WORKSHOP: ASSESSING LEARNING OBJECTIVES

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WORKSHOP:
ASSESSING LEARNING OBJECTIVES

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AGENDA

- Introductions
- Learning goals
- Assessment
  - Standards & rubrics
- Learning theory
- Inquiry & learner-centered instruction
- Using evidence of student learning
Dr. Beth Lewis
- Assistant professor, science education (TLTE)
- Former geologist & high school science teacher

Small group activity

First, individual writing (5 minutes)
1. Describe an assessment that you use effectively in your classes (i.e., provides you with an accurate picture of student understanding)
2. A specific assessment concern/problem you want to resolve in the near future
3. Share with your group (5 minutes)
4. Summarize your group’s ideas in two lists (5 minutes)
Educative assessment systems are (Wiggins, 1998, p.12):

- “designed to teach -- to improve performance (of student and teacher) and evoke exemplary pedagogy...”
- built upon “meaningful performance tasks that are credible and realistic (authentic), hence engaging to students.”

An educative assessment makes for a productive learning opportunity...two for one

- Example: Tiffany Heng-Moss has entomology students in course/labs construct their own insect collection

Discuss in your group (5 minutes):

- When have you used an educative assessment in your classes?
II. LEARNING GOALS & ASSESSMENT

- A learning goal should be specific and measurable
- Instruction should be aligned with learning goal
  - "Opportunity to learn"
- Assessment standards (see NRC handout)
  - Students should understand your expectations
    - Deliberate attempts to make task more difficult to figure out violate assessment standards
- Use clear product descriptors & rubrics
- Are not just a list of criteria and distribution of points
- Each criteria should have a unique description of the quality of each level...provides feedback to students on what they did well and what needs improvement
- Translation of rubric to grade

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Exemplary (4)</th>
<th>Proficient (3)</th>
<th>Partially Meets Standard (2)</th>
<th>Not Yet (1)</th>
<th>Missing (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spelling &amp; Grammar</td>
<td>Correct grammar, spelling, &amp; punctuation</td>
<td>Some grammar, spelling, and/or punctuation errors</td>
<td>Multiple grammar, spelling, and/or punctuation errors</td>
<td>Consistent poor grammar, spelling, and/or punctuation</td>
<td>Nothing to assess.</td>
</tr>
</tbody>
</table>
ACTIVITY: LEARNING GOAL

- Handout:
  - Learning goal example

- Write a clear learning goal for one of your classes (5 minutes):
  - "Students will be able to...." (process)
  - "Students will understand..." (content)

- Share your objective with your group and provide feedback on the clarity of each other's objectives (5 minutes)
ACTIVITY: LEARNING GOAL (CON’T)

Individual write (8 minutes)….describe:

▪ one way you could determine if students were making progress toward this goal
▪ at the end of your instruction how you could determine if students had a deep understanding of your learning goal….share with your group

Q: Would you grade either of these assessments?
▪ Why or why not?

Q: How would you ensure that students had the opportunity to learn these concepts?

Discuss with your group (5 minutes)
Handout: 5E & assessment / Degrees of learner-centered activities

- Social constructivist learning theory
  - In practice: students need opportunities to co-construct meaning from learning activities
- 5E instructional model (Bybee)
  - based upon the learning cycle (Lawson)
**INQUIRY-BASED INSTRUCTIONAL MODEL**

Inquiry-based instruction: e.g., the 5E model

- **Engage:** hook (also a good opportunity to access prior knowledge)
- **Explore:** students doing science
- **Explain I:** students making meaning through oral and written discourse
- **Explain II:** teacher provides any necessary clarification of concepts and terms
- **Elaborate:** students apply understanding to new situation/context
- **Evaluate:** throughout, formative & summative
# DEGREES OF LEARNER-CENTERED ACTIVITIES

From: Hackling, 2005

<table>
<thead>
<tr>
<th>Level:</th>
<th>Problem</th>
<th>Equipment</th>
<th>Procedure</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common Name</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0: Verification</td>
<td>Given</td>
<td>Given</td>
<td>Given</td>
<td>Given</td>
</tr>
<tr>
<td>1: Guided inquiry</td>
<td>Given</td>
<td>Given</td>
<td>Given</td>
<td>Open</td>
</tr>
<tr>
<td>2a: Open guided inquiry</td>
<td>Given</td>
<td>Given</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>2b: Open guided inquiry</td>
<td>Given</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>3: Open inquiry</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
</tbody>
</table>
IV. USING EVIDENCE OF STUDENT LEARNING

- Types of evidence:
  - **Whole group measures** on assignments (i.e., grades)
  - Strategically select a **sub-sample of student work** to analyse, by a particular lens or *rationale*...
    - gender (e.g., male/female students), *because we are trying to recruit more women into science*...
    - performance level (e.g., top, middle, and bottom third)
    - degree (i.e., majors/non-majors)
  - Informally **interview and/or survey** students for what helped them learn
...TO MAKE CLAIMS & REFLECT UPON INSTRUCTION

- Analyse for effective instruction...
  - which concepts students learned
  - which concepts student struggled with, and potentially retained misconceptions

- Reflect upon your instruction....
  - What positive claims can you make about student learning in your classes? (...and what instruction you would keep the same)
  - How could you adjust your instruction to better support student learning?

Set a goal for your instruction & assessment with the learning goal you wrote today
REFERENCES