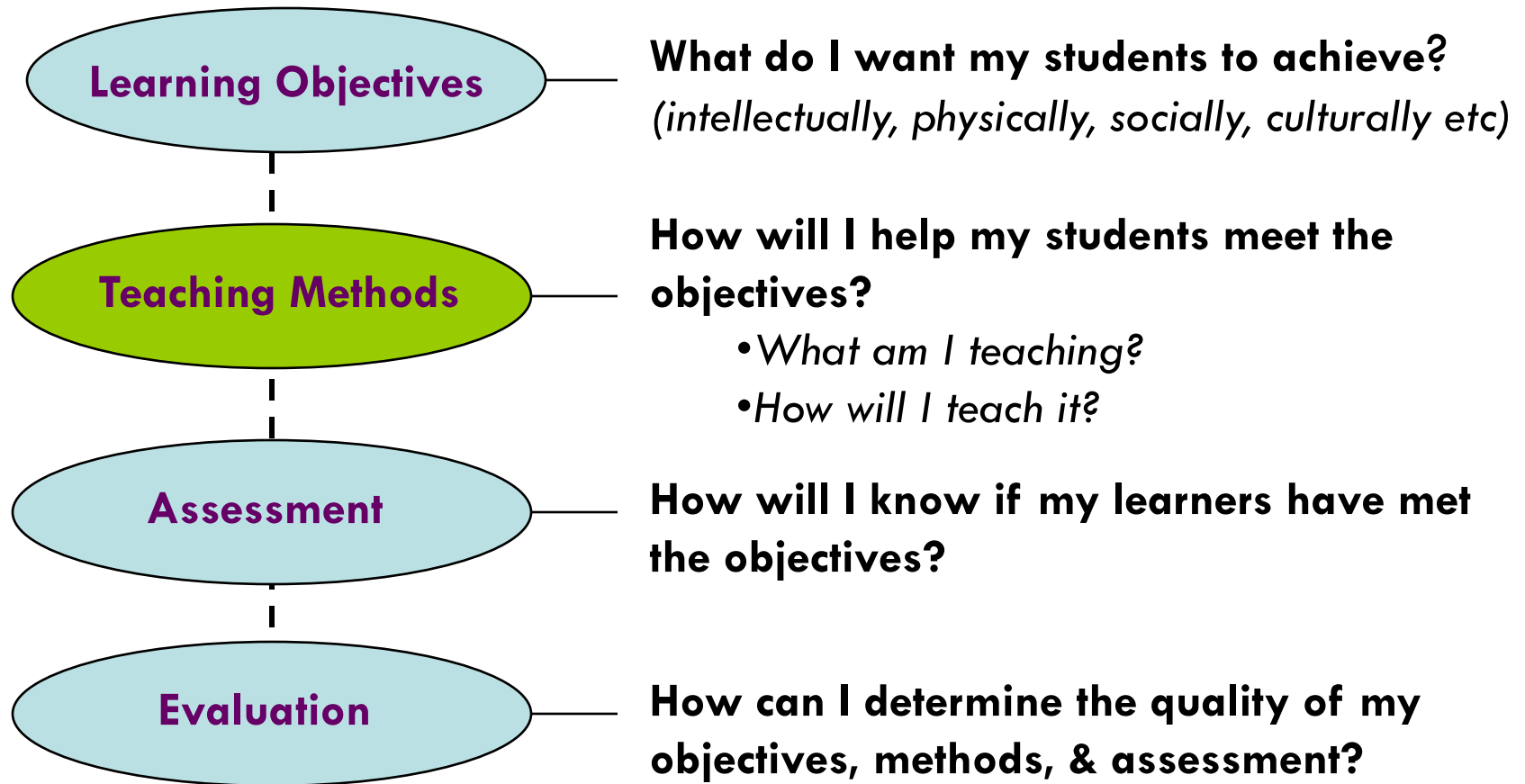


Aligning the Learning Experience



What teaching methods
and activities can
engage our students?



Active Learning Methods

Promote questioning, comparison of ideas

Reveal opposing points of view & misconceptions

Explore alternatives, application of concepts

Promote problem-solving & communication skills

Provide additional method of assessing learning

Some Active Teaching Methods

Interactive lecture

- Mini discussion groups/pairs
 - Problem-solving groups
- Polling: Clickers/note cards
- Students predict outcome
- Opportunities for critical thinking & response
 - Written response

Discussion

- Full group
- Small-group “feeders”
- Round-robin
- Case studies
- Polls/surveys
 - Debate
- Role play

Inquiry/Problem-based learning

- Answer or create real-world problems
- Work through ill-structured problems
- Use research methods
- Think critically to connect evidence and explanations

Case Study

Dr. Sharif is giving a lecture on global warming, her area of expertise, to first-year students. The material is a mixture of information from the course textbook and her graduate school notes. To make sure her students have a clear set of notes, she has created 20 PowerPoint slides containing relevant passages, which she has been reading verbatim with occasional commentary. Halfway through the hour, she can see that her students are not taking notes and seem bored. She asks if there are any questions, but when no one responds she moves on. She is worried that she will not get through the material on time.

A week later, when she is grading the exam, she is perplexed because her students seem to have missed some major points about global warming

What problems do you see here? What could Dr. Sharif do?

Engaging your students during lecture



Reconceptualizing the Lecture: Restricted vs. Engaged

The restricted lecture (more teacher focused)	The engaged lecture (more learner focused)
One-way	Multidirectional
Goal is coverage	Goal is understanding
Engage at cognitive level only	Engage at interpersonal level
Lecturer sets agenda	Feedback between lecturer and students
Lecturing “causes” learning	Lecturing engages students to help them construct knowledge

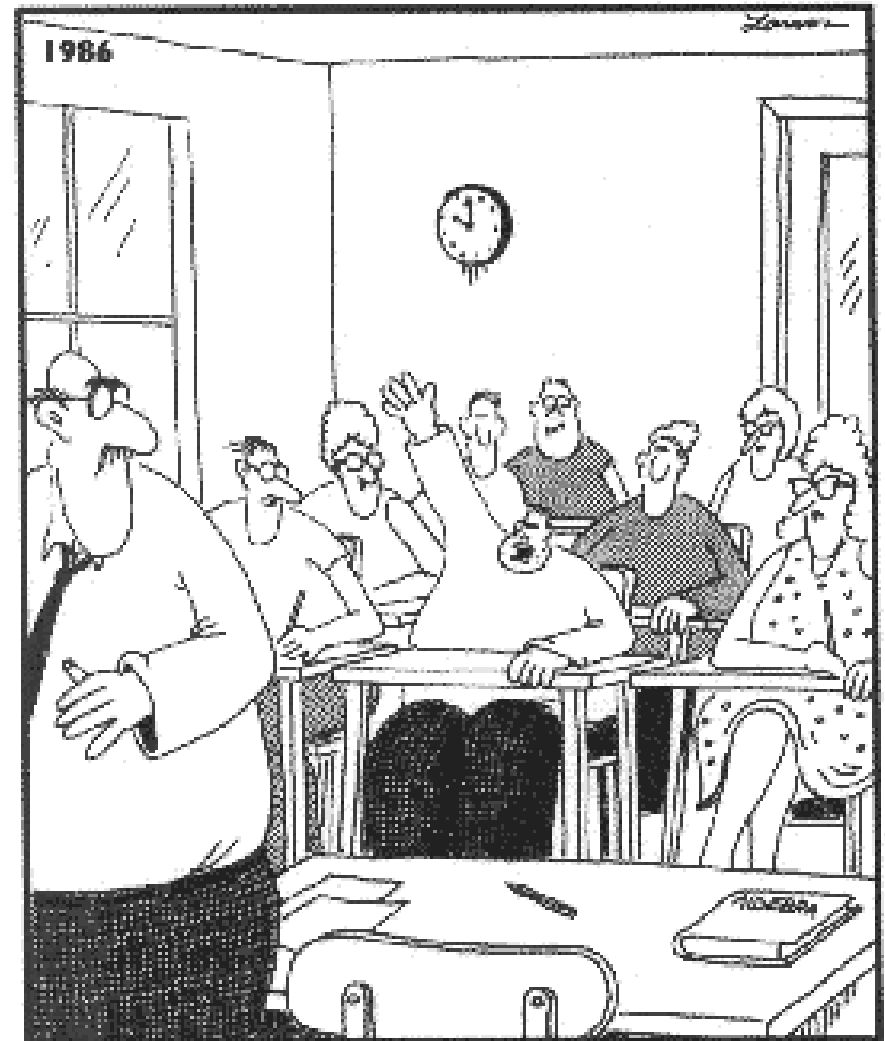
In restricted lectures, students...

Are often overloaded
with information

May not feel personal
relevance

May not be openly
invited to participate

Often do not engage
fully



"Mr. Osborne, may I be excused? My brain is full."

When students memorize, and don't make connections....

“Study this for the exam...”

Last Fernday, George and Tony were in Donlon peppering gloopy saples and cleaming, burly greps. Suddenly, a ditty strezzle boofed into George's grep. Tony blaired, “Oh George, that ditty strezzle is boofing your grep!”

Please Answer the Following Questions:

1. When were George and Tony in Donlon?
2. What did the ditty strezzle do to George's grep?
3. What kind of saples did George and Tony pepper?
4. What was Tony's reaction?
5. What do you imagine happened next?
 1. (Last Fernday)
 2. (Boofed into George's grep)
 3. gloopy saples)

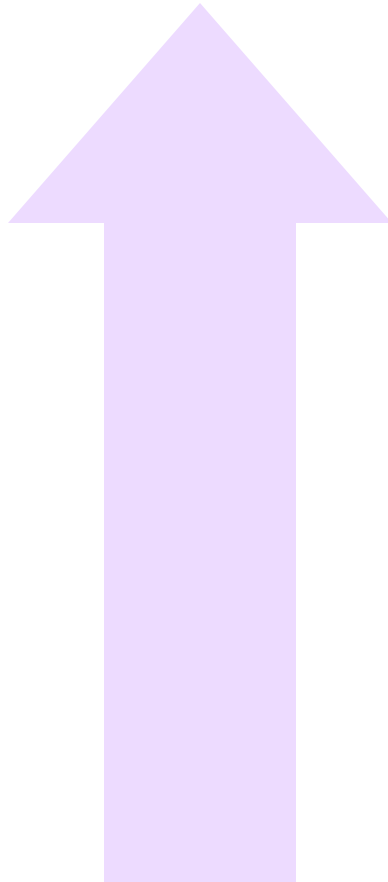
Searle Center for Teaching Excellence 4. “Tony blaired, ‘oh George, that ditty strezzle is boofing your grep’”

What kind of thinking do I want from my students?

- During my lecture
- Throughout the course



What is it you want your students
to be able to do or know...?



Creating

Evaluating

Analysing

Applying

Understanding

Remembering

Problematizing the Content

- A. Begin with a question/problem (related to a core concept)
- B. Help students understand the significance/ relevance of the question or problem
- C. Provide students an opportunity to answer the question or problem with reasons for the answer
- D. Answer the question or problem
- E. Leave students with a question or problem (to help make connections)



Lecture goal: Evaluate the Columbia explosion using Organizational Theory

Begin with a question/problem

How does the explosion of Columbia space shuttle show the failure of a high risk, high reward organization (NASA)?

Help students understand the significance of problem

The explosion of the Columbia space shuttle in 2003 was a national tragedy and a disaster for NASA. Shuttle flight operations were delayed for nearly two years afterwards.

Let students answer the question/problem

Small group discussion: How did NASA's history, cultural traits, and long-term organizational practices contribute to the disaster?

Answer the question/problem

Review NASA systems and relevant operations theory

Leave students with a question/problem

How transferable is this organization theory to other disasters, such as FEMA's response to Hurricane Katrina?

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Lecture goal: Analyze the underlying causes of Sickle Cell Disease

Begin with a question/problem

Help students understand the significance of problem

Let students answer the question/problem

Answer the question/problem

Leave students with a question/problem

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What are the causes of Sickle Cell Disease?

Sickle cell disease is an inherited disorder in which red blood cells (RBCs) are abnormally shaped. This abnormality can result in painful episodes, serious infections, chronic anemia, and damage to body organs.

Small group discussion: What are known causes of other blood cell disorders? How could one family member get hemoglobin SC disease while another gets sickle cell anemia?

Review symptoms, physiology, mechanisms of Sickle Cell

Recent research indicates that the drug hydroxyurea may slow the rate at which the disease progresses. What could explain this?

Consider...

What would a problematized lecture look like in your class/session?

Take a few moments to reflect...

Other active learning methods...



Northwestern medical students experiment in a physiology laboratory equipped with the newest technology and instruments of 1900. *Courtesy of University Archives.*

Active Learning Example: Engineering

Overarching goal:

introduce students to sources of chemical and process information, begin to assess their roles as chemical engineers within the community, appreciate the importance of communication.

Case study

Goal: question assumptions about factory/plant safety

Groups told that an incident has occurred at a chemical plant. Need to respond to local fire marshal asking for input about possible chemicals and hazards on site and to speculate what accident could have occurred.

Instructor reviewed responses, found variation in level of thoroughness, use of sources, and depth of understanding.

In class: addressed the issue of reputable information sources, discussed what constitutes extraordinary conditions in chemical engineering and how safe plants are designed.

Active Learning Example: Political Science – large lecture

- Short pre-lecture readings
- Lectures incorporate puzzle/problem; students engage in solving it by raising their hands, talking in small groups
- Students respond to critical thinking question at end of each class

E.g., Students read article, reconstruct the argument, spot errors in reasoning

E.g., After a discussion of Duverger's law that an American-style electoral system leads to a two-party system, ask:
Why don't India and Canada fit this law even though they have American-style electoral rules?

Active Learning Example: Statistics for Speech & Hearing Science

Students collect their own data on speech tasks in two groups (e.g., male and female)

- e.g., how long a person can sustain “ah,” or verbal fluency (name as many animals as you can)

Then analyze to compare groups and discuss findings & strengths and limitations of study

- Can be done in class
- Can be done in groups
- Students see for themselves how findings emerge from research
- Students become familiar with the notion of experimental design, practice critiquing research

Think about a class or session you teach.
What are two or three things you can
do to engage your students?



Retrieved from <http://www.cgm.northwestern.edu/cgm/Academics>

Reflect...

- *Think* of a course where you felt engaged as an undergrad
 - Why did you feel engaged in this class?
 - Can you identify 2-3 aspects of the course/instruction that contributed to your learning?
- *Pair*: Relate your experience to your partner
- *Share*: Identify common themes in your experiences

Indications for Genetic Evaluation and Counseling

- History of recurrent (2+) miscarriages
- Pregnancy at increased risk for medical problems
 - *family history*
 - *prior screening results*
 - *age*
- Child with undiagnosed medical problems
- Individual with known genetic condition
- Concern about family medical history
 - *child, sibling, parent or other affected relative*
- Presymptomatic genetic testing for adult onset conditions

What are some

Indications for Genetic Evaluation and Counseling ???

- History of recurrent (2+) miscarriages
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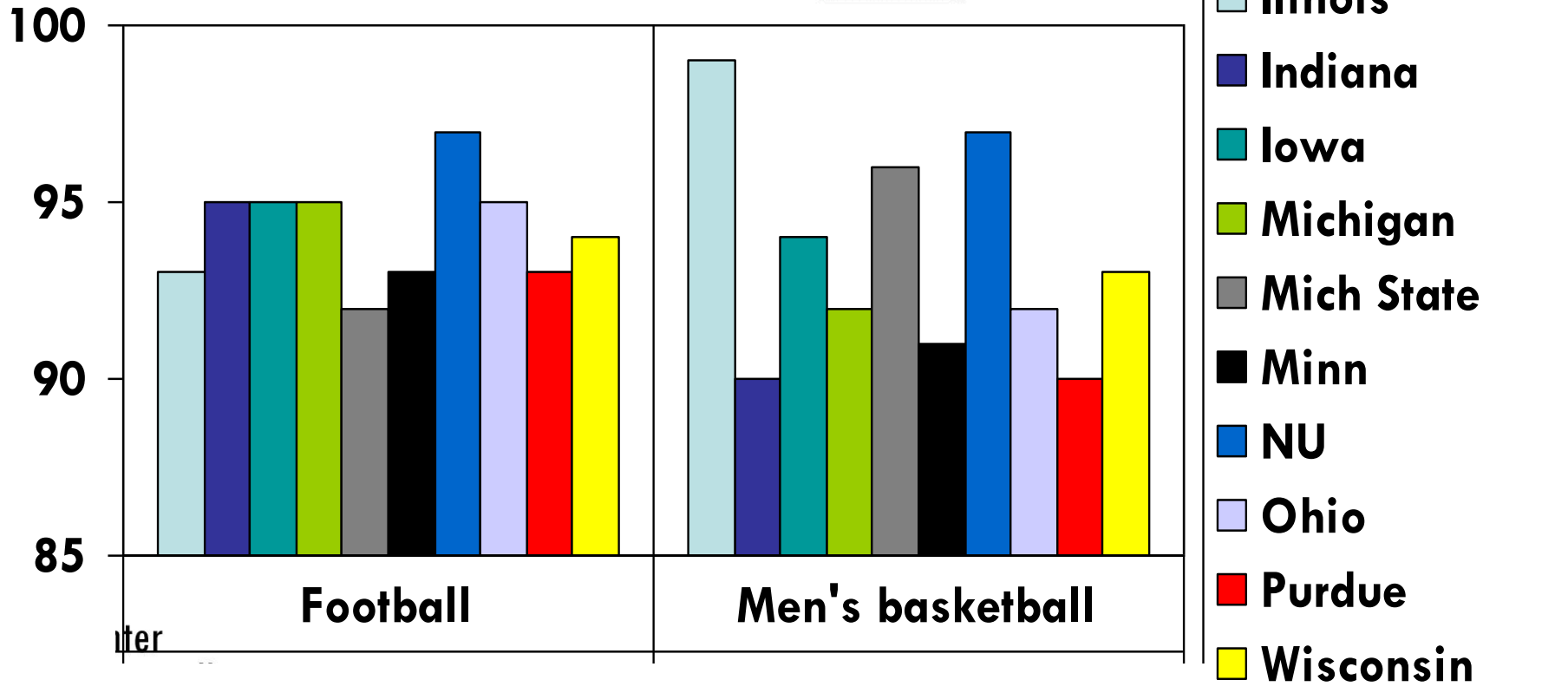
Get students to hypothesize or generate answers; turn rhetorical questions into real questions

At what Big Ten University do student athletes perform the best academically in:

- Football?
- Men's basketball?

Generate student knowledge and interest before presenting chart, graph or table

Big Ten 2008 Academic Performance Ratings



Brainstorming

What does an arch
symbolize about
Northwestern?



PHOTO: NATHAN MANDEL

Pre-lecture: can help provide direction for teacher

Mid-lecture: provides a break, allows teacher to
check in with students

End of lecture: provides summary, student
assessment

Pre Knowledge Check

What figures, themes or images can you identify in this portrait?



Jan van Eyck, *Arnolfini Portrait* (1434)

Application

- How does this painting confront or conform to contemporary notions of gender and religion?
- What knowledge of science does this painting suggest?



The convex mirror



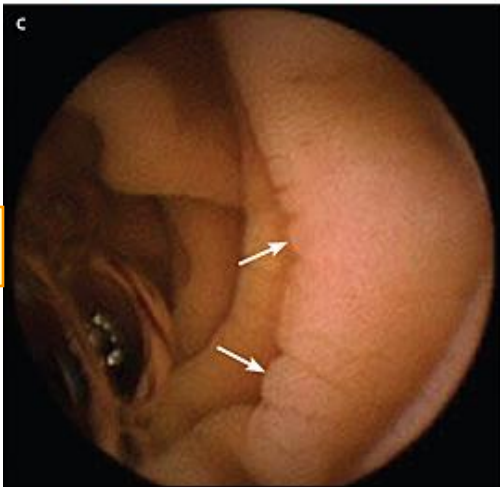
Jan van Eyck, *Arnolfini Portrait* (1434)

More Examples

Pre-knowledge or comprehension check

Compare endoscopic photo normal intestine (A) with (B).

- What condition or disease could this symptom indicate?
- How does this symptom develop?



Application

- What genetic tests can be used to test/confirm this disease?
- What are the risks for passing on this disease to one's offspring?

Muddiest Point

What aspect of Celiac disease are you still unclear about?

Debate: Who owns the past?

Weigh the benefits & harms associated with the trend to return archeological items to their homelands

Benefits

- A nation has the right to its birthright
- Many artifacts were unlawfully stolen through conquest or through imperialism In museums, artifacts may be displayed out of context
- May be ethically or morally irresponsible to display artifacts with spiritual or human significance (e.g bones, mummies)

Harms

- Political boundaries change; new people may live over old land
- Many countries do not have the ability to house fragile objects appropriately
- Difficult to determine “true” owners
- People (scientists, students etc) will lose valuable opportunity to study and learn

In pairs or small groups, students can generate and debate key ideas.