Building Lifelong Learning Skills Into Course Design

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Why?

Traditional Course Goals
• **Use mathematics** to describe the motion of objects in space and in a gravitational field
• **Know the three great mechanical conservation laws** in the universe and describe them mathematically: energy, momentum, and angular momentum

Traditional Course Assessments and Experiences
• Lecture, Homework, Exams
Why?

Average percent of correct responses increases by more than 60% after small group discussions.

<table>
<thead>
<tr>
<th>When Students Were Polled</th>
<th>Average Percent of Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Group</td>
<td>42.7%</td>
</tr>
<tr>
<td>Post-Group</td>
<td>70.2% ***</td>
</tr>
<tr>
<td>Class</td>
<td>95.5%</td>
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</tbody>
</table>
Why?

- Teamwork
- Responsibility for Own Learning and Helping Others
Why?

- Construct and Reconstruct Physics Knowledge

Average percent of correct responses increases by more than 60% after small group discussions.
Why?

- Play
- Problem-Solve
- Write and Communicate
Why?

Responses from students regarding “what skills they are learning in my class that will help them throughout college and in their future careers”:

“Collaboration (working with new people each time)”, “Teamwork”, “Group work – responsibilities in a team”

“Communication”, “Explaining Reasoning”

“Systematic quantitative reasoning”, “Quantitative problem-solving”, “Approaching problems in unconventional ways”

“Science”, “Physics”
Workshop Outline

• Workshop Outcomes (Objectives) and Group Work Management (5 min)
• Course Design: Brainstorm and Share Out (5 min)
• Implement Backward Course Design, Peer Review, and Share Out (40 min)
• Complete Assessments: Group Work and Workshop Session (5 min)
• Review Workshop Outcomes (1 min)
Workshop Outcomes

• Outline and apply backward course design in order to incorporate lifelong learning skills into a participant-chosen course

• Discuss and revise participant-created learning goals, outcomes, assessments, and learning experiences in order to experience the design process and share best practices with all session participants
Workshop Outcomes Cont’d

• Practice teaching and learning techniques in order to expand on participants’ repertoires, and determine which techniques will be useful in a participant’s own context

• Model group member roles in order to support group members and to function effectively as a team
Group Work Management: Roles

**Facilitator**
- Gets the team started
- Makes sure everyone understands what’s going on
- Organizes team so they complete the task
- *Does everyone get what to do?*
- *Who knows how to start?*
- *I’m not sure we all understand...can someone help?*

**Resource Monitor**
- Asks the team questions in order to determine if outside resources (books, notes, materials, people) are needed
- Calls the instructor over for team questions (not necessarily one who asks the question)
- Organizes the team cleanup of materials.
- *Are there other materials/resources that would help us?*
- *Do we all have the same question?*

**Product Monitor**
- Makes sure each member understands the work, records the data, and can report out
- Gives update statements on team’s progress
- Makes sure each member’s thinking is incorporated into the group’s final product
- *Are all of our ideas included in our final product?*
- *Is everyone prepared to report out our ideas?*
- *Did everyone get that in your notes?*

**Equity Monitor**
- Encourages equal participation and enforces use of norms
- Makes sure all voices are heard
- Assures that all members explain their thinking and understand each other’s thinking
- *How can we work this out?*
- *Can someone explain it another way?*
- *We need to work on listening to each member.*

From: Dr. Robin Angotti, UWB & the book: *Designing Groupwork: Strategies for the Heterogeneous Classroom* by Elizabeth Cohen
Course Design: What steps do you take?
Lifelong Learning Skill Learning Goals [5 min]

- What do you want students to learn?
- Example: Increase strength and confidence in writing and communication

- Your turn
  - Use the worksheet provided in the handout
Lifelong Learning Skill and Content Learning Outcomes [15 min]

• What do you want students to be able to demonstrate that they have learned? Must be measurable!

• “Formula”: Observable behavior/verb phrase (Bloom’s Taxonomy) + “in order to” + reason why¹.

• Bloom’s Taxonomy (Action Verbs in Handout)

• Example: Practice both written and verbal methods of communicating mechanics knowledge gained in order to defend individual and group reasoning, and to inform a diverse audience [Bloom’s Level: Evaluating]

• Your turn
  – Use the worksheet provided
  – Peer review LGs and LOs using provided peer review worksheet with the person next to you. Discuss and revise. Share out.

¹From: ACRL Immersion Assessment Program
Lifelong Learning Skill and Content Learning Experiences [5 min]

• What activities will the students experience?

• Examples for writing and communication:
  – Group whiteboard work
  – Practicing quantitative problems
  – Reading, watching and playing with resources at home
  – Labs

• Your turn
  – Use the worksheet
Lifelong Learning Skill and Content Assessments [15 min]

• How will you know they achieved the outcomes?

• Examples for writing and communication:
  – Whiteboard work: conceptual and quantitative problems; audiences: instructor and peers
  – Three homework problems: fully worked out on paper according to a problem-solving guideline; audiences: instructor and student
  – Resource worksheets: 10 “what, why, and how” questions, graded for completeness; audiences: student, peers, and instructor
  – Lab report/notebook: intro, data collection, analysis, interpretation; Cover Letter assignment: link lab skills to job ad requirements; audiences: instructor, peers, career center reps, and, hypothetically, hiring managers

• Your turn
  – Use the worksheet provided
  – Peer review Assessments using provided worksheets with the person next to you. Discuss and revise. Share out.
Workshop Assessments [5 min]

- Complete the group work evaluation form found in the handout (you can keep this)
- Complete the workshop session evaluation form
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References


Thank you!

Further example materials available upon request:

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