# Planning and Assessing Student Learning

Kathryn M. Plank
Faculty & TA Development
The Ohio State University

# Expert & Novice Learners

# How Experts Differ from Novices

- *How People Learn:*

  *Brain, Mind, Experience, and School*

  John D. Bransford, Ann L. Brown, and Rodney R. Cocking, editors.

  Expanded edition, National Academy Press, 2000
- Available online at http://www.nap.edu

# Activity

- Think about a recent experience you had learning something in your field (e.g., a new concept or method).
- How did you learn it?

# Activity

- Now think about a recent experience you had learning something outside your field (e.g., driving a stick shift, replumbing a toilet, speaking German).

- How did you learn it?

# Reflection

- How did you know what was working and what was not?
- How were the experiences different?
- What did it feel like?
- What made it difficult?
- How did your skills in other fields help?
- How much of what you did as an expert would your students know to do?

# Characteristics of Expert Learners

1 Experts notice features and meaningful patterns of information that are not noticed by novices.

# Example

- In one study, a chess master, a Class A player, and a novice were given 5 seconds to view a chess board position from the middle of a chess game and then asked to recreate it. The master player correctly placed many more pieces than the Class A player, who in turn placed more pieces than the novice (16, 8, 4).

# Example

- However, these results occurred only when the chess pieces were arranged in configurations that conformed to meaningful games of chess. When chess pieces were randomized and presented for 5 seconds, the recall of the chess master and Class A player were the same as the novice—they placed from 2 to 3 positions correctly.

# Implications for Teaching

- The superior recall ability of experts has been explained in terms of how they ‘chunk’ various elements of a configuration that are related by an underlying function or strategy.

# Characteristics of Expert Learners

2 Experts have acquired a great deal of content knowledge that is organized in ways that reflect a deep understanding of their subject matter.

# Example

- In an example from physics, experts and competent beginners (college students) were asked to describe verbally the approach they would use to solve physics problems.

# Example

- Experts usually mentioned the major principle(s) or law(s) that were applicable to the problem, together with the rationale for why those laws applied to the problem and how one could apply them.

# Example

- In contrast, competent beginners rarely referred to major principles and laws in physics; instead, they typically described which equations they would use and how those equations would be manipulated.

# Implications for Teaching

- Expert knowledge is not simply a list of facts and formulas that are relevant to their domain; instead, their knowledge is organized around core concepts or ‘big ideas’ that guide their thinking about their domains.

# Characteristics of Expert Learners

3 Experts' knowledge cannot be reduced to sets of isolated facts or propositions but, instead, reflects contexts of applicability: that is, the knowledge is 'conditionalized' on a set of circumstances.

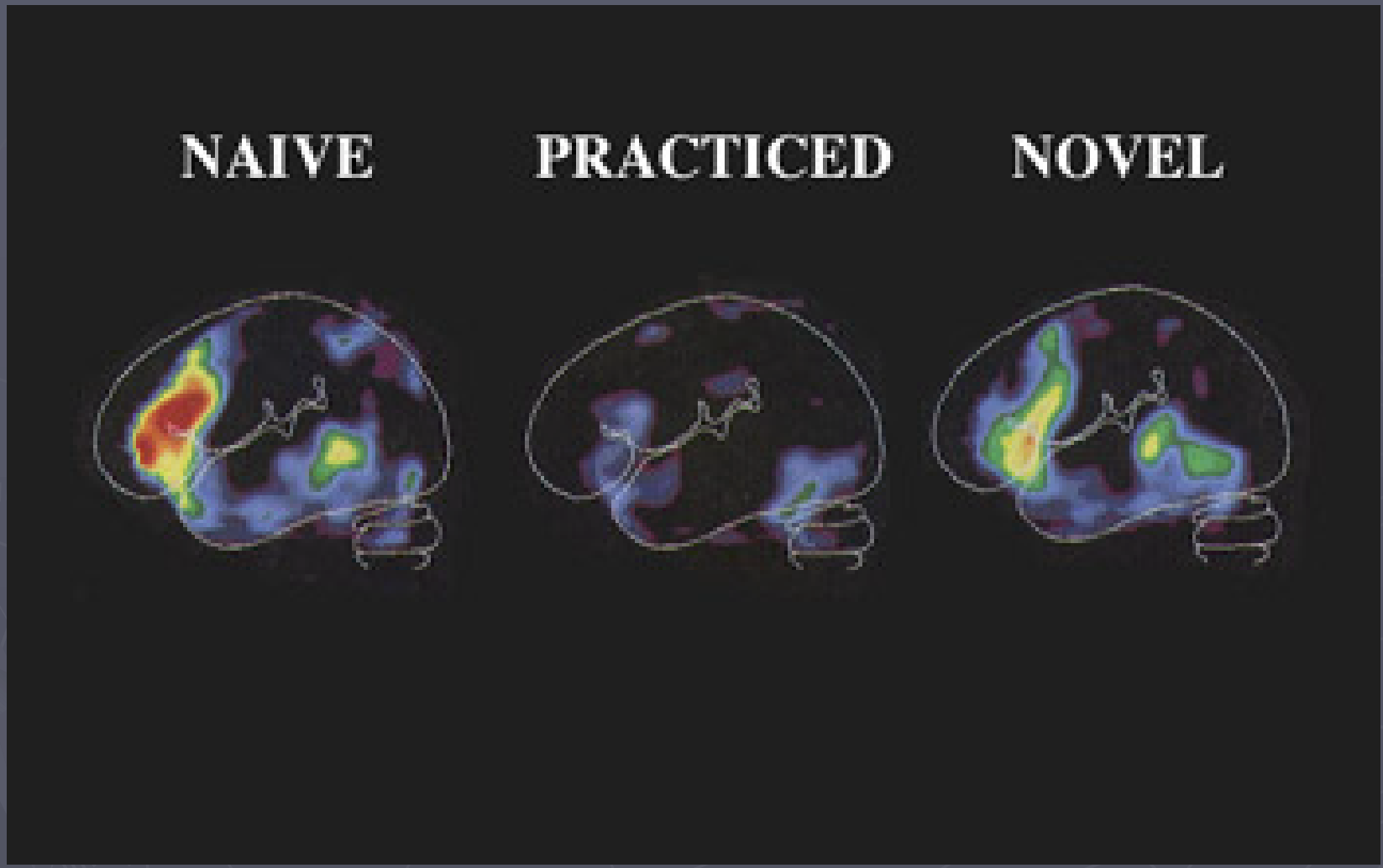

IN GOD WE TRUST
LIBERTY
1976
UNITED STATES OF AMERICA
E PLURIBUS UNUM
ONE CENT

# Implications for Teaching

- Experts have a vast repertoire of knowledge that is relevant to their domain or discipline, but only a subset of knowledge is relevant to any particular problem.

# Characteristics of Expert Learners

4 Experts are able to flexibly retrieve important aspects of their knowledge with little attentional effort.


NAIVE
PRACTICED
NOVEL

# Implications for Teaching

- Fluency is important because effortless processing places fewer demands on conscious attention and gives a person more capacity to attend to other aspects of the task.

# Characteristics of Expert Learners

5 Though experts know their disciplines thoroughly, this does not guarantee that they are able to teach others.

# Example

- You probably have numerous examples of this from your own experience!

# Implications for Teaching

- Expert teachers know the kinds of difficulties that students are likely to face; they know how to tap into students' existing knowledge in order to make new information meaningful; and they know how to assess their students' progress.

# Characteristics of Expert Learners

6 Experts have varying levels of flexibility in their approach to new situations.

# Example

- Two history experts (one a Lincoln expert and one from another specialty) and a group of future teachers were asked to read and interpret a set of documents about Abraham Lincoln and his view of slavery.
- The Lincoln expert brought detailed content knowledge to the documents and easily interpreted them.

# Example

- At the beginning of the task, the 2nd historian reacted no differently than the group of future teachers:  they appealed to an array of present social forms and institutions (e.g., “spin doctors”) to explain why things seemed discrepant.

# Example

- The historian, however, did not stop with initial analysis and worked from hypothesis that the apparent contradictions might be rooted less in Lincoln's duplicity than in his own ignorance of the 19th century. He was able to piece together an interpretive structure that brought him by the task's end to where his more knowledgeable colleague had begun.

# Implications for Teaching

- An important characteristic exhibited by the history expert involves what is known as ‘metacognition’—the ability to monitor one’s current level of understanding and decide when it is not adequate.

# Strategies for Teaching

- Helping students recognize and construct patterns of information
- Connecting new knowledge to old
- Making thinking visible
- Assessing students' understanding
- Helping students assess their own understanding

# Applying the principles

- Key ideas
- Prior knowledge
- Motivation
- Encoding
- Structure
- Modeling
- Practice with coaching
- Transfer
- Self-regulation
- Individual difference

# Assessing Learning

# Assessment

*Effective Grading: A Tool for Learning and Assessment*

Barbara E. Walvoord and Virginia Johnson Anderson

Jossey-Bass, 1998

# Assessment

- Goals
- Assessment
- Planning

# Assessment for Learning

- “But if the test is right—if it really tests the central learning goals of the course—then we should teach to it.  In fact, it seems criminal not to.”  (Walvoord and Johnson)

# Classroom Assessment Techniques

*Classroom Assessment Techniques: A Handbook for College Teachers 2nd ed.*

Thomas A. Angelo and K. Patricia Cross

Jossey-Bass, 1993

# Classroom Assessment Techniques

- Background Knowledge Probe
- Misconception/Preconception Check
- Problem Recognition Tasks
- Documented Problem Solutions
- Classroom Opinion Polls

# Assessment for Learning

- Begin by considering what you want your students to learn.
- Select tests and assignments that both teach and test the learning you value most.
- Construct a course outline that shows the nature and sequence of major tests and assignments.

# Assessment for Learning

- Check that the tests and assignments fit your learning goals and are feasible in terms of workload.
- Collaborate with your students to set and achieve goals.
- Give students explicit directions for their assignments.

# Assessment for Learning

- Case study for assessment-driven learning:
  - Collaborative learning
    - Assessment to manage groups, guide learning
    - Assessment of product and process
    - Self-assessment and peer assessment

# Assessment for Learning

- Collaborative learning resources
  - *Cooperative Learning for Higher Education Faculty* (Barbara J. Millis and Philip G. Cottell, Oryx Press, 1998)
  - "Assessing Effectiveness in the Collaborative Classroom" (Sharon Farago Cramer, New Directions in Teaching & Learning no. 59)