Transitioning to Active Learning

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Beyond Lectures

“It is the one who does the work who does the learning.”

—Terry Doyle

Presentation Topics

- Learner-centered course design
- Prioritizing content
- Aligning learning objectives
- Benefits of active learning
- Examples of active learning
Learner-Centered Course Design

Be Familiar With Important Core Concepts

- Identify Desired Results
- Determine Acceptable Evidence
- Plan Learning Experiences
- Sequence Course Topics
- Evaluate Course
- Revise Course

Prioritizing Content

Worth Being Familiar With

Important to Know and Do

Crucial for Conceptual Understanding

- The discipline’s “essential questions”
- Correction of common misconceptions
- What we hope students will remember 5 years from now

Reproductive and Perinatal Epidemiology

Course Learning Objective
Students will be able to:
- Critically review epidemiologic research about
  - Selected reproductive health concerns
  - Pregnancy and perinatal outcomes
  - Forms of evidence in reproductive and perinatal epidemiology

Key Concepts
Students will understand:
- Selection bias
- Interpretation of equivalency trials
- Reverse causality
- Limitations of observational epidemiology
Learning Objectives

Course & class session learning objectives

Students will be able to:

Critically review epidemiologic research about
  • Selected reproductive health concerns
  • Pregnancy and perinatal outcomes
  • Forms of evidence in reproductive and perinatal epidemiology

Students will be able to:

Critically evaluate forms of evidence in reproductive and perinatal epidemiology
Planning for Active Learning

• What student preparation is needed?

• What kinds of activities will foster desired learning objectives?
  ▶ Levels of learning (Bloom’s Taxonomy)
  ▶ Depth of learning (surface vs. deep)
## Bloom’s Taxonomy (Revised)

<table>
<thead>
<tr>
<th>Can be achieved through active or passive learning</th>
<th>Can be achieved only through active learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Level 2</td>
</tr>
<tr>
<td>[Cells filled with various actions like <code>define</code>, <code>describe</code>, <code>identify</code>, etc.]</td>
<td>[Cells filled with various actions like <code>analyze</code>, <code>critique</code>, <code>evaluate</code>, etc.]</td>
</tr>
</tbody>
</table>

### Understanding
- **Remembering**
  - Cite examples
  - Define
  - Describe
  - Identify
  - List
  - Name
  - Recall
  - Record
  - Relate
  - Repeat
  - Summarize
  - Translate

### Applying
- **Understanding**
  - Demonstrate
  - Employ
  - Explain
  - Express
  - Infer
  - Interprete
  - Locate
  - Recognize
  - Report
  - Restate
  - Sketch
  - Use

### Analyzing
- **Applying**
  - Analyze
  - Calculate
  - Compare
  - Categorize
  - Infer
  - Interpret
  - Locate
  - Recognize
  - Report
  - Restate
  - Summarize
  - Translate

### Evaluating
- **Analyzing**
  - Appraise
  - Assess
  - Compare
  - Contrast
  - Evaluate
  - Experiment

### Creating
- **Evaluating**
  - Assemble
  - Collect
  - Construct
  - Create
  - Design
  - Formulate
  - Generate
  - Invent
  - Manage
  - Organize
  - Plan
  - Prepare
  - Produce
  - Propose

“Any fool can know. The point is to understand.”

– Albert Einstein
“To grasp the meaning of a thing, an event, or a situation, is to see it in its relations to other things... 

“In contrast, the thing without meaning to us, is something whose relations are not grasped.”

– John Dewey
Deep Learning and Understanding

At the heart of all understanding (deep learning), is the relation of "means-consequence," e.g.:

- How does a thing, event, or situation
  - Operate or function
  - What consequences follow from it
  - What causes it
  - What uses it can be put to

Deep Learning and Means-Consequence

- Do course assessments/assignments ask students to consider the following?
  - How a thing operates?
  - How a thing functions?
  - What consequences follow from it?
  - What causes it?
  - What uses it can be put to?

## Surface Learning vs. Deep Learning

<table>
<thead>
<tr>
<th>Knowledge (Surface Achievement)</th>
<th>Understanding (Deep Achievement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facts</td>
<td>The meaning of the facts</td>
</tr>
<tr>
<td>A body of coherent facts</td>
<td>The “theory” that provides coherence &amp; meaning to facts</td>
</tr>
<tr>
<td>Verifiable claims</td>
<td>Fallible, in-process theories</td>
</tr>
<tr>
<td>Right or wrong</td>
<td>A matter of degree or sophistication</td>
</tr>
<tr>
<td>I know something to be true</td>
<td>I understand why it is, what makes knowledge</td>
</tr>
<tr>
<td>I respond on cue with what I know</td>
<td>I judge when to and when not to use what I know</td>
</tr>
</tbody>
</table>

### Surface Learning vs. Deep Learning

<table>
<thead>
<tr>
<th>Surface Learning</th>
<th>Deep Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Focus is on the “signs” (or on the learning as a signifier of something else)</td>
<td>• Focus is on “what is signified”</td>
</tr>
<tr>
<td>• Focus on unrelated parts of the task</td>
<td>• Relates previous knowledge to new knowledge</td>
</tr>
<tr>
<td>• Information for assessment is simply memorized</td>
<td>• Relates knowledge from different courses</td>
</tr>
<tr>
<td>• Facts and concepts are associated unreflectively</td>
<td>• Relates theoretical ideas to everyday experience</td>
</tr>
<tr>
<td>• Principles are not distinguished from examples</td>
<td>• Relates and distinguishes evidence and argument</td>
</tr>
<tr>
<td>• Task is treated as an external imposition</td>
<td>• Organizes and structures content into coherent whole</td>
</tr>
<tr>
<td>• Emphasis is external, from demands of assessment</td>
<td>• Emphasis is internal, from within the student</td>
</tr>
</tbody>
</table>

Implementing Active Learning

Students will be able to:

*Critically evaluate* forms of evidence in reproductive and perinatal epidemiology

- Level of learning = Bloom’s level 6 (evaluating)
- Learning activity should facilitate *deep learning*
Students taught through active learning methods learn 2 to 3 times more than those taught through traditional lectures.

What is Active Learning?

Doing and Reflecting

- Four key elements
  - Critical thinking
  - Individual responsibility for learning
  - Open ended activities
  - Well-designed learning activities

Transitioning to Active Learning

- Clarify expectations
- Explain why active learning is being used
- Explain how active learning approaches will be assessed
- Model activity
- Check progress with formative assessments
- Debrief after active learning sessions
Stepping out from behind the Curtain
Facilitating Active Learning

- Engage students in the learning process through
  - Reading
  - Writing
  - Discussing
  - Problem solving
  - Cooperative learning (*includes peer, self, and whole group assessments*)

Alignment

Image Source: Public Domain Pictures.net
Alignment

Students will be able to:

*Critically evaluate* forms of evidence in reproductive and perinatal epidemiology

Level of learning = Bloom’s level 6 (evaluating)

- **Useful**
  - Discussion
  - Exploration/problem-solving
  - Student led-sessions

- **Less Useful**
  - Polling
  - Visible quiz
  - Value line
  - Pair/Share
Active Learning Examples (Index Card Strategies)

- **Minute paper**
  - Students indicate the most important thing they learned and something that remains unclear

- **Direct paraphrasing**
  - Students explain a concept in their own words for a particular audience

- **Application notes**
  - Students write down a real-world application of what they learned

- **K-W-L-F**
  - Students respond to the following prompts before and after a learning session—Know, Want to know, Learned, Follow-up

Active Learning Examples (Quick)

• **Think (write)-Pair-Share**
  ▶ Students are given a question, problem, example, to develop. They work for 2-5 minutes alone (thinking) and write down their thoughts. Then discuss their ideas for 3-5 minutes with the student sitting next to them (pair). Finally, pairs share their ideas with the whole class (share).

• **Visible Quiz**
  ▶ Students collaborate in small teams to answer questions, then are brought together to share the answers their team reached.

• **3 - 2 - 1 Format**
  ▶ Students are asked to share with a partner or small group: 3 ideas or issues presented, 2 examples or uses of the idea/information covered, 1 unresolved/remaining question/area of possible confusion

Active Learning Examples (Quick)

• **Value Line**
  ▶ Students are asked to group together based upon their response to a divisive question. Groups stand together long enough to get a sense of mass, are asked another question, and move again throughout a cycle of questions.

• **Send/Pass a Problem**
  ▶ Students work together to solve a problem, write down potential solutions and then pass their solutions to the next group, who work from the first group’s solutions, then add to the collection until several problems and resolutions have been passed throughout the class.

• **Paradox**
  ▶ Students are presented with a paradox about an essential concept. Working in groups of 3 or 4 they attempt to resolve the paradox.

Active Learning Examples (Class Session)

- Discussion
- Student-led review sessions
- Debates
- Problem-based-learning
- Case-based-learning
- Concept mapping
- Peer feedback
- Panel discussions
- Role playing
Active Learning & Technology

Explore, Create, Curate, Review, Share

- Polling (response systems)
- VoiceThread
- YouTube
- Wolfram Alpha
- Discussion forums
- Explain Everything
- Twitter
The Flipped Classroom

• “A pedagogical model in which the typical lecture and homework are reversed.”

• Students engage with didactic content outside of class in preparation for active learning in class

Blended/Hybrid Learning

- “Blended learning is the thoughtful fusion of face-to-face and online learning experiences”
- Unlike the Flipped Classroom, “seat time” is reduced
- Active learning takes places both online and in class
- In planning the course, instructors determine which learning objectives would benefit from face-to-face experiences

Learner-Centered Course Design

Be Familiar With

Important

Core Concepts

- Sequence Course Topics
- Plan Learning Experiences
- Determine Acceptable Evidence
- Revise Course

Identify Desired Results

References:

- Educause (2012). 7 things you should know about the flipped classroom. *Educause Learning Initiative.* Washington, DC.

Resources: