COURSE DESIGN WORKSHOP
EARTH EDUCATORS RENDEZVOUS - 2020
JULY 16-17, 2020

1. Describe strategies to promote an inclusive college-level classroom
2. Explain the principal components of the backward design process
3. Analyze sample learning objectives and assessments.
4. Write learning objectives and design assessments for new lessons

LEARNING OBJECTIVES

WELCOME BACK! - Schedule

8:00-8:10 Quick content review of Day 1
8:10-8:30 Objective Homework Review
Objective Q&A, deep-dive in chat
**WELCOME BACK! - Schedule**

8:30-8:55 Objective Homework Review
You will be randomly assigned to a breakout room. Discuss your experience writing objectives and steps you took to make them detailed and measurable along with any challenges.

**ASSESS LEARNING OBJECTIVES WITH A CHECKLIST**

1. Is it a clear statement that describes what students should know or be able to do at the conclusion of one lesson?
2. Is it measurable and describe how that measurement is achieved (i.e., Blooms/Fink verbs)?
3. Does it represent specific competencies, skills, and/or knowledge that students are to master or demonstrate?
4. Does it avoid jargon and technical language unless specific vocabulary terms are required?

**Learning Objectives … Check. What Next?**
FEEDBACK & ASSESSMENT

Assessment - activities that are undertaken to provide information to be used as feedback to modify teaching and learning practices

- Formative assessment - low stakes/no stakes, evidence used to measure how well students are learning and to help the teacher to improve ongoing instruction – happens in class (or online)
- Summative assessment - the use of data, assembled at the end of a sequence of activities, to provide an overview of learning – happens on exams, homework or graded projects.

STRATEGIES TO SUPPORT STUDENT LEARNING

Provide assessment and feedback opportunities during class

Active Learning:
1. Students participate in classroom activities (either “Doing” or “Observing”) in addition to/instead of listening to direct instruction
2. Activities provide opportunities for student reflection on learning and/or facilitate student/instructor interaction and assessment of learning

Examples
- Think – Pair – Share
- Concept Maps
- Mini Papers
- Concept Tests
- Concept Maps

For more examples of active learning strategies, see McConnell et al., (2017) Instructional Utility and Learning Efficacy of Common Active Learning Strategies, Journal of Geoscience Education, 65, #4

FEEDBACK & ASSESSMENT

"FIDElity" Feedback

- Frequent - where possible give (formative) feedback daily or weekly
- Immediate - provide feedback soon after related student work is completed
- Discriminating - clearly explain differences between high/low scoring work
- Empathy - show understanding for the students when delivering feedback

Adapted from Fink, 2003
**Matching Assessments w/ Learning Objectives**

Match each learning objective with separate defined assessment task.

**Keep small tasks relatively brief – ConceptTest, fill-in concept map, Venn diagram.**

**What are the 2 most common gases in Earth's atmosphere?**

A. Carbon dioxide and oxygen
B. Nitrogen and carbon dioxide
C. Oxygen and nitrogen

**When would the sun be most likely to be overhead somewhere between the equator and the Tropic of Cancer in the Northern Hemisphere?**

A. Between the spring equinox and summer solstice only
B. Between the spring and fall equinox
C. Between the fall equinox and the winter solstice only
D. Between the fall and spring equinox

**Match each learning objective with separate defined assessment task. Keep small tasks relatively brief – ConceptTest, fill-in concept map, Venn diagram.**

**Place the terms in the appropriate places in the Venn diagram.**

**A. Rimmage**
B. Aggregation
C. Collision-coalescence
D. Vapor deposition
E. Evaporation
F. Sublimation
G. Condensation
H. Freezing
J. Melting
K. Graupel
L. Sleet
**Matching Assessments w/ Learning Objectives**

Include at least one learning objective that focuses on higher order thinking skills and/or authentic tasks.

- For example, verbs associated with Bloom’s Taxonomy that reflect tasks involving higher order thinking skills objectives include: derive, predict, analyze, design, interpret, synthesize, formulate, plan, correlate, evaluate, create, critique, and adapt.

Assessments should be appropriate for both students and instructors.

- Account for student preparation and experience and instructor workload.

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**Potential Learning Objectives**

Would you make any changes to the potential learning objectives you wrote for homework?

What is the nature of the changes?

What assessment would you create that matches the revised learning objectives?

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**Schedule**

9:20 - 9:35 BREAK
OBJECTIVES AND ASSESSMENT

Whip around: In your own words, what connects learning objectives and assessment in the student experience?

9:35 – 9:40

OBJECTIVES AND ASSESSMENT

Group Discussion:
How do educators traditionally plan these course elements during course design?

How have you planned learning goals, in-class activities and assessment in your past courses?

9:40 – 9:45

Schedule

9:45 – 10:00 Backwards Design
**FIVE YEARS OUT...**

What Do You Want Your Students to Remember?

- enduring concepts (e.g., democracy, equilibrium)
- how to **transfer knowledge** to novel circumstances
- how to **engage in critical inquiry** and analysis
- **know how** to get and evaluate information
- be able to communicate competently using a wide variety of media
- habitually seek, respect and use **diverse perspectives** in problem-solving
- see **ethical problems** and make ethical choices

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**START WITH THE END IN MIND**

<table>
<thead>
<tr>
<th>&quot;Traditional&quot;</th>
<th>&quot;Backward&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>List Course Topics</td>
<td>Enduring Understandings and Learning Goals</td>
</tr>
<tr>
<td>Design Instruction</td>
<td>Acceptable Evidence</td>
</tr>
<tr>
<td>Design Exams/Papers</td>
<td>Instructional Activities</td>
</tr>
</tbody>
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Wiggins and McTighe (1998)

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**BACKWARD DESIGN IS OUTCOME BASED RATHER THEN COURSE TOPICS**

Identify desired results

- Determine acceptable evidence
- Plan learning experiences and instruction

Identify Learning Objectives

- Feedback and Assessment
- Teaching and Learning Activities
1. Learning Objectives

- SWBAT (students will be able to): objectives should be measurable and include both higher- and lower-order examples.

2. Feedback & Assessment

- Low stakes formative assessments and high stakes summative assessments (exams) linked to learning objectives.

3. Teaching & Learning Activities

- Content in short segments separated by assessments.

Situational Factors (e.g., class size, classroom characteristics, student motivation, student rank etc.)

Establishing Curricular Priorities

- Worth being familiar with
- Important to know and do
- Big Ideas & Enduring Understanding

Assessment Types

- Traditional quizzes and tests
  - Selected or constructed response

- Performance tasks and projects
  - Open ended
    - Complex
    - Authentic

Wiggins and McTighe (1998)
HELPFUL LINKS

Understanding By Design
* https://cft.vanderbilt.edu/guides-sub-pages/understanding-by-design/
What is backward Design?
* https://educationaltechnology.net/backward-design-understanding-by-design/
Backwards Design Tool: One Teacher’s Journey and Process in NGSS
* http://www.mtscienceducation.org/toolkit-home/from-1d-to-3d/backwards-design-tool/

OBJECTIVES AND ASSESSMENT

Group Discussion:
How do you think we can put backwards design into practice during our course design?

10:00 – 10:10

HOW TO APPLY BACKWARDS DESIGN

Reginald General Discussion:
How I put backwards design into practice?

10:10 – 10:15
**How to Apply Backwards Design**

Jason’s NCSU Example: Separate PowerPoint

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**Lesson Design Rubric**

Five categories, 10 items to consider:
- Learning objectives
- Assessment and Feedback
- Resources and Materials
- Instructional Strategies
- Alignment

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**High Structure Course Template**

Multiple features to support student learning via Backward Design
- Identify clear learning objectives
- Create tasks (assessments) associated with learning objectives.
- Provide students opportunity to practice tasks or task components during class (formative assessment, active learning).
- Match measurable summative assessments to learning goals as directly as possible.
- Be explicit with how these actions help support learning
10:30 - 10:50 Brainstorm goals for your upcoming course and generate a plan for revision via lesson design rubric

10:50 Workshop Evaluation

END OF DAY 2
THANK YOU!!!