Enhancing Student Engagement through Problem-Based Learning
Problem-Based Learning Workshop at University of Hartford

http://www.udel.edu/pbl/hartford

George Watson and Mark Serva
Institute for Transforming Undergraduate Education
University of Delaware

<table>
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<th>Monday, May 19, 2008</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Coffee and Registration</td>
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| 10:30                | **Experience It Yourself: “Deflating Grady”**  
Participants will work through a PBL problem, exploring a variety of strategies to use in problem-based instruction. |
| noon                 | Lunch            |
| 1:00                 | Experience It Yourself: Wrap-up |
| 1:30                 | **What is PBL? Why PBL?**  
The process and objectives of problem-based learning, including discussion about models of PBL |
| 2:15                 | **Facilitating PBL Groups, Groups in Action**  
Participants will learn effective strategies for forming groups, initiating group activities, and helping students work productively in their groups. |
| 3:30                 | Wrap-up; Reflections on the day |
| 4:00                 | adjourn           |

<table>
<thead>
<tr>
<th>Tuesday, May 20, 2008</th>
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<tr>
<td>8:30</td>
<td>Coffee and Registration</td>
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<tr>
<td>9:00</td>
<td><strong>What Is a Good PBL Problem?</strong></td>
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| 9:30                  | **Writing Effective PBL Problems**  
Participants will learn to write materials suitable for a problem-based course and then share ideas and PBL scenarios for their courses. |
| 11:00                 | **Presentation of PBL Problem Ideas and Scenarios** |
| 11:45                 | Orientation to the PBL Clearinghouse |
| noon                  | Lunch            |
| 1:00                  | **The First Week of Class/Strategies for Success in Using PBL** |
| 1:30                  | **Using Collaborative Technology to Support Student-Centered Teaching** |
| 2:15                  | **Comparison of Teacher-Centered and Learner-Centered Paradigms; Assessment in a Student-Centered Environment** |
| 3:00                  | Wrap-up; Reflections on the workshop |
| 3:30                  | adjourn           |
DEFLATING GRADY
Part I – Maintaining Standards

The following is an e-mail exchange between Prof. Grady Rizeng and his chair, Lois Marks, that Prof. Rizeng has forwarded to Dean Nolira.

-----Original Message-----
Sent: Sunday, January 09, 2005 11:31 PM
To: A. C. Nolira
Subject: FW: RE: RE: RE: RE: Maintaining our standards

Dean Nolira,
Can you believe what I have to put up with? I'm begging you to do something about the way I'm treated by this tyrant!

Grady Rizeng
University Distinguished Professor

-----Original Message-----
Sent: Sunday, January 09, 2005 8:25 PM
To: Grady Rizeng
Subject: RE: RE: RE: RE: Maintaining our standards

I'm not saying that. What concerns me is that your grades reflect a different standard and that has all sorts of implications. Let's meet tomorrow morning at 8 to discuss grade inflation. That's not too early for you I hope.

Lois Marks
Department Chair

-----Original Message-----
Sent: Sunday, January 09, 2005 3:22 PM
To: Lois Marks
Subject: RE: RE: RE: Maintaining our standards

But as you said yourself, we get really good students. Do you really think half of them should get C's or lower?

Grady Rizeng
University Distinguished Professor

-----Original Message-----
Sent: Saturday, January 08, 2005 8:19 PM
To: Grady Rizeng
Subject: RE: RE: Maintaining our standards

That's fine, but perhaps you need to redefine the criteria for excellence. Do you think this is Lake Wobegon where all the students are above average? From your grades, I can't tell who the best students are.

Lois Marks
Department Chair
Absolutely. With all due respect, I don't accept the premise that low grades necessarily mean high standards. They could mean unreasonable standards or poor teaching. I have taught my courses for many years and have well-defined criteria for an A. If everyone achieves those criteria, then everyone gets an A. Of course the converse is true as well.

Grady Rizeng
University Distinguished Professor

As you should be aware, this department is well known for its rigor. We attract excellent students and they work hard. For many years the average grades given in this department have been among the lowest on campus, which reflects our demanding standards.

My reason for writing you is that grades in this department have risen in recent years and the grades you give are among the highest in the department—63% A's and B's. Do you really think your students deserved those grades?

Lois Marks
Department Chair

1. Individually: In 25 words or less, write down in a complete sentence your definition of grade inflation.
2. As a group, share your definitions and come to consensus on a definition that your group should write down.
DEFLATING GRADY
Part II – Midnight Thoughts

Somehow Grady Rizeng couldn’t get to sleep. He had just ripped off the e-mail to the dean to vent his frustration. He kept thinking about his 8 am meeting with Dr. Marks. He felt blind-sided by the insinuation that the grades he gave his students were too high. He had never looked at his grades over time or in comparison with grades given by his faculty colleagues. Never had he thought he was being easy on the students and their course evaluations suggested they had worked hard in his courses. “What evidence does she have that the increase in grades in the department is due to my courses or a decrease in my standards? Couldn’t it simply be that our students are getting better? There are all sorts of reason that grades might be rising.” At 1 am he got out of bed and logged on to the Internet to see what he could find out that would help him later in the morning.

Meanwhile, Lois Marks was having second thoughts. “Did I come down too hard? I assumed Grady’s high teaching ratings reflected easy grading standards. Did I jump to an incorrect conclusion? I need to check into this a bit more.” And she logged on to the Internet as well.

1. What information should Prof. Rizeng bring to the meeting with his chair?
2. What evidence would Chairperson Marks need to demonstrate grade inflation?
Within a few minutes of googling “grade inflation” both Prof. Rizeng and Chair Marks found the following graph. The data show the average grades received by college students at US public and private schools over the past 30 years.

Make a list of questions (learning issues) you have about these data.
Characteristics of Good Learning Issues

"...once you have learned to ask questions - relevant and appropriate and substantial questions - you have learned how to learn and no one can keep you from learning what ever you want or need to know."


Knowledge is power (Bacon). All of us have vast areas of ignorance and we will never come close to knowing more than a very small fraction of what there is to know. Nevertheless, being aware of what we don’t know is also a type of power because it enables us to focus our learning where it counts when we have problems to solve. The more adept we become at defining what we need to know in away that it can be pursued, the easier it is to quickly locate needed information and the better problem solvers we become.

Most of us are reluctant to reveal our ignorance. Who wants to look “stupid?” A major tenet of problem-based learning is that learning occurs best in an environment where we can admit our knowledge gaps and do something about them by working together to achieve understanding. In problem-based learning, our knowledge gaps become our learning issues. The way we go about defining learning issues influences the depth of understanding we achieve. What are the characteristics of a good learning issue?

1. Presented in the form of a **question** or **series of questions**.
2. **Focused** so that it seeks specific information.
3. Constructed so that it asks an **answerable** question.
4. Pursues information that is **relevant** to the problem.
5. Goes beyond superficial knowledge to probe **conceptual** issues.
6. Often set in a **context** that provides direction. **Why** is the question important?
DEFLATING GRADY
Part IV – Who Cares?

As an individual, match the statements below with the following stakeholders. Then compare with other in your group and come to consensus.

__ Chairman Marks
__ Dean Nolira
__ Student Newspaper Reporter
__ Faculty Union Representative
__ Parent of a Student
__ Alumnus who hires Graduates

A: “This is a complex problem. We need to create a culture where learning not grades is the focus.”

B: “This is an academic freedom issue. They can’t tell Grady what to do.”

C: “In addition to grades, the transcript should include a score from a nationally standardized exam in the discipline.”

D: “Why is Prof. Rizeng being harassed by his department when he’s a great teacher.”

E: “What are Joe’s chances of getting into medical school if they limit the number of “A’s”?

F: “Without uniform and demanding standards, grades aren’t worth a thing.”
DEFLATING GRADY
Part V – What’s Our Position?

The following questions are offered to help your stakeholder group focus its attention and define its position on grade inflation.

   How does grade inflation hurt your stakeholder group?
   How big is the problem? Is it getting worse?

Members in your stakeholder group need to be prepared to articulate the position and provide support for it when they return to their respective home groups.
Princeton University’s faculty recently approved a proposal to limit the number of “A’s” in any department to 35%. Your diverse group of stakeholders has been charged to do better and come up with an effective solution. Your plan needs to eliminate or reduce the problem of grade inflation and be feasible in terms of time, person-power, expense, and material. The interests of multiple stakeholders must be considered.

Your satisfactory plan will be presented to the assembled audience.
What is PBL?

Characteristics Needed in College Graduates

Excellent communication skills
Ability to define problems, gather and evaluate information, develop solutions
Address problems in a complex real-world setting
Team skills – ability to work with others

Quality Assurance in Undergraduate Education (1994)
Wingspread Conference, ECS, Boulder, CO.

What is PBL?

“…careful inspection of methods which are permanently successful in formal education…will reveal that they depend for their efficiency upon the fact that they go back to the type of situation which causes reflection out of school in ordinary life. They give pupils something to do, not something to learn; and if the doing is of such a nature as to demand thinking, or the intentional noting of connections; learning naturally results.”

John Dewey (1916)

Carnegie Foundation Recommendations

Make research-based learning the standard.
Build inquiry-based learning throughout the four years.
Link communication skills and course work.
Use information technology effectively.
Cultivate a sense of community.

Boyer Commission, 1998

What is PBL?

What is PBL?

“The principal idea behind PBL is that the starting point for learning should be a problem, a query, or a puzzle that the learner wishes to solve.”


What Is PBL?

“…a process of acquiring understanding, knowledge, skills and attitudes in the context of an unfamiliar situation, and applying such learning to that situation.”

C. E. Engel, University of Newcastle
What are the Common Features?

Learning is initiated by a problem. Problems are based on complex, real-world situations. All information needed to solve problem is not given initially. Students identify, find, and use appropriate resources. Students work in permanent groups.

A Typical Day...

PBL Process

Presentation of Problem
Organize ideas and prior knowledge (What do we know?)
Pose questions, state learning issues (What do we need to know?)
Assign responsibility for questions; discuss resources

Integrate new information; Refine questions
Reconvene, report on research
Research questions; summarize; analyze findings

Resolution of Problem; (How did we do?)

Common Classroom Models

Medical school
Floating Facilitator
Peer Facilitator
“Hybrid”

 Choosing a Model...

Class size
Intellectual maturity of students
Student motivation
Course learning objectives
Instructor’s preferences
Availability of peer facilitators

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

| More structured format; more instructor input into learning issues and resources |
| Instructor rotates through groups: Asks questions, directs discussions, checks understanding |
| Group size: 4 |
| 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

| Non-exclusive use of problem-driven learning in a class. |
| May include separate lecture segments or other active-learning components. |
| Floating or peer facilitator models common. |

An entry point into PBL.

Reaches students at many levels.
Facilitating PBL Groups: Groups in Action

Institute for Transforming Undergraduate Education
University of Hartford
May 19, 2008

Dr. Deborah Allen's contribution to this presentation is acknowledged and appreciated.

Why Use Groups?

- Simulates the “real world” use of teams
- High motivation when actively involved
- Learn more fully and with less effort
- Learn in context
- Allows exploration of more complex problems
- Can allow students to self-select their major areas of interest.

Five Elements of Cooperative Learning

- Positive interdependence
- Individual accountability
- Promotive interaction (face-to-face)
- Use of teamwork skills
- Group processing


Teams and Trust

- Trust:
  - A willingness to put oneself at risk within a specific context.

Nurturing and Eroding Team Trust

List five things that students do to inhibit trust on their teams.

Report out in 5 minutes

Step 1: Conflict Case Studies

A. Read over the case study that your group has been given.

B. As a faculty member, consider how you would handle the situation

C. Discuss the steps you could take to prevent these problems arising in the future
Step 2: Conflict Case Study

A. Fold the handout so that your ideas for resolutions are covered up by the folded paper, but the case study text is still revealed.

B. Pass the folded case study on to the group on your left.

C. When you receive another group’s case study, keep that group’s ideas for resolutions covered up.

Step 3: Conflict Case Study

A. Read over the new case study that your group has been given.

B. As a faculty member, consider how you would handle the situation

C. Discuss the steps you could take to prevent these problems arising in the future

Steps 4 & 5: Conflict Case Study

A. Pass the case study on to the group on your left.

B. Uncover the possible resolutions “brainstormed” by the previous 2 groups.

C. Given the information that you have, which of the resolutions do you think is the best option? Why?

D. Discuss the methods proposed to prevent the problem in the future. Which is the best option? Why?

Be prepared to report out on questions C & D in 10 min.

Trust and Teams

• To be “trustworthy,” indicates one has the characteristics that merit another’s trust:
  – Competence—the teammate has the capacity to complete the desired task.
  – Benevolence—the teammate cares about my needs and will act in my best interests.
  – Integrity—the teammate is honest and keeps his or her commitments.

• Trust acts as an initiator of action:
  – Trusting behavior: delegation of tasks to a team member
  – Distrusting behavior: completing all tasks on your own.
  – “Anxiety in life is what squeaking and grinding are in machinery that is not oiled. In life, trust is the oil.” Henry Ward Beecher (1813-1887)

Phases of Group Development

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<th>Forming</th>
<th>Group Task</th>
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<tr>
<td>Define purpose</td>
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<tr>
<td>Determine objectives</td>
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<tr>
<td>“Best Behavior” / inwardly focused</td>
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<tr>
<td>Storming</td>
<td>Competition for ideas</td>
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<tr>
<td>“What are we supposed to do?”</td>
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<tr>
<td>Determine &amp; accept roles</td>
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<tr>
<td>Norming</td>
<td>Ease into roles and ground rules</td>
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<td>Development of trust &amp; consequences</td>
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<td>Agenda setting</td>
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<td>Performing</td>
<td>Comfort in assigned roles</td>
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<tr>
<td>Autonomous</td>
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<tr>
<td>Dissent expected and encouraged</td>
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<tr>
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<thead>
<tr>
<th>Forming</th>
<th>Evidence of Failure</th>
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<tr>
<td>Group lacks focus</td>
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<tr>
<td>Storming</td>
<td>Attends to wrong things</td>
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<td>Conflict over objectives</td>
<td></td>
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<tr>
<td>Norming</td>
<td>Not completing tasks</td>
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<td>Conflict within group</td>
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<tr>
<td>Performing</td>
<td>Poor standards</td>
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<td>Conflict within group &amp; w/instructor</td>
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<td>Late assignments</td>
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<tr>
<td>Performing</td>
<td>Poor performance continues</td>
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<td>Conflicts go unresolved</td>
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<td>Sense that grades unfair</td>
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The Team Grid and Code of Conduct Exercise

| Name, Phone, and Email Address | Things I Love to Talk About | Why I Am Taking This Class | Personal or Professional Achievement for 2007 | On Teams, I tend to be a...
|--------------------------------|----------------------------|----------------------------|-----------------------------------------------|-------------------------------
|                                |                            |                            |                                               |                               |
|                                |                            |                            |                                               |                               |

Code of Conduct: How should we handle poor performance on this team?

In Groups, I Tend to Be a….

- Leader
- Worker
- Planner
- Mediator
- Entertainer

Purposes of “Completing the Grid”?

- Forming:
  - What does everyone expect to get out of this class?
  - Do we have 5 leaders? Entertainers?
  - How do I contact you?
- Storming
  - What role do I want to play? (Leader vs. Entertainer)
- Norming
  - How do we handle poor performance?
- Encourages the movement through the phases and the formation of trust

Purposes of “Completing the Grid & Code of Conduct”

- Spurs discussion on class priorities:
  - What is my role? How important is this class to me?
  - What skills do my team members have? (competence)
- Allows groups to learn about their group members
  - How do I contact you?
  - Differing priorities (Leader vs. Entertainer)
  - Reduces depersonalization (benevolence)
  - Sets expectations early (integrity)
  - Focuses on similarities in group members’ backgrounds, instead of the differences
- Encourages the formation of trust

Final Suggestions for Using Groups

- Prevention is often the best approach
- Set expectations early
- Form heterogeneous groups
- Use permanent groups
- Rotate roles of responsibility
- Rely on group-selected ground rules
- Conduct peer evaluations
**Assessment of Individual Performance in Groups**

**Name of Person You Are Assessing:**

**Your Name:**

**Group Name:**

For each of the assessment categories below, place an "X" in the box that best indicates the extent to which you think that statement describes the person you are assessing. Fill one out for each member of your group and one for yourself. Forms are due at the start of class on the date given in the syllabus.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>disagree</th>
<th>somewhat agree</th>
<th>agree</th>
<th>strongly agree</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Does not miss out on group activities by being absent.</td>
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<td>2.</td>
<td>Does not miss out on group activities by being late.</td>
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<td>3.</td>
<td>Finishes all jobs assigned by the group on time.</td>
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<td>4.</td>
<td>Comes to class having read the material necessary for advancing group discussion.</td>
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<td>5.</td>
<td>Listens well to others' presentations.</td>
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<td>6.</td>
<td>Contributes to the group's discussion.</td>
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<td>7.</td>
<td>Does not dominate the discussion.</td>
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<td>8.</td>
<td>Brings new and relevant information to the group's discussion.</td>
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<td>9.</td>
<td>Uses appropriate resources for researching presentations.</td>
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<td>10.</td>
<td>Presents logical ideas and arguments.</td>
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<td>11.</td>
<td>Asks questions that promote clearer and deeper understanding.</td>
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<tr>
<td>12.</td>
<td>Communicates ideas and information clearly.</td>
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<tr>
<td>13.</td>
<td>Helps to identify and implement ways that the group can function better.</td>
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Please circle an overall rating:

1. Excellent - Exceeds expectations
2. Good - Meets expectations
3. OK - Improvement in some key areas needed
4. Major improvement needed

Please use the back of the form to respond to the following two statements. Link your responses to the ratings above as appropriate.

1. Describe the ways in which this individual most helps your group's learning.
2. Describe the ways in which a change in this person's behavior could improve your group's learning.

Borrowed from Deb Allen (Biological Sciences) website for BISC2078 at the University of Delaware. 
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