

# 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

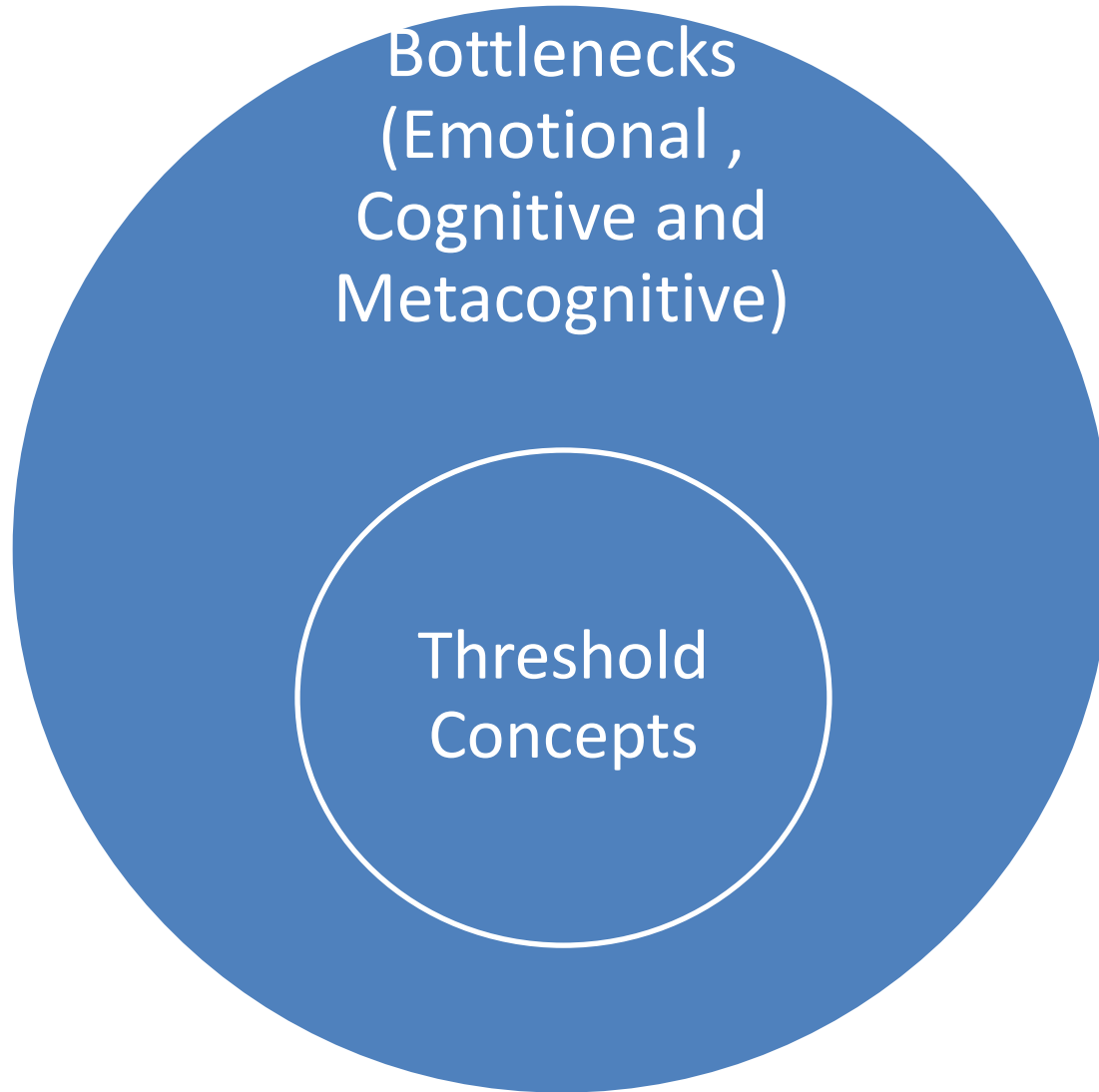
## Threshold Concepts

- Instructors 'identify key concepts
- Works within instructor's view of what is important in the discipline
- Focused on paradigm shifts

## Decoding the Disciplines

- Starts with places students get stuck
- Bottlenecks mark gap between student and expert ways of operating
- Identifies crucial mental processes of discipline

# Two Theories of Difficulty



Bottlenecks  
(Emotional ,  
Cognitive and  
Metacognitive)

Threshold  
Concepts

# Two Theories of Difficulty

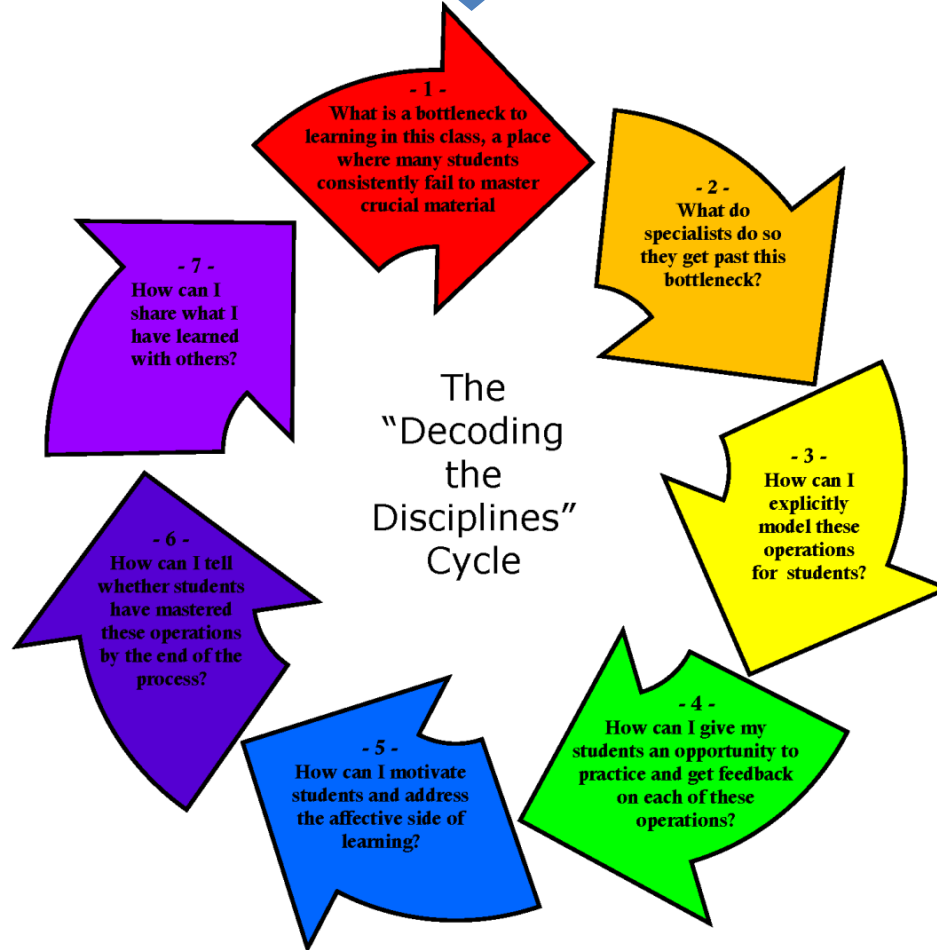
Bottlenecks  
(Emotional and  
Cognitive)

"I can't do math"

Threshold  
Concepts

Elasticity of  
demand

**Bottlenecks  
(Emotional and  
Cognitive)**





# 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



# Bottlenecks

## Compound Interest

Building a financial vocabulary

## Budget, Savings, & Debt

Anatomy of a Paycheck

## Saving Prioritizations

Investment Horizons

## Risk Adversity

## Risk/Return Trade-off

Investment Vehicles

## Retirement Projection

## Balancing Liquidity and Risk with Savings Goals

## Retirement Plans, Portfolio Diversification, and Inflation



# Decoding the Disciplines

- 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

