

Getting Started in PBL



*Institute for Transforming
Undergraduate Education*

University of Delaware



Problem-Based Learning:
From Ideas to Solutions through Communication
January 2007

Concerns About Moving to PBL?

Course Transformation: A Balancing Act

Control
Teacher vs. Student

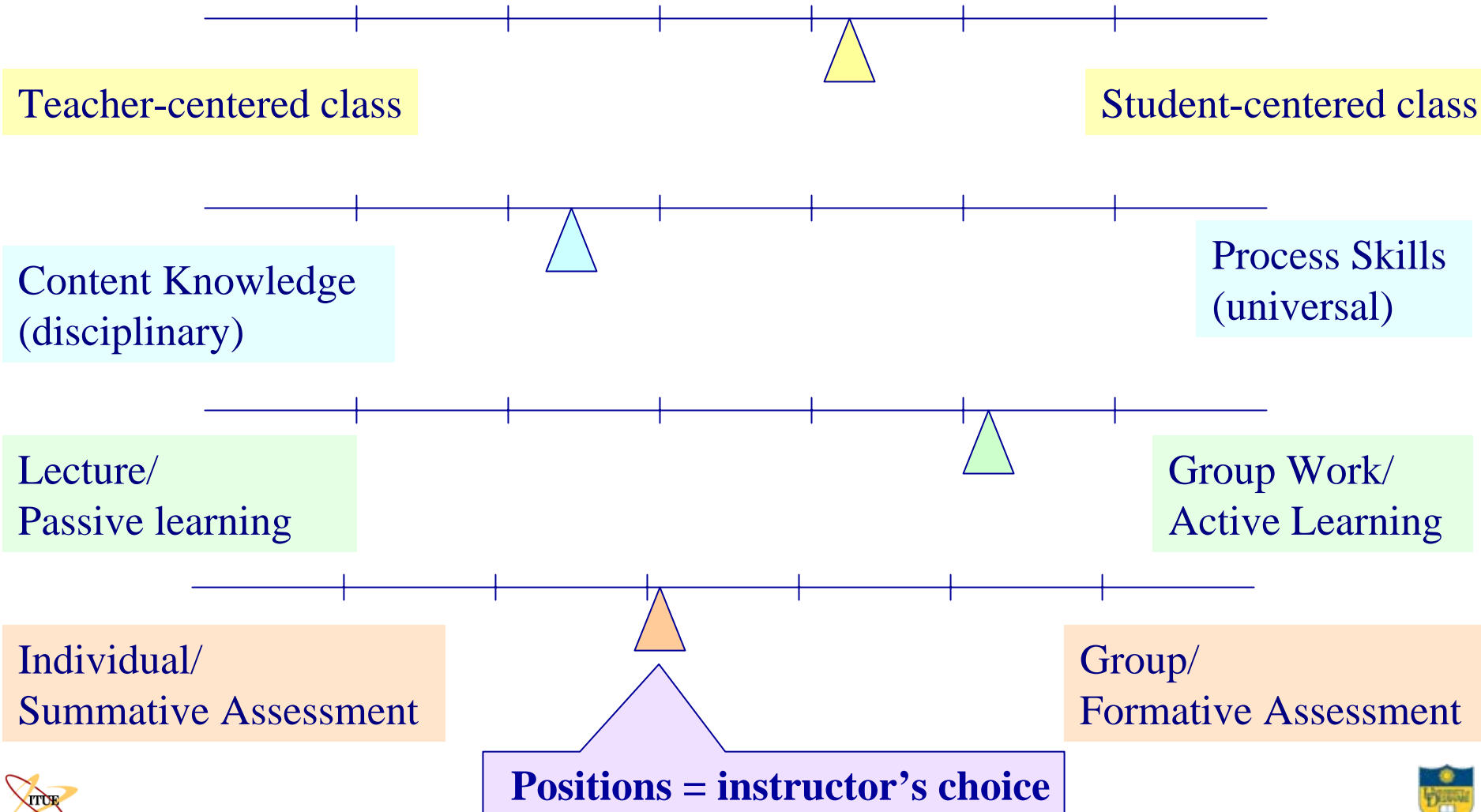
Objectives
Content vs. Process

Format
Problems vs. Lecture
Group Work vs. Individual



Assessment
Individual vs. Group
Formative vs. Summative

PBL Works With a Range of Choices

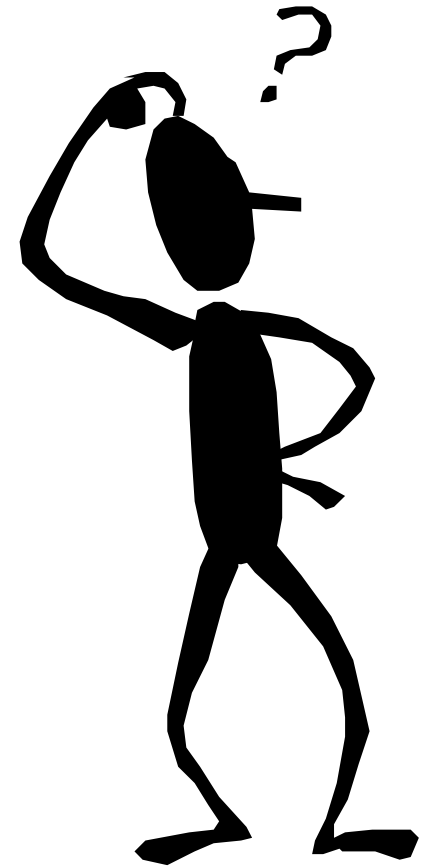


First Choice: Course Goals

What do you want your students to

- know
- be able to do
- value

as a result of taking this course?



Translate Goals into Learning Objectives

List specific expectations and outcomes.

Consider a range of objectives:

- Overall course objectives
- Objectives within specific unit/topic

Keep assessment in mind:

- How will you determine if an objective has been met?
- Assessment \neq "grading". Consider both formative and summative assessments

Balancing Course Objectives

Tackle hard decisions about course content

- What material is really essential?
- Which areas/topics require expert insight?
- Are there obligations connected to trailing/parallel courses, accreditation?

Don't overlook process skills

- Which skills are most important to your goals?
- Coordinate content and process objectives



Balancing Instructional Strategies

1. Teacher- and Student-Centered Instruction

How much control can/should you relinquish?

- Instructor comfort level
- Student comfort level
- Student learner level /maturity/motivation
- Class size/level

What areas of control are negotiable?

- Course content/coverage
- Assessment/standards/grading policies
- Class format

Two Examples

General Chemistry

- Freshmen, nonmajors
- **Teacher** control
 - Content
 - Format
 - Grading
 - Guiding PBL questions
- **Student** control
 - Group work/product
 - Peer evaluation

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Science and Pseudoscience

- Senior HD candidates
- **Teacher** control
 - Introductory content topics
 - Extent of writing required
- **Student** control
 - Specific content topics
 - Session format (group)
 - Assessment type, weighting
 - Peer evaluation

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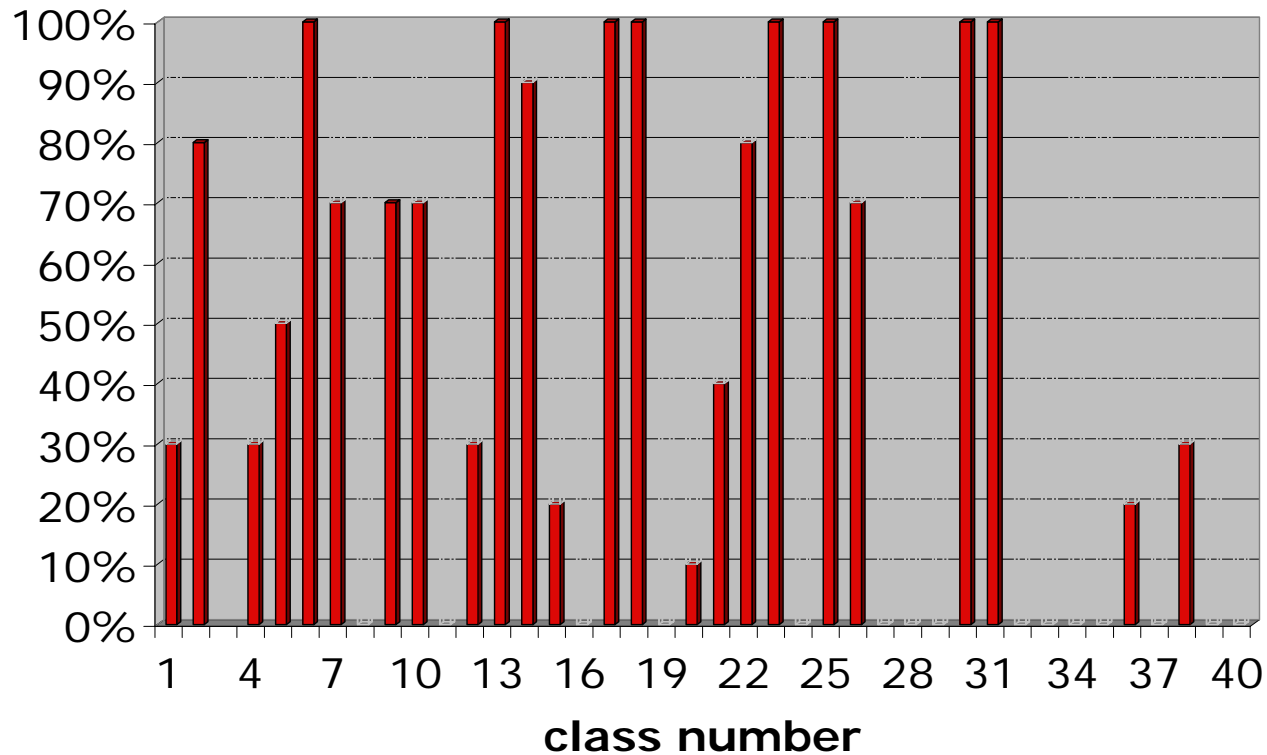
Balancing Instructional Strategies

2. PBL and Other Approaches

- **What proportion of problem-driven learning to use?**
 - Introduction of all major concepts through problems
 - Mix of problems and other active learning strategies
 - Mix of problems and interactive/traditional lecture format
 - Interactive/traditional lecture with 1-2 PBL units
- **What type of problems/structure?**
 - Multistage/multipage, lasting several weeks
 - A few stages, spanning several class periods
 - Single stage, for one session
 - Completely student-centered responses, or guiding questions
 - Products/assessment

An Example: Blending PBL with Other Approaches

Percent of Class Time Involving PBL
CHEM 104H 03S



Balancing Instructional Strategies

3. Group (PBL) and Individual Work

Multiple ways to use groups

- Permanent groups throughout the semester as the central “learning units”
- Permanent groups for problems; individual work or ad hoc groups for other active learning
- Ad hoc groups for occasional problems; mostly individual work
- Individual work with “capstone” PBL problem

Practical Issues for Group Work

- Class size: number, size of groups
- Classroom size, structure
- Schedule: number, length of class periods
- Extent of out-of-class group work required
- Guidance within groups
 - Independent
 - Guiding questions
 - Peer facilitator
 - Fostering functional group behavior
- Group formation and composition

Assessment Issues in PBL

*How Might Assessment Change
in a PBL Course?*

Underlying Assessment Themes in a PBL Course

- Greater student involvement
 - in assessing their own work and learning processes
 - in helping to evaluate peer work
- Promotion of mastery (learning) vs. performance (grade) goals
- Emphasis on feedback (formative) in addition to evaluation (summative)
- Using group power while retaining individual accountability
- Integration of knowledge

Finding a Balance in Assessment

- Formative and summative assessments
- Individual and group products
- PBL-themed and traditional assessments
- Mastery and normed standards
- Peer and instructor evaluations
- Attendance and participation scores
- Assessment of both content and process objectives

Many traditional assessment tools still apply in PBL!

“PBL-Themed” Assessments?

- Group problem on exams (in-class or take home)
- Grade product from PBL problem
- Ask questions related to PBL problem on exam
- Preparation of concept maps
- Tasks integrating communication, thinking skills with content
- Authentic reports to outside “authority”
- Student construction or critique of rubrics
- Student construction or critique of problems
- Evaluation of group process and individual contributions (by group and instructor)

Some Assessment Resources

- “Learner-Centered Assessment on College Campuses”, Mary E. Huba and Jann E. Freed, Allyn & Bacon 2000, ISBN 0-205-28738-7
- “Learner-Centered Teaching”, Maryellen Weimer, Jossey-Bass 2002, ISBN 0-7879-5646-5
- “Classroom Assessment Techniques”, Thomas A. Angelo and K. Patricia Cross, Jossey-Bass 1993, ISBN 1-55542-500-3
- “Effective Grading”, Barbara E. Walvoord and Virginia J. Anderson, Jossey-Bass 1998, ISBN 0-7879-4030-5
- “Engaging Ideas”, John C. Bean, Jossey-Bass 2001, ISBN 0-7879-0203-9
- “Field-tested Learning Assessment Guide (FLAG)”, at <http://www.flaguide.org/> (accessed 4/18/06)



Making Choices Public in a Syllabus

Typical Syllabus Contents:

- Course information and policies
- Instructor information
- Text, readings, materials
- Course calendar / schedule

What aspects of your syllabus might or should change when you incorporate problem-based learning?

Changes Commonly Needed

Meeting Place for Class

- Fixed seating vs. moveable seats; PBL or case study room option

Educational Philosophy

- Why PBL?
- Changing roles: student and faculty responsibilities
- Group work, roles, ground rules
- How? Idea of class format, “typical day”

Changes Commonly Needed

Grading and Assessment

- Value of content knowledge/global skills
- Nature of assessment tools
- Individual and group accountability
- Attendance, participation
- Exam logistics: group components, extended time, scheduling

Common Classroom Models for PBL

- Medical school
- Floating Facilitator
- Peer Facilitator
- “Hybrid” PBL
- Large Classes

Medical School Model

- Dedicated faculty tutor
- Groups of 8-10
- Very student-centered environment
- Group discussion is primary class activity

A good choice for

- Highly motivated, experienced learners
- Small, upper-level seminar classes

Floating Facilitator Model

- Instructor moves from group to group
 - Asks questions, directs discussions, checks understanding
- Group size: 4
- More structured format: greater degree of instructor input into learning issues and resources

Other class activities:

- Groups report out
- Whole class discussions
- (Mini-)lectures

A good choice for

- Less experienced learners
- Classes of all sizes

Peer Facilitator Model

Advanced undergraduates serve as facilitators

- Help monitor group progress and dynamics
- Serve as role models for novice learners
- Capstone experience for student facilitators

A good choice for

- Classes of all sizes

“Hybrid” PBL Model

Non-exclusive use of problem-driven learning in a class

- May include other active-learning components, lecture segments
- Floating or peer facilitator models common

Often used as entry point into PBL in course transformation process

Dealing with Large Classes

Using PBL with large classes (> 100 students) presents special challenges, but can be successful.

Consider hybrid PBL or floating / peer facilitator models

- Peers, TA's help extend instructor's presence

Use a more teacher-centered, structured format

- Incorporate guiding questions into problems
- Interrupt group activity more often for
 - Discussion of learning issues
 - Reporting out to whole class

- In fixed seating lecture hall, keep some rows unoccupied for better access to all groups.
- Group grading (vs. individual) papers/projects can reduce grading burden.
- Consider visual (readily graded) assessments (graphs, diagrams, concept maps, etc.)