Decoding the Disciplines and Threshold Concepts: A Conversation between Paradigms

1. Bottleneck
2. Operations
3. Models
4. Practice and feedback
5. Motivation
6. Assessment
7. Sharing
<table>
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<tr>
<th>Threshold Concepts</th>
<th>Decoding the Disciplines</th>
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<tbody>
<tr>
<td>• Instructors ‘identify key concepts</td>
<td>• Starts with places students get stuck</td>
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<td>• Works within instructor’s view of what is important in the discipline</td>
<td>• Bottlenecks mark gap between student and expert ways of operating</td>
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<td>• Focused on paradigm shifts</td>
<td>• Identifies crucial mental processes of discipline</td>
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Two Theories of Difficulty

Bottlenecks (Emotional, Cognitive and Metacognitive)

Threshold Concepts
Two Theories of Difficulty

Bottlenecks (Emotional and Cognitive)

“I can’t do math”

Threshold Concepts

Elasticity of demand
Bottlenecks (Emotional and Cognitive)

- 1 - What is a bottleneck to learning in this class, a place where many students consistently fail to master crucial material

- 2 - What do specialists do so they get past this bottleneck?

- 3 - How can I explicitly model these operations for students?

- 4 - How can I give my students an opportunity to practice and get feedback on each of these operations?

- 5 - How can I motivate students and address the affective side of learning?

- 6 - How can I tell whether students have mastered these operations by the end of the process?

- 7 - How can I share what I have learned with others?

The "Decoding the Disciplines" Cycle
Bottlenecks

1. Compound Interest
2. Building a financial vocabulary
3. Budget, Savings, & Debt
4. Anatomy of a Paycheck
5. Saving Prioritizations
6. Investment Horizons
7. Risk Adversity
8. Risk/Return Trade-off
9. Investment Vehicles
10. Retirement Projection
11. Balancing Liquidity and Risk with Savings Goals
12. Retirement Plans
13. Portfolio Diversification
14. Inflation
Compound Interest
Building a financial vocabulary
Budget, Savings, & Debt
Anatomy of a Paycheck
Saving Prioritizations
Investment Horizons
Risk Adversity
Risk/Return Trade-off
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Retirement Projection
Balancing Liquidity and Risk with Savings Goals
Retirement Plans, Portfolio Diversification, and Inflation
• Faculty create knowledge, but they do so in a tacit manner

• Many teachers in the classroom simply transmit the results of knowledge creation

• Faculty who transmit knowledge may believe they are opening that way of knowing to students

• From the student perspective, the threshold may be blocked
Steps to Decoding the Disciplines

1. Identify Bottleneck
2. Decode crucial operations
3. Model
4. Provide practice
5. Motivate
6. Assess
7. Share
What Decoding Has to Offer Threshold Concepts

– Mechanism for making tacit knowledge explicit
  • The Bottleneck Interview
– Breaking tasks into their constituent parts
– Explicit process for developing strategies to deal with bottlenecks
– Basis for Collective Action
Example of Decoding a Threshold Concept

Student preconceptions in History

- Bottleneck: Students are unable to see the perspectives of different actors from the past
  - They look for good guys and bad guys

- Pre-Assessment: To what extent is the level of competition we have in our society today good or bad? Why do you say that?
Collecting Preconceptions—History

• Narrative 1: People used to be ignorant and didn't allow competition, squelched freedom. Now we allow competition and life is better.

• Narrative 2: We used to have a moral world that was balanced, but unrestricted competition destroyed the harmony of life and now everything is contested.

➤ Students look for good guys and bad guys in history
Step 2: Expert Thinking in History

• Historians reconstruct the realities of different actors in the past. They think about
  
  • The cognitive categories of people in the past
  • The values held by people in the past
Step 3: Modeling—History

- Develop a metaphor
  - Example: Gestalt images
- Model the reconstruction of the values and assumptions implicit in texts in class
Step 4: Practice and Feedback -- History

- Retelling fairytales from a different viewpoint
- Find the contrasting values or assumptions behind specific passages from writers with very different world views
Step 5: Motivation -- Principles

- Disrupt Rituals of Learning (Bain, 2006)
- Hold Students Publicly Accountable to Peers
Step 6: Assessment—History

Pre-Post comparisons

– Compare assignments in weeks 4 and 15
– Average score increased from 2.3 to 3.5 (34%)
– Scoring scale:
  1 = repetition of literal meaning
  5 = polished presentation of the assumptions implicit in the text
Step 6: Assessment in History: Global Assessment

One survey question:

Some students are unhappy with the way U.S. sources depicted Spain, while others disagreed with sources that criticized the United States. No one comes off well in all the sources. Which of the student reactions most closely matches your own response?

__Student A: “I’ll say what the professor has been saying about them.”
__Student B: “I’ll give both sides of the story to be objective.”
__Student C: “I won’t use offensive materials to be responsible.”
__Student D: “I’ll try to figure out why they say what they do.”
Evidence of Students’ Learning: Spring 2011

Measure of Students’ Ability to Negotiate Affect in their Response to the Survey Question on Upsetting Material

![Bar chart showing the percent of students who can negotiate affect in their response to the survey question on upsetting material, differentiated by affect level (Low/Low-Medium, Medium, High) and course type (HLP Full Implementation, Non-HLP).]