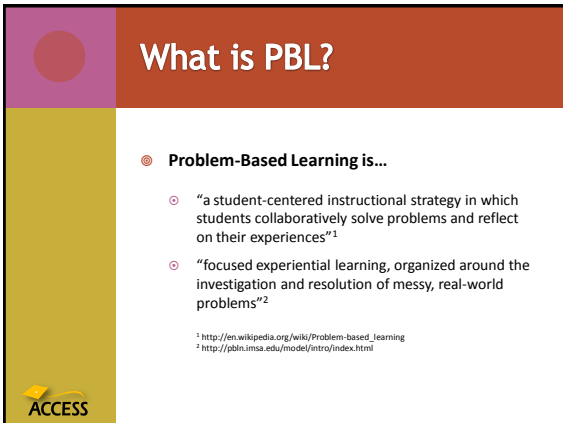


PBL:
Problem-Based Learning

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What is PBL?

- **Problem-Based Learning is...**
 - "a student-centered instructional strategy in which students collaboratively solve problems and reflect on their experiences"¹
 - "focused experiential learning, organized around the investigation and resolution of messy, real-world problems"²

¹ http://en.wikipedia.org/wiki/Problem-based_learning
² <http://pbli.imsa.edu/model/intro/index.html>






History

- **McMaster University in Ontario, Canada (1965)**
 - "goal of improving students' ability to apply knowledge in clinical contexts, increase retention of information, and develop lifelong learning habits."¹
- **Popular at many schools of medicine and public health**
 - Univ. of Delaware
 - Univ. of New Mexico
 - Drexel University
 - Harvard School of Dental Medicine
 - Others...



Key Concepts


- PBL is student-centered, active and engaging
- Learning is driven by challenging, open-ended problems
- Students work collaboratively to solve problems and reflect on their learning experiences
- Content is introduced in the context of real-world, complex problems
- Emphasizes exploration, questioning and reflection (critical thinking)
- Emphasizes process, not answers



Research


- **At Harvard School of Dental Medicine, PBL students did significantly better than non-PBL students in the areas of:**
 - Communication with patients
 - Critical thinking
 - Independent learning
 - Performance in small group settings
 - Self-assessment
 - Teamwork

Thammasitboon K, Sukotjo C, Howell H, Karimbur N. "Problem-based learning at the Harvard School of Dental Medicine: self-assessment of performance in postdoctoral training." Journal of Dental Education. 2007 71: 1080-1089




Instructor's Role

- **As students assume more responsibility for their learning, instructor becomes a facilitator**
- **Getting started**
 - Begin w/ worked examples
 - Model how to solve problems
 - Instructor support is faded as soon as possible



Activity

- **What do you think are the pros and cons of using PBL with your students?**
 - Instructor's perspective
 - Students' perspective




The Instructor

Pros

- "I like seeing my students more engaged."
- "I am preparing students for the real world."
- "Students understand the material at a deeper level."

Cons

- "PBL is time-consuming; I can't cover as much material."
- "I worry about losing control of my class."
- "Students may not be the best teachers."
- "I am no longer the 'sage on the stage.'"




The Students

Pros

- "The problems we work on feel real and relevant."
- "I remember more when I work through a problem from start to finish."
- "I can see how the topics in this course are connected."


Cons

- "I don't think the instructor is doing his/her job; the students are doing all the work!"
- "Just tell them me what I have to memorize for the exam!"
- "I hate getting stuck in a deadbeat group!"




Erica's evolving use of PBL

- Group exams are designed to make students use the material & critical thinking to solve problems.
- Group exams are designed to be too difficult to answer during one class period.
- Students are told the types of questions asked on the group exams will be used on their individual exams.




Erica's evolving use of PBL

- Students are given the exams 1 week before they are to take them.
- They are told they are expected to work on these outside of class, & that they will not be able to finish them if they come to class unprepared.
- They have 35 minutes, the last 15 minutes of class we go over the answers.




Erica's evolving use of PBL

- On the day of the exam the group decides on the best answer, fills out an answer sheet & turns it in for a group score. Students may fill in a page of dissent.
- If the dissenter is correct only they will get the points, if they are wrong only they will lose points.
- Students must be present during the group exam to get credit. I verify the presence of students during the exam, helps me to learn their names
- The last 15 minutes of class the students develop the key by answering questions about the group exam using their clickers.




Erica's evolving use of PBL

1. **Determining the identity of field isolated organism based on their characteristics: comparing eubacteria, archea, & eukaryotes; classification.**
2. **Metabolism & bioremediation**
3. **Transcription, translation and mutations**
4. **Viral life cycles and anti-viral drugs**




PBL and UDL

1. **Ideas and information are represented in multiple ways**
 - ⊙ Learning is driven by challenging, open-ended problems
 - ⊙ Students assume more responsibility, instructor becomes facilitator
 - ⊙ Emphasizes process, not answers
2. **Students express comprehension in multiple ways**
 - ⊙ Students work collaboratively to solve problems and reflect on their learning experiences
 - ⊙ Individual and group assessments
 - ⊙ Team members can play multiple roles
3. **Multiple opportunities for engagement**
 - ⊙ PBL is student-centered, active and engaging
 - ⊙ Content is introduced in the context of real-world, complex problems
 - ⊙ Exploration, questioning and reflection (critical thinking)




Recommendations for PBL Implementation

- ⊙ **Ask yourself:**
 - ⊙ What are your reasons for implementing PBL?
 - ⊙ What do you expect your students to gain?
 - ⊙ What works and what doesn't in your current teaching approach?
 - ⊙ Will you switch entirely to PBL or adopt a hybrid approach?
 - ⊙ What makes for a good PBL instructor?
 - ⊙ Are you clear about students' responsibilities and your expectations using PBL?



Next Time...

- **Universal Design for Learning as applied to course materials and technology**
 - Microsoft Word
 - Adobe PDF
 - HTML



Thank you!
