Tackling the Curse of Knowledge in Building Undergraduate Economics Schemas

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Objectives

1. Explain what a schema is and how it is formed as students are learning new economics concepts
2. Summarize how knowledge is activated and apply it to teaching content to novices
3. Describe how prior knowledge plays a role in schema formation so you can help students better remember what you teach them.
4. Be able to describe how the Curse of Knowledge interferes with your ability to understand their prior knowledge.

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Demo

One half of the room close their eyes (no peeking!)
Half with eyes open: tap with me the start of this song:
Jingle Bells, Jingle Bells
Jingle all the way
Oh what fun it is to ride in a
One horse open sleigh

Curse of Knowledge: It is difficult for experts to imagine how novices think of a topic. This involves both coming into a course and during a course.

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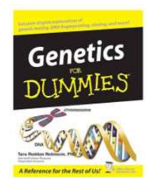
Breakout – Form Groups of 3 or 4

What is the oddest thing a student has said to you about an economic topic?
<u>ex</u>: The government imports oil into the United States
<u>ex</u>: A student confused inflation and interest rates (circa 2020).
You have 3 minutes.
Report out.
Not just "prior knowledge."
"This 'curse of knowledge' means is that it is dangerous, and often profoundly incorrect to think about student learning based on what appears best to faculty members, as opposed to what has been verified with students." – Carl Wieman



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Addressing the Curse of Knowledge

One Minute Papers
JiTTs
Think Alouds

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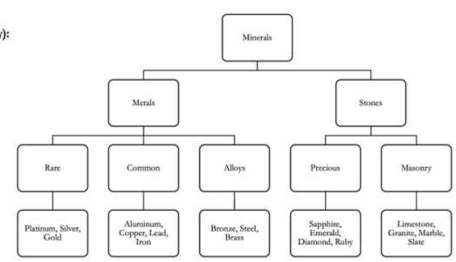
Types of Minerals (listed alphabetically):

Aluminum: common metal
Brass: alloy metal
Bronze: alloy metal
Copper: common metal
Diamond: precious stone
Emerald: precious stone
Gold: rare metal
Granite: masonry stone
Iron: common metal
Lead: common metal
Limestone: masonry stone
Marble: masonry stone
Platinum: rare metal
Ruby: precious stone
Sapphire: precious stone
Silver: rare metal
Slate: masonry stone
Steel: alloy metal



"Hierarchical Retrieval Schemas in Recall of Categorized Word Lists," Bower et al. (1969)

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Defining Schemas

The term schema is an apt one for characterizing knowledge, because the essence of knowledge is structure. Knowledge is not a "basket of facts" *(Anderson & Pearson, "A schema-theoretic view of basic processes in reading comprehension," 1984)*

Schemas are "A schema is a mental construct comprising a cluster or collection of related concepts" *(Bartlett, "Remembering: A study in experimental and social psychology," 1932)*

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Supply and Demand

Demand
- Definition
- Axes on graph
- Why downward sloping
- Change in demand
- Change in quantity demanded

Supply
- Definition
- Axes on graph
- Why upward sloping
- Change in supply
- Change in quantity supplied

Supply and Demand

Identical axes on graph

Analogous
- change vs. change in quantity demanded or supplied definitions

Different reasons for slopes

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What is This Passage About?

The procedure is actually quite simple. First, you arrange items into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities, that is the next step; otherwise, you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many… A mistake can be expensive as well… It is difficult to foresee any end to the necessity for this task in the immediate future, but then, one never can tell. After the procedure is completed, one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated.

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Were You Stumped? Washing Clothes.

The procedure is actually quite simple. First, you arrange items into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities, that is the next step; otherwise, you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many… A mistake can be expensive as well… It is difficult to foresee any end to the necessity for this task in the immediate future, but then, one never can tell. After the procedure is completed one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated.

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Importance of Prior Knowledge

Readers who were told the passage was about washing clothes *before* reading the passage (rather than after) had a much greater understanding of the passage (64% versus 30%) and greater recall (32% versus 15%).

Moral: Help your students learn better by being sure that their prior knowledge is activated to engage their existing schemas.

Bransford and Johnson, "Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall," 1972.

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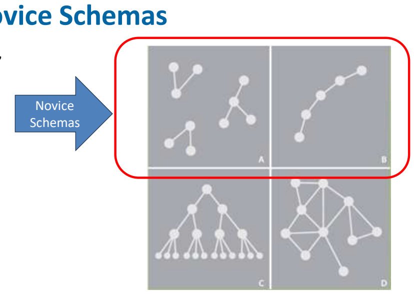
Expert vs. Novice Schemas

The dots are concepts, facts, or procedures, and the lines are connections between them.

Do you think the bottom or top panel represents the schemas of novices?



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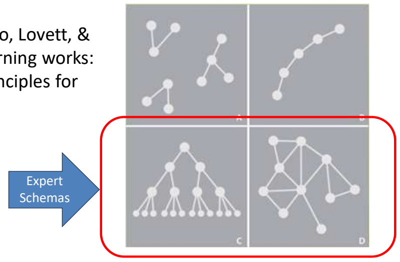
Expert vs. Novice Schemas

Ambrose, Bridges, DiPietro, Lovett, & Norman, (2010), How learning works: Seven research-based principles for smart teaching, 2010.



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Schema Formation in Economics

Content needs to relate to something known to students

Building on content should also be relational

Keep in mind that students bring ideas to our classes and these possibly incorrect ideas are parts of their schemas as well.

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Building Schemas in Economics

- Connect aggregate expenditures equals aggregate production in GDP accounting when teaching equilibrium in the aggregate demand and supply model.
- Connect a fall in real GDP in a time series plot of its values to the equilibrium moving left in the aggregate demand and supply graph.
- Connect an increase in the GDP deflator in its time series plot to the equilibrium moving up in the aggregate demand and supply graph.
- Connect an increase in the GDP deflator to the definition of inflation that was covered earlier in the course.
- Connect marginal productivity to wage determination

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Building Schemas in Economics

A. The price of widget goes from \$1.30 to \$1.50, and the quantity demand falls from 2,500 units to 2,000 units. Calculate the own price elasticity using the midpoint formula.

1. -2.0
2. -1.6
3. -1.4
4. -1.2
5. -1.0

B. Which best explains the concept of own price elasticity?

1. how a change in quantity demand leads to a change in a price
2. how a change in a price leads to a change in quantity demanded
3. it is the slope of the demand curve
4. it is the inverse of the slope of the demand curve

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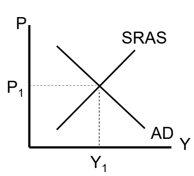
Building Schemas in Economics

Clicker question in a macro principles course:
How many of the following could not be directly measured by P or Y?
expansions, inflation, unemployment rate, deflation, recessions, federal funds rate, and disinflation

A. 0
B. 1
C. 2
D. 3
E. 4



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1. Measuring the Economy
2. Why Economies Grow in the Long-Run
A. Rates of Economic Growth
B. Growth – "Zero-Sum?"
C. Role of Capital (K) & Tech. (A) in Growth (P.5)
D. Role of Markets & Institutions in Growth
civilization recap
markets
North and South Korea
market examples
how to get more educated workers?
what drives gasoline prices?
creative destruction
summary of market economies & growth
economic systems
markets – why not so popular?
institutions
markets & institutions
where do institutions come from?
what England got right?
E. U.S. Growth Equally Shared?
F. Growth Over the Next 30 Years
3. The Labor Market and the Business Cycle
4. Explaining the Economy's Movements in the Short-Run

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Breakout – Form Groups of 3 or 4

What might you do (or have done) to help enrich students' schemas?
You have 3 minutes.
Report out.

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"We should think about what our assignments are making students think about. The assignments that are best for learning go beyond engagement. They make students elaborate on concepts by making meaningful associations, they emphasize key distinctions among different concepts, and they require students to apply concepts in new ways."

Stephen Chew, "Student Engagement Is Not Student Learning," 2022

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Conclusion: Objectives Achieved?

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