  - What is a new example of X?
- After material is presented students are asked to develop 2-3 questions about the material using question stems.
- Pairs are formed and questions asked in turn.

Source: King, Allison. (2003).

Peer Questioning Activity

How can small groups be used to help X?

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Implementing SGL

- Examine the scope of your course.
- Form groups.
- Design appropriate tasks.
- Address group practices.
- Design assessments that foster positive interdependence and individual accountability.
- Address problems actively and proactively.

Examine the scope of your course

- Start with your learning objectives.
- Confront “coverage” concerns head-on.
- Decide where you want to be on the Informal to Formal SGL continuum.

Forming Groups

- How many students in a group?
- Teacher Selection or Student Selection?
- Collecting helpful data.

Benefits of student-selected groups

- Often quicker to form into groups.
- Transfers more responsibility to students.
- Students often consider schedule-compatibility for longer-term groups.

Problems with student-selected groups

- Students of similar abilities and aptitudes tend to congregate.
- Pre-existing relationships tend to dominate group dynamics.
- Under-represented or shy students are often left out or left until last.
- Selection is not driven by cognitive and affective goals.

Source: Panitz, T. (1997).

Benefits of teacher-selected groups

- Heterogeneity is more easily achieved.
- Student schedule-compatibility for out-of-class activities can be pre-determined.
- Multiple goals can be addressed.

Criteria for forming groups

- Heterogeneity.
- Teacher selected.
- Plan for under-represented students.
- Ensure common blocks of time.

Design appropriate tasks

- Informal tool, formal technique, or strategy?
- For what outcome?
  - Cognitive rehearsal?
  - Conceptual change?
  - Critical thinking?
  - Teamworking skills
- How large are your groups?

"As members of a team, individual students become willing to commit to a very high level of effort in their learning, and learning teams are capable of solving problems that are beyond the capability of even their most talented members."

Source: Fink, L. D. (2004).

Address group practices

- Communicate the importance of group-work on the first day.
- Stress positive interdependence and individual accountability.
- Let students know your grading plan.
- Set clear expectations.
- Discuss group function guidelines and get students involved.

Myths about SGL Assessments

- If you assess student learning, you have to give students grades.
- Faculty must read every student paper and provide feedback.
- Students are not capable of meaningful involvement in assessment.
- Involving students in assessment takes valuable time away from learning and lowers their achievement.
- Assessment is a faculty responsibility, not to be done by students.
- Individual assessment is lost in team-based approaches to assessment.

Design assessments that foster positive interdependence and individual accountability

- Make assessments meaningful.
- Use a criterion-referenced system for all assessment and evaluation.
- Use a variety of assessments.
- Directly involve students in assessing each other's participation in the group.
- Use assessments as pedagogical tools.

Making Assessments Meaningful

1. To be meaningful, assessment has to have a purpose that is significant.
2. Assessments are meaningful when students are involved in conducting the assessment.
3. Meaningful assessments provide a direction and road map for future efforts to learn.

Address problems actively and proactively

- The best way to address problems is to structure groups so they don't occur.
- Give students enough guidance and authority to work out minor problems themselves.
- Build in diagnostics.
- Plan for interventions.
- Plan for dissolving groups, firing members.

"Engaging students in learning is principally the responsibility of the teacher, who becomes less an imparter of knowledge and more a designer and facilitator of learning experiences and opportunities. In other words, the real challenge in college teaching is not covering the material for the students; it's uncovering the material with the students."

Source: Smith, et. al. (2005).