

# What Is PBL?



*Institute for Transforming  
Undergraduate Education  
University of Delaware*



**Problem-Based Learning:**

**From Ideas to Solutions through Communication**



# Characteristics Needed in College Graduates

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High level of communication skills

Ability to define problems, gather and  
evaluate information, develop solutions

Team skills -- ability to work with others

Ability to use all of the above to address  
problems in a complex real-world setting

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



# What Is PBL?

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“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.”

*Boud, D. (1985) PBL in perspective. In “PBL in Education for the Professions,” D. J. Boud (ed); p. 13.*



# What Is PBL?

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*“...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)**



# What are the Common Features of PBL?

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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.

Learning is active, integrated, cumulative, and connected.



# Questions are Critical

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*“...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 whatever you want or need to know.”*

Neil Postman & Charles Weingartner  
in *Teaching as a Subversive Activity*, 1969



# Characteristics of Good Learning Issues

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Presented in the form of a question or series of questions.

Focused so that it seeks specific information.

Constructed so that it asks an answerable question.

Pursues information that is relevant to the problem.

Goes beyond superficial knowledge to probe conceptual issues.

Often set in a context that provides direction. Why is the question important?



# A Typical Day in a PBL Course





# PBL: The Process

Resolution of Problem;  
(How did we do?)



Integrate new  
Information;  
Refine questions



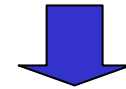
Reconvene, report  
on research;



Research questions;  
summarize;  
analyze findings



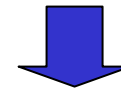
Presentation of Problem



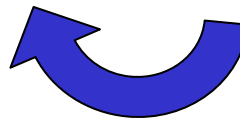
Organize ideas and  
prior knowledge  
(What do we know?)



Pose questions (What do  
we need to know?)



Assign responsibility  
for questions; discuss  
resources





# Question for Groups

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Reflect on your PBL experience so far:

What do instructors do to guide students working on a PBL problem?

*Be prepared to report out in 5-10 min.*



# Problem-Based Learning Cycle

**Overview/  
Assessment**

**Mini-lecture**  
(only if needed!)

**Whole Class  
Discussion**

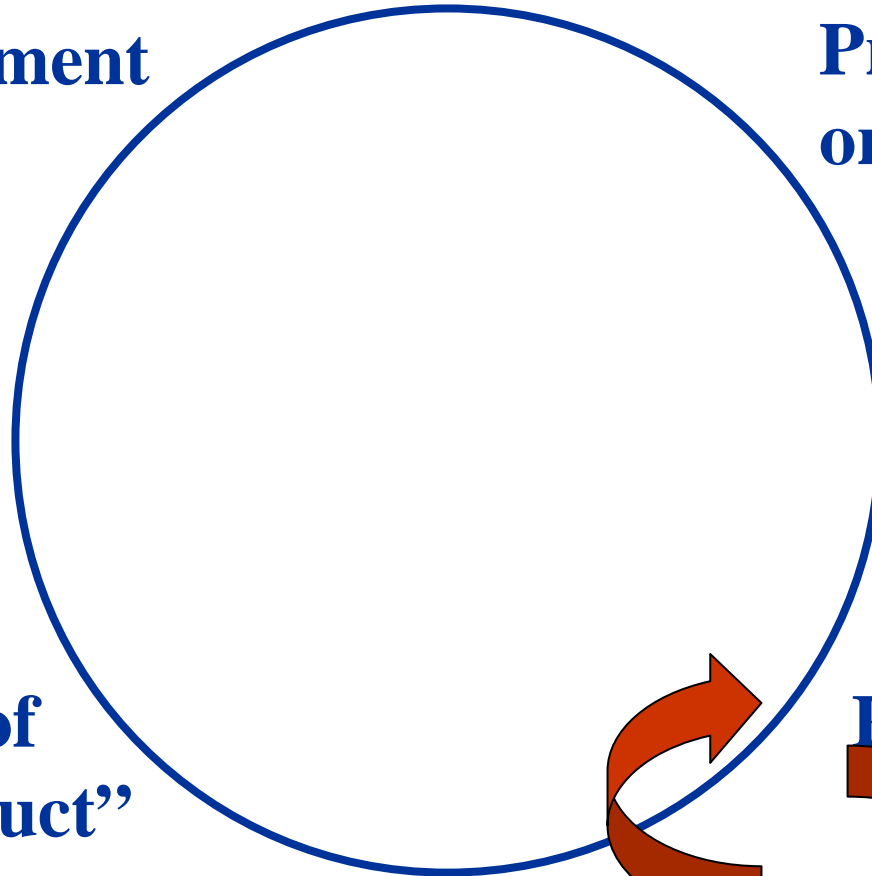
**Preparation of  
Group “Product”**

**Group Discussion**

**Problem, Project,  
or Assignment**

**Group  
Discussion**

**Research**





# Factors in Choosing a Model

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Class size

Intellectual maturity of students

Student motivation

Course learning objectives

Instructor's preferences

Availability of peer facilitators



# Common Classroom Models

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- Medical school
- Floating Facilitator
- Peer Facilitator
- “Hybrid”



# Medical School Model

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- 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

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- More structured format: greater degree of instructor input into learning issues and resources
- Group size: 4
- Instructor rotates through groups: Asks questions, directs discussions, checks understanding
- 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

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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



# Dealing with Large Classes

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Floating facilitator or peer facilitator models are the most appropriate.

Requires a more teacher-centered, structured format: instructor directs group activities

Group size: 4

Reduce grading burden through group (vs. individual) papers, projects



# “Hybrid” PBL

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- 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

*Often used as entry point into PBL in course transformation process*



# Effectiveness of PBL: Research

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- Ample evidence for the value of active and cooperative learning (Johnson, Johnson and Smith, 1991)
- Strict comparisons of PBL and traditional approaches difficult to design (Prideaux, 2000):
  - Randomization, blinding difficult
  - Many uncontrollable variables: variants in PBL, resources, motivation
  - Appropriate outcome measures: content knowledge vs. process skills
- Most research studies from medical education



# General Trends from Research

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- Content knowledge comparable to that found in traditional courses (Newman, 2003)
- PBL leads to
  - improvement in student attitude and clinical performance (Vernon and Blake, 1993)
  - deeper approach to learning (Newble and Clarke, 1986)
  - better interpersonal skills and attitudes towards patients (Nandi et al., 2000)