Real-World Transfer of Learning

@juliehstern
What issues are most important to you or concerning to you?
91 AMERICANS die every day from an opioid overdose (that includes prescription opioids and heroin).
How do we prepare students to solve complex problems?
Three Components of Creativity

- Expertise: technical, procedural, and intellectual knowledge
- Creative-thinking Skills: how flexibly and imaginatively people approach problems
- Motivation: intrinsic is more effective than extrinsic
People who live in this region of Uzbekistan are migrating to Kazakhstan, the country to the northeast.
Step 1: Start with what you already know. Write a full paragraph to explain your understanding of the question below.

21. What is the relationship between freedom and migration?

Word Bank:

Refugee  Natural Resources  Freedom  Migration  Jobs  Immigration
Step 3: Use your knowledge about freedom, resources and migration to give advice to the people of Kazakhstan.

22. Should the people of Kazakhstan allow migration to their country from people from Uzbekistan?
Discussion Questions

• What exactly did the students transfer?

• Why did I not teach about the Aral Sea before the test?
Assessing Higher Ordered Thinking

• Present something for students to think about, usually in the form of introductory text, visuals, scenarios, resource material, or problems of some sort.

• Use novel material – material that is new to the student, not covered in class and thus subject to recall.
The Structure of Knowledge

People often **migrate** for greater **freedom** and **opportunity**.

**Migration** usually comes with great **sacrifice** and **hardship**.

- **Opportunity**
- **Migration**
- **Security**
- **Freedom**

**US Westward Migration**

Dates, people, places
Plants, animals, insects, fish, people

living things

organisms

biotic/abiotic
Step 3: Use your knowledge about **freedom**, **resources** and **migration** to give advice to the people of Kazakhstan.

22. Should the people of Kazakhstan allow migration to their country from people from Uzbekistan?
The Structure of Knowledge

People often migrate for greater freedom and opportunity.

Migration usually comes with great sacrifice and hardship.

- Opportunity
- Migration
- Security
- Freedom

US Westward Migration

Dates, people, places

Partner share: How did this unit on the US Westward Migration prepare students to tackle the Aral Sea problem?
The reason experts remember more is that what novices see as separate pieces of information, experts see as organized sets of ideas.

- Bransford, et. al., 2000, How People Learn: Brain, Mind, Experience, and School
Research shows:

• There is a difference in the way the brain processes factual knowledge, conceptual knowledge and procedural knowledge.
• Concepts provide organization and structure for easier retrieval of facts.
• Experts organize facts into a conceptual framework.
Transfer (of learning) always involves reflective thought in abstracting from one context and seeking connections with others.

- Perkins and Salomon, 1988
*Teaching for Transfer, Educational Leadership*
High Road Transfer

Dissimilar Tasks

Similar Tasks

Low Road Transfer
Research shows:

- Abstracting to the **conceptual level** allows transfer to happen.
- Concept understanding allows us to **recognize patterns** and trends among different situations or contexts.
- Transferring our understanding creates **deeper learning**.
Structure of the Discipline

• Numbers can be composed or decomposed into different combinations of parts or a whole.
• Equations represent relationships between parts and wholes in addition and subtraction situations.
• Vocabulary development improves reading comprehension.
• Forces cause change.
• Energy exists in many forms within systems.
• Art often portrays cultural heritage.
abstract
conceptual
question

specific
context
Curricular Topic #1

Subtopic A    Subtopic B    Subtopic C    Test on A, B, C
Big Idea

• Communities create rules to help everyone get along.
Why do communities create rules?
Real-World Transfer
Elon Musk’s two-step process:

1) Deconstruct knowledge into fundamental principles
2) Apply those principles to new fields
Interdisciplinary Units

Explain the causes and impacts of the Great Influenza outbreak of 1918
If you’re a historian, you might consider the political, economic, or social conditions that led to the spread of the flu.
If you’re a scientist, you might interpret the assignment differently. You might research and design experiments to determine how the flu virus operates on a cellular level.
If you’re a mathematician, you’d have yet another approach. You may look for data to create a mathematical model of the disease as it spread through the population.
<table>
<thead>
<tr>
<th>Grade</th>
<th>Big Ideas (Accounts) (theories vs. copies of the past, making sense vs. reproducing, selection, omission, degrees of reliability vs. objective truth, bias)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th</td>
<td>(theories) Geographers construct theories to explain the interactions between people and their environment based on evidence (rather than intuition or personal experience).</td>
</tr>
<tr>
<td>7th</td>
<td>Historians can construct accounts of the ancient past based on archaeological evidence and limited written resources. However, historians can never be sure that their accounts are 100% accurate because the evidence they have to work with does not provide all the information they need.</td>
</tr>
<tr>
<td>8th</td>
<td>Historical accounts are theories of what happened in the past (rather than objective truths). We don’t judge accounts as true/false, but rather by degrees of reliability.</td>
</tr>
<tr>
<td>9th</td>
<td>Reliable accounts may still have weaknesses caused by acts of omission. It is impossible for historians to incorporate all possible evidence into one account (omission is inevitable).</td>
</tr>
<tr>
<td>10th</td>
<td>Historians selectively incorporate evidence into their accounts. A historian’s selections and omissions often reveal a bias that we must consider for when reading his/her accounts.</td>
</tr>
<tr>
<td>11th</td>
<td>Accounts of historical events often reflect the ideals and values of the historian’s context rather than the ideals and values of the time period studied.</td>
</tr>
<tr>
<td>12th</td>
<td>Historians design inquiry and research around carefully crafted and refined questions. The way a historical question is framed often determines the type of account produced. (i.e. The question “Why did the Roman Empire fall when it had resisted attack for 100s of years?” will lead to a different account than “Why did the Western Roman Empire fall when it did not fall in the East?”)</td>
</tr>
</tbody>
</table>
Science:

• **Planning and Carrying Out Investigations** *(6th)*: Scientists and engineers plan and carry out investigations individually and collaboratively, identifying independent and dependent variables and controls.

• **Planning and Carrying Out Investigations** *(9th)*: Scientists plan and carry out investigations that build, test, and revise conceptual, mathematical, physical, and empirical phenomena.

• **Constructing Explanations and Designing Solutions**: *(8th)* Scientists construct explanations for either qualitative or quantitative relationships between variables. They also apply scientific reasoning to show why the data are adequate for the explanation or conclusion.

• **Constructing Explanations and Designing Solutions**: *(12th)* Scientists engage in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.
Mathematics:

- **Sense making and perseverance:** (6th) Mathematicians begin by explaining to themselves the meaning of a problem and look for entry points to its solution. We continually ask ourselves, “Does this make sense?”

- **Sense making and perseverance:** (10th) Mathematicians consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution.

- **Modeling and using tools:** (6th) Mathematicians apply math to solve problems arising in everyday life, society and the workplace.

- **Modeling and using tools:** (12th) When making mathematical models, mathematicians use technology to visualize the results of varying assumptions, explore consequences, and compare predictions with data.
Create a social media campaign to reduce the influence of cyber manipulation on political elections.
What is the relationship between invasion and falsifications?

Context #1

Context #2

Context #3

Context #4

Question of Conceptual Relationship

p. 59, elementary
p. 42, secondary
What is the relationship between invasion and falsifications?
What is the relationship between invasion and falsifications?
What is the relationship between invasion and falsifications?
What is the relationship between invasion and falsifications?

From: Charles Delavan <cdelavan@hillaryclinton.com>
Date: March 19, 2016 at 9:54:05 AM EDT
To: Sara Latham <slatham@hillaryclinton.com>, Shane Hable <shable@hillaryclinton.com>
Subject: Re: Someone has your password

Sara,

This is a legitimate email. John needs to change his password immediately, and ensure that two-factor authentication is turned on his account.

He can go to this link: https://myaccount.google.com/security to do both. It is absolutely imperative that this is done ASAP.
Create a social media campaign to reduce the influence of cyber manipulation on political elections.
Humanities

• Historians investigate sources and conduct independent research on claims to determine the reliability of a text.
ICT Integration

• Digital citizens act and model in ways that are safe, legal and ethical.

• Technologically literate people curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
Physical Education

- Strong defense anticipates possible false moves and responds quickly.
Create a social media campaign to reduce the influence of cyber manipulation on political elections.
Step 1: Start with what you already know. Write a full paragraph to explain your understanding of the question below.

25. What is the relationship between invasion, falsifications and strategy?
STOP to check your work. Did you...

☐ Write a clear statement that tells how the concepts are related?

☐ Explain your thinking in other words?

☐ Give examples to show what you mean?

☐ Illustrate your understanding with a metaphor or diagram?

Word Bank:

<table>
<thead>
<tr>
<th>Attacks</th>
<th>Fake Outs</th>
<th>Vulnerability</th>
<th>Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Spaces</td>
<td>Defense</td>
<td>Anticipation</td>
<td>Tricks</td>
</tr>
</tbody>
</table>

Step 2: Read the following sources. Record notes on the side of the text to show how this man helped to sway political elections.
President of Mexico Enrique Peña Nieto, whom Sepúlveda said he helped bring to power
Step 3: Use your knowledge of falsifications and invasion to create a plan of defense.

How can the people of democracies reduce the impact of cyberattacks on their elections?

STOP to check your work.
Did you...

☐ Write a clear statement that tells TWO strategies people can use to protect their elections?

☐ Explain both strategies and tell how they can prevent the use of power?

☐ Give examples to show how these strategies...
Key Points

• All disciplines have complex processes which can be written into big ideas or statements of conceptual relationship.
• Teacher interest and student interest in the topic usually = strong units.
• Increasing abstraction and breadth can tie lots of disciplines together (Changing one part of a system impacts other parts of the system; Falsifications create open spaces for an attack during an invasion)
21st Century Learner

quality of thinking

Move from right/wrong questions to those that require sound reasoning.

Equip students with tools to monitor their learning and engage in life-long learning.

orientation as a learner

strength of heart

depth of understanding

Explicitly reveal the big, transferable ideas that arise from studying fact-rich contexts.

Educate the whole child, facilitating traits such as responsibility, kindness, open-mindedness.

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