Understanding by Design
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Summer Institute
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Essential Q’s of UbD
+ What is ‘understanding’- really ‘getting it’?
+ If that’s what understanding is, what follows? What does understanding as a goal require of -
  + ‘Designs’ - our planning?
  + Learning and teaching activities?
  + Assessment and feedback to learners?
+ How do we achieve understanding by design (vs. ‘good fortune’)?

The big ideas of UbD
+A focus on ‘backward’ design:
  + “Backward” from understanding-based goals, to solve common lesson planning weaknesses
+A focus on understanding:
  + Making sense of facts and skills, via big ideas & transfer of learning

The big ideas of UbD

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KEY: 3 Stages of (“Backward”) Design
1. Identify desired accomplishments
2. Determine acceptable evidence
3. Plan learning experiences & instruction

What we typically (incorrectly) do:

1. Identify content
   - Without checking for alignment

2. Brainstorm activities & methods
   - Without checking for alignment

Then, and only then
3. Come up with an assessment
Why UbD? 3 useful Q’s to ask as kids work:
• What are you doing?
• Why are we doing it?
• What will it help us be able to understand/do (that matters)?

The course is not the textbook
• The textbook CANNOT be a complete course - it is a resource
  + It is a jam-packed & incoherent resource, to be sold in 50 states (esp. CA, FL, TX)
  + Like an encyclopedia, it provides mostly ‘logically’ organized content - not an optimally-framed syllabus to achieve specific local goals and priorities

Toward Valid Curriculum: Focus on Priority outcomes

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**Stage 1 - Desired Results**

- Performance Tasks

- Other Evidence:

**Stage 2 - Assessment Evidence**

- Other Evidence:

**Stage 3 - Learning Plan**

- Other Evidence

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**UBD Template**

- The Template: Designed to address the problems we identified

**Content mastery = a means, shaped by goals**

- If content mastery is the means, what is the desired end?
- What in the future should students be able to achieve?
- Why is this worth learning? What of it?

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**Backward Design from ‘Coverage’**

“I want students to go to France to -

- 1) see all the important sites in Paris
- 2) experience the culture
- 3) hear and speak the language”

**Backward Design from ‘Coverage’**

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Note that this is not really a goal statement. It describes some activities, not any specific learnings desired from doing activities.

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**Goal vs. skill**

- “I want students to learn to decode”

This is a skill; what’s the point of the skill? What’s the goal?

**Backward from true Goals**

- Students need to learn to decode - along with other skills - in order to successfully comprehend and find value in what they read, on their own
Backward design from ‘content coverage’

+ I want students to understand -
  + The Constitution
  + The 3 branches of government

No - not a learning goal - this just says what the content is

Backward Design from Goals

+ I want students to leave my course having understood that -
  + The Constitution was a solution, based on compromise, to real problems of balance and limit of powers - in a long, sometimes bitter history - with many fights that are with us and will always be with us.

Backward Design from the Understandings Sought

“I want students to come home from France having learned that...
+ 1) What countries build monuments to is a telling cultural insight. What do Paris monuments tell us?
+ 2) Americans can appear ‘ugly’ if they are not attentive to how some of what is ‘natural’ to us is naturally ‘rude’ to them. Am I unwittingly acting like an Ugly American?
+ 3) Travel abroad is most rewarding when you take the risk to use the language, and appear eager to learn from natives.

What’s holding me back from trying to speak in French? How can I more readily take the ‘risk’ and have fun doing so?

Backward Design from Goals

+ I want students to be able to use that understanding to -
  + See current struggles between the 3 branches on their own and have an informed opinion
  + and transfer that understanding to -
    + A modern relevant situation:
      + Design a government for Iraq
      + A system of governance for our school

Content mastery = the means

+ If content mastery is the means, what is the end?
+ I want you to learn grammar so that, in the long run, you are able, on your own to speak and write in any situation with precision, clarity, and maximum impact.
+ SO: you have to design your courses BACKWARD from the kinds of communication challenges that depend upon precise grammar.

Backward Design:

I want them to learn [content] so that, in the long run, they will be able, on their own to [a long-term desired accomplishment, involving important transfer & extension of learning]

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Backward Design of Curriculum: what follows from the goals

+ Note that you design backward from the ability of students to use ‘content’ to make new connections and transfer
+ Just like sports: you haven’t ‘gotten it’ unless you can ‘see it’ and ‘use’ it ‘in the game’

Intelligent use’ of content acquired is the ultimate goal

+ You acquire knowledge, skill, and understanding to use them together effectively
+ Understand when to use which knowledge and skill, and how to use them all wisely in new situations

Many teachers mistakenly think that acquisition is the only goal

+ “The academic standards incorporate and strongly promote the understanding that active, hands-on learning will benefit students of all ages. By integrating and applying basic knowledge and skills in practical and challenging ways across all disciplines, students experience learning that is more engaging and motivating. Such learning stays in the mind long after the tests are over and acts as a springboard to success beyond the classroom.”

AMT - We have 3 Goals

- Acquire important knowledge and skills
- Make Meaning of & with “big ideas”
- Transfer Learning to new situations

See “Put Understanding First” in Educational Leadership May 2008, Volume 65, #8 Pages 36-41

Many teachers mistakenly think that acquisition is the only goal

+ Even the MO state standards make this clear in distinguishing the Show Me Standards (performance) from the foundational Standards (content)
+ “The standards are built around the belief that the success of Missouri’s students depends on both a solid foundation of knowledge and skills and the ability of students to apply their knowledge and skills to the kinds of problems and decisions they will likely encounter after they graduate.”

i.e. - not a good way to learn to drive a car…
From the MO Standards:

+ These standards for students are not a curriculum. Rather, the standards serve as a blueprint from which local school districts may write challenging curriculum to help all students achieve their maximum potential.

Key problem: wrongly treating textbook as the syllabus

+ The textbook is just a collection of relatively discrete lessons and drills, not a purposeful, integrated, and mission-focused course of study.
+ In the best designs, therefore: the textbook is a resource used with discretion, not the syllabus.

Intelligent use of textbooks

1. Syllabus written before textbooks chosen
2. Syllabus is based on Standards, big ideas, transfer goals
3. Thus: Which chapters highlighted, which skimmed, which skipped, given the Standards?
4. What activities and assessments needed beyond what the textbook supplies?

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Transfer defined and justified

+ What is ‘transfer of learning’?
  + “Transfer of learning” is the use of knowledge and skills (acquired in an earlier context) in a new context. It occurs when a person’s learning in one situation influences that person’s learning and performance in other situations.
  + When transfer of learning occurs, it is in the form of meanings, expectations, generalizations, concepts, or insights that are developed in one learning situation being employed in others.

Example: getting your driver’s license

The Transfer Question:
+ What should the student be able to do effectively with a repertoire of knowledge and skill, increasingly on their own, in future tasks at the heart of true expertise?
+ How, then, will transfer ability be developed over the course of the course?

We often confuse the drills with the game
+ ‘Drills’ - test items
  + Short-term objective
  + Out of context
  + Discrete, isolated element
  + Set up and prompted for initial simplified learning
  + Doesn’t transfer to new situations on its own
+ The ‘game’ - real task
  + The point of the drills
  + In context, with all its messiness and interest value
  + Requires a repertoire, used wisely
  + Not prompted: you judge what to do, when

Gradual Release of Teacher Responsibility
+ I do, you watch
+ I do, you help
+ You do, I help
+ You do, I watch
+ This is a general schema for the development of transfer ability at any age, in any subject

‘Gradual Release’ in History, for example
+ The transfer goal: you can analyze and interpret any unfamiliar primary and secondary source document on your own (i.e. no clues, scaffolds, hints).
+ Gradual release means
  + You have to learn document-reading strategies and use them with decreased teacher hints, and learn from feedback - just like the reader and the athlete
  + Provide various DBQ practice problems, in which the context variables change and increase the complexity

‘Gradual Release’ in Math, for example
+ The transfer goal: you can solve any complex unfamiliar problem on your own (i.e. no clues, scaffolds, hints) in which context matters.
+ Gradual release means
  + You have to learn problem-solving strategies and use them with decreased teacher hints, and learn from feedback - just like the reader and the athlete
  + Provide various practice problems like the NAEP bus problem, in which the context variables change and increase the complexity

What research says on teaching for transfer
Halpern and Hakel, in Change:
+ “The single most important variable in promoting long-term retention and transfer is “practice at retrieval.” This principle means that learners need to generate responses, with minimal cues, repeatedly over time, with varied applications so that recall becomes fluent and is more likely to occur across different contexts and content domains.”
Research on transfer:

+ An especially sensitive way to assess the degree to which students’ learning has prepared them for transfer is to use methods such as “graduated prompting”. This method can be used to assess the amount of help needed for transfer by counting the number and types of prompts that are necessary before students are able to transfer.

+ Some learners can transfer after receiving a general prompt such as “Can you think of something you did earlier that might be relevant?” Other learners need prompts that are much more specific. Tests of transfer that use graduated prompting provide more fine-grained analysis of learning and its effects on transfer than simple one-shot assessments.

State tests demand autonomous transfer!

+ Every formal testing situation requires prior release of teacher responsibility:
  + Student gets no hints, scaffold, context clues
  + Student has to ‘read strategically’ – figuring out what to do when.

Irony: the most difficult test questions involve TRANSFER, not recall

+ Unfamiliar reading passages and writing prompts - you have to transfer all your prior learning to a new text, out of context

Irony: that’s what the difficult problems are - TRANSFER problems

+ Novel-looking versions of math and science problems, with no clues here from the textbook or teacher as to which skills apply now

FCAT - Florida

Which sentence BEST tells what the article is about?

- People in Japan grow beautiful cherry trees that bloom in the spring.
- Eliza Silemore asks Mrs. Tall to plant cherry trees in Washington, D.C.
- The mayor of Tokyo visits Washington, D.C., to see the beautiful cherry blossoms.
- People in the United States can see cherry blossoms, thanks to Mayor Ooki and Mrs. Tall.

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FCAT

Which sentence BEST tells what the story is about?

- A family takes a trip to the beach.
- A boy reveals that he is scared of the sun.
- A sister discovers that her little brother is smart.
- A family learns about the dangers of too much sun.

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Grant Wiggins: Understanding by Design

**FCAT**

What is the MOST important lesson the young bird learns in this story?

- Stay close to your nest.
- Be careful where you land.
- Swimming is easier than flying.
- The marsh is safer than the pond.

**MCAS - math 10th gr**

From a Boston Globe article:

The hardest question on the math section, which just 33 percent got right, asked students to calculate the distance between two points.

**MCAS 10th gr English**

Edmund Spenser lived from 1552-1599. Read his poem "Sonnet 26" below. Use the information from the poem to answer the questions.

Sweet is the rose, but grows upon a briar;
Sweet is the juniper, but sharp his bough;
Sweet is the eglantine,¹ but pricketh near;
Sweet is the fir bloom, but his branch is rough;
Sweet is the cypress, but his rind is tough;
Sweet is the nut, but bitter is his pill;
Sweet is the broom flower, but yet sour enough;
And sweet is moly,² but his root is ill.

So every sweet with sour is tempered still,
That maketh it be coveted the more:
For easy things, that may be got at will,
Most sorts of men do set but little store.
Why then should I account of little pain,
That endless pleasure shall unto me gain!

**Purpose Question**

What is the purpose of the last two lines of the poem?

A. to add humor to the poem
B. to reassert the speaker’s anger
C. to summarize the poem’s meaning
D. to repeat the poem’s visual imagery

State Average: 68%
NAEP: Dishpan Ducks
by Margaret Springer

“Choose the Best Title”
+ In the story, Rosa enjoys spending time at the creek behind her apartment building.
+ Do you think “Rosa’s Creek” would be a better title than “Dishpan Ducks”? Use evidence from the story to compare both titles and to explain which title is better.

NAEP: High Score described
+ Only 18% of students showed evidence of full comprehension.
+ “Full comprehension”:
  + These responses provide an opinion about which title is better by discussing both titles or by providing multiple pieces of linked information in support of one title.
  + Responses may suggest that neither title is better than the other as long as they provide support for the opinion.
  + Responses may provide an alternative title and support that title with at least two pieces of linked information.

Typical Response

Dishpan Duck is better than Rosa’s Creek because the creek is not here.

55

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MCAS (MASS) test item: 10th-grade English reading item

A fellow fourth grader broke the news to me after she saw my effort on a class assignment involving scissors and construction paper. “You cut out a purple bluebird,” she said. There was no reproach in her voice, just a certain puzzlement. Her observation opened my eyes— not that my eyes particularly help—to the fact that I am colorblind. In the 36 years since, I’ve been trying to understand what that means. I’m still not sure I do....

Unlike left-handers, however, we seem disinclined to rally round our deviation from the norm. Thus there’s no ready source of information about how many presidents, or military heroes, or rock singers have been colorblind. Based on the law of averages, though, there must have been some. We are everywhere, trying to cope, trying to blend in. Usually we succeed. Until someone spots our purple bluebirds. Then the jig is up.

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The most wrong item on the state test: 71% incorrect!

This selection is best described as -
A. a biography.
B. a scientific article.
C. an essay.
D. an investigative report.

Many students said it could not be an essay because “it was funny” and because “it had more than 5 paragraphs.”

Transfer = the real ‘game’ of using content on your own

+ Applying prior learning to -
  + a novel and increasingly new and unfamiliar-looking task
  + An increasingly challenging context & situation (in terms of purpose, audience, dilemmas, “noise” etc.)

Note how this goal changes our view of time use!

+ What will we do to achieve the performance goal - given the very limited time we have?
  + We do NOT say: sorry, no time for performance-based learning and assessment - there is too much information to cover!
  + Nor do we make this mistake in the arts, athletics, writing, speaking a language

Intro problem: Four 7th-grade classes had a race of all the students. Devise as many ways as you can to determine a fair ranking of the 4 classes, given the individual runner results in the table. Summarize the 2-3 top ways you think would be most fair, and be prepared to discuss your answers...

Math unit: “What is Fair? Does math help?”

Individual ranking of runners in a race by all 7th-grade classes

The problem: local practices - especially in assessment - typically do not derive from or align with long-term goals

Other question-framing activities/discussions

+ What do we mean when we say that the rules of a game of chance are “not fair”? What role does math play in our judgment?
+ Why is it fair to have one person cut the cake and the other person to choose the piece?
+ When is straight majority voting “fair” and when is it “not fair”?
+ When is it “fair” to consider an “average” in ranking performance (e.g. salaries, home prices, batting average) and when is it “unfair”?
The content is learned on the way, as a means

+ What mathematical tools are well suited to judging fairness?
+ Measures of central tendency:
  + Mean
  + Median
  + Mode
+ Quizzes to check for skill development

Final task in the unit on mean/median/mode

+ So, what is a fair grade?
+ Based on our study in this unit of various measures of central tendency, and the pros and cons of using “averages” (and other such measures) in various situations, Propose and defend a “fair” grading system for use in this school. How should everyone’s grade in classes be calculated? Why is your system more fair than the current system (or: why is the current system most fair?)
+ A final reflection on the unit, based on the essential question “What is fair? Does math help us?”

How people learn

+ A major goal of schooling is to prepare students for flexible adaptation to new problems and settings. The ability of students to transfer provides an important index of learning that can help teachers evaluate and improve their instruction.
+ Students develop flexible understanding of when, where, why, and how to use their knowledge to solve new problems if they learn how to extract underlying principles and themes from their learning exercises.

   + How People Learn, Natl Academy of Sciences

To make meaning is to, on your own,…

+ ‘Connect the dots’
+ Make sense of (seemingly isolated) experiences, facts, text
+ Identify the gist, point, purpose, significance
+ Draw appropriate inferences

A ‘big idea’ is a working and effective ‘meaning’ - a useful ‘theory’, ‘schema’ or ‘theme’

+ Consider detectives at work:
  + Who has the motive? Might this be a love triangle, we should follow the money, etc.
+ ‘Theory’ in science/math -
  + Look for the most parsimonious explanation
+ ‘Theme’ -
  + Boy finds girl, boy loses girl, boy finds girl
  + The American Dream
  + History as a history of progress
Arguably a very big idea in driving:

+ Anticipate: assume the other guy is an idiot

Transfer based on meaningful ideas permits future learning

+ “The first object of any act of learning, over and beyond the pleasure it may give, is that it should serve us in the future.... In essence, it consists in learning initially not a skill but a general idea which can then be used as a basis for recognizing subsequent problems.... This type of transfer is at the heart of the educational process - the continual broadening and deepening of knowledge in terms of...ideas.”

+ Bruner, Process of Education p. 17

What idea can help us make sense out of...

+ Clouds, puddles, disappearing puddles?
+ Tides, falling objects, phases of the moon, Mars orbit
+ Salem Witch Trials, Slavery, the Holocaust, the current economic collapse?
+ No number can be divided by zero, negative numbers, any number to the zero power = 1?
+ Sarcasm, irony, tall tale?
+ [any set of actions by a character]

Critical Point!!

+ All the really big ideas are not obvious to the novice!
+ Often counter-intuitive
+ Easy to misunderstand
+ Require inference and active intellect, not just passive perception
+ They are ‘obvious’ to the expert - and therein lies the challenge of teaching for understanding!

Dewey said it decades ago:

+ It would be impossible to over-estimate the educational importance of arriving at conceptions: that is, meanings that are general because applicable in a great variety of different instances in spite of their difference...they are known points of reference by which we get our bearings when we are plunged into the strange and unknown. Without this conceptualizing, nothing is gained that can be carried over to the better understanding of new experiences.

+ Dewey, 1933, p. 153

That’s Why EQs are so important

+ Essential Questions signal that active inquiry and meaning-making is the means and key to the goal
+ Students learn that “acquisition” is different from “meaning-making”
+ Meaning-making is “in my head” not “on the page” (QAR)
+ Students learn that many schemas, theories need testing - and changing!
**1st Stage of “Backward” Design**

1. Identify desired accomplishments
2. Determine acceptable evidence
3. Plan learning experiences & instruction

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**New Pearson Lit. Series**

+ Is truth the same for everyone?
+ Can all conflicts be resolved?
+ How much information is enough?
+ What is the secret to reaching someone with words?
+ Is it our differences or similarities that matter most?
+ Are yesterday’s heroes important today?

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**Key Qs: From Polya How to Solve It**

+ What is the unknown? What are the data? What is the condition?
+ Have you seen it before? Or have you seen the same problem in a slightly different form?
+ Can you see clearly that [each] step is correct? Can you prove that it is correct?
+ Can you check the result? Can you check the argument?
+ Can you derive the solution differently?
+ Can you use the result, or the method, for some other problem?

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**From new Magruder’s Gov’t text**

+ How much power should the federal government have?
+ What are the most pressing social problems and how should they be addressed by government?
+ When should America go to war?
+ What is the proper balance between free enterprise and government regulation of the economy?
+ What is the proper balance between national security and civil liberties?
+ What is America’s role in the world?

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**Understandings vs. facts**

+ Understandings - STAGE 1
  + Conclusions, inferences - statements that sum up the unobvious meaning of facts or experiences
  + Specific full-sentence generalizations about the use of facts and skills - a statement of wise but arguable strategy
  + Summary insights, rules of thumb, aphorisms - “the moral of the story” as someone sees it

+ Knowledge - STAGE 1
  + Facts to be taken and learned as such
  + Settled knowledge, accepted as true or given
  + Obvious, unproblematic and straightforward claims

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**From Big Ideas to Understandings about them**

+ An understanding is a “moral of the story” about the big ideas
  + What specific insights will students take away about the meaning of ‘content’ via big ideas?
  + Understandings summarize the desired insights we want students to realize
  + An understanding may be that there IS NO agreed-upon understanding! (e.g., in confusing data or historical interpretation)
“Equivalence”

+ Understandings about this ‘big idea’ in math:
  + Quantities can be converted into many equal symbolic forms: fractions - decimals; factoring and regrouping, etc.
  + The essence of problem solving is finding the most useful equivalences - i.e. turning complex into simple, unfamiliar into familiar, unknown into known.
  + The same mathematical ideas can be represented concretely, graphically, or symbolically. Context determines which is most appropriate.

Toward ‘understandings’ via misunderstandings!

+ Recall we noted above that a big idea has an unobvious, perhaps even strange and counter-intuitive aspect to it -
  + The water cycle vs. “it is gone”
  + “Discuss with the author” even though the author cannot be there

Other Misconceptions in math

+ From 2061 Benchmarks (AAAS):
  + Variables Students have difficulty understanding how symbols are used in algebra. They are often unaware of the arbitrariness of the letters chosen to represent variables in equations. Middle-school and high-school students may regard the letters as shorthand for single objects, or as specific but unknown numbers before they understand them as representations of variables. These difficulties tend to persist even after instruction in algebra and are evident even in college students.

Sample Reading Misconceptions

+ All the answers can be found by ‘looking it up in the book’
  + If I just keep scanning the lines, it will eventually make sense
  + If I know all the words, I know what the text means
  + The teacher, of course, knows ‘the’ answer to questions about what the book really means
  + The book means what any reader says it means

Sample History Misconceptions

+ History is about the facts of what happened
  + We know what happened - or at least someone does; we can look it up and settle the dispute.
  + The people in the past believed odd and primitive things; we know better.
  + There is one major cause for an effect, and the key cause is obvious.
  + Maps are objective facts.

2nd Stage of “Backward” Design

1. Identify desired accomplishments
2. Determine acceptable evidence
3. Plan learning experiences & instruction
Stage 2: What follows for assessment?

The analytic challenge is to identify the ULTIMATE tasks that embody the bottom-line learning goals/purposes:

- What real-world important tasks epitomize the Goal?
- What projects should a student who has met the Standard be able to do well?
- What is Mission Accomplished? What challenges in the world should students be prepared to handle and accomplish?

What assessment for understanding implies

Bloom and common sense say:

- Your thinking and support, not just your answer - “show your work”, the dissertation and its defense
- The ability to apply what you have learned to a novel problem or situation
- Being able to perform, on your own, with minimal prompting - to do the subject
- The ability to adjust, as needed
- The ability draw inferences, on your own, from the facts: generalize, compare & contrast, etc.
- The ability to argue/critique/evaluate the work of others as well as one's own

2 validity questions for a practical ‘test of the test’:

1. Could the test be passed, but without understanding?
2. Could the specific test performance be poor, but the student still reveal understanding in various ways before, during, and after?

The goal is to answer NO to both

Not the format that matters but what we are looking for!

- Regardless of the type of test (quiz, essay, observation),
  - what should we look for?
  - where should we look?

In order to say - they got it (or didn’t)?

A unit example, geography: “Why there?”

1. Consider: give each student a large topographical map of the US (or your state, or an ancient region), and ask them to identify places where big cities are most likely and least likely to be & say why.
2. Now, give them a road map and ask of various cities: Why there? What’s your ‘theory’ about settlement & geography?

Why There? (2)

2. Acquire: Read the relevant textbook sections on the relation between geography and population settlement.
- Quiz on the chapter - re: regions, settlement, geography
Why there? (3)

Further inquiry: test your theory
• What are the capitals of New Jersey, New York, Maryland, Illinois, and California, and why are they there?
• Study local growth over the past 150 years in the state: why here and not there?
• Jigsaw research & discussion
Generalize - test your theory again

Why There (4): Transfer Your Learning

4. Civic planning. You are a geographer hired to make predictions about population trends over the next century, based on maps, climate and trade data.

Using your understanding of the links between geography, settlement, migration, trade, and transportation: advise the planning agencies of the government on what they can expect.

• (Students can be presented with modern maps of countries/states - or maps of colonial times or ancient river civilizations that they have not yet studied)

Framing a course in World History by transfer tasks:

• 1. The design of a tour of the world’s most holy sites
• 2. The writing of a Bill of Rights for use in Afghanistan, Iraq, and other new democracies
• 3. Report on Latin America to the Secretary of State: Policy analysis and background report on a Latin American country. What should be our current policy, and how effective has recent policy with that country been?
• 4. Collect and analyze media reports from the Internet on other countries’ views of US policies in the Middle East. Do we understand the issues?
• 5. Provide a briefing on the AIDS crisis in Africa and how American policy has helped as well as hurt the situation
• 6. Take part in a model UN on the issue of terrorism: you will be part of a group of 2-3, representing a country, and you will try to pass a Security Council resolution on terrorism
• 10. Russia: friend or foe? Provide the Foreign Relations Committee with a briefing on the current state of Russia, the last century of American-Russian relations, and future worries and possibilities

Research on assessment of transfer:

• An especially sensitive way to assess the degree to which students’ learning has prepared them for transfer is to use methods such as “graduated prompting”. This method can be used to assess the amount of help needed for transfer by counting the number and types of prompts that are necessary before students are able to transfer.

• Some learners can transfer after receiving a general prompt such as “Can you think of something you did earlier that might be relevant?” Other learners need prompts that are much more specific. Tests of transfer that use graduated prompting provide more fine-grained analysis of learning and its effects on transfer than simple one-shot assessments.

3rd Stage of “Backward” Design

1. Identify desired accomplishments
2. Determine acceptable evidence
3. Plan learning experiences & instruction
What did the ‘best design’ exercise show us?

+ There are certain basic criteria that good instructional design meets:
  + Meaningful, relevant, engaging & thought-provoking work
  + Clear performance goals, with models
  + Lots of feedback and opportunities to use it
  + Options for personalization & collaboration
  + Hands-on, real-world challenges - learn by doing
  + ‘Just-in-time’ instruction that focuses on useful processes and helpful sequences for task mastery

Stage 3 Design Standard

Autonomy as the goal of HS

+ I do, you watch
+ I do, you help
+ You do, I help
+ You do, I watch

+ This is a general schema for the development of transfer ability at any age, in any subject

Eric Mazur’s Physics Courses at Harvard

+ After fifteen minutes, Mazur poses a question that requires conceptual understanding (such as estimating the displacement of a toy boat in a bathtub).
  + Students write their answers on a sheet and identify their levels of confidence in the answer.
  + In pairs, attempt to convince others of their answers.
  + Students then answer the question a second time and report their confidence levels again.
  + The whole class is polled again about their answers.

Findings: less “lecture” = better results

+ Mazur has collected data on the impact of his approach on several outcome measures over a decade vs. traditional lecture -
  + students performed considerably better on standard physics course exams
  + students scored higher on measures of traditional problem solving
  + Students scored much higher in conceptual understanding
  + Mazur: “No lecturer, however engaging and lucid, can achieve this level of improvement and participation simply by speaking.”

Some ‘moves’ students need to learn and to self-activate:

+ To come to understand, learners need to be coached in and eventually self-activate independently -
  + Study & Research skills & questioning
  + Compare and contrast different views; anticipate alternative perspectives
  + Generalize and extend learning - develop, test, refine a thesis
  + Transfer learning to new and realistically ‘messy’ situations
  + Frame/clarify genuine (non-routine and ambiguous) problems and solve them
  + Monitor and adjust to achieve performance goals
  + Find and consider relevant causes/effects; Ask: “What if?” and similar imaginative/empathy Q’s
  + Question a text or experience critically but respectfully
  + Verify general claims made by teacher & text
7 Recommendations

1. Design backward from Standards, not CPI’s
2. Design backward from Transfer & Integrated Performance, not Topics
3. Make clear the job is NOT marching thru textbook
4. Face the reality of boredom in HS
5. Face widespread myths and ignorance about tests and best practice
6. Develop Autonomy over time - prepare kids for college and workplace
7. Demand that each department have a mission, act on it, and monitor it constantly via formative assessments

deliberately develop student autonomy over time

+ Almost every HS is arguably failing to develop the autonomy students need in college and the workplace.
+ Merely being told what to do and being assigned lots of content will never develop autonomous decision-making about studying, research, and use of time
+ No college schedule looks like HS schedules
+ In college, most work is done outside of class, based on having learned how to learn

Promoting Learner Autonomy

Scaffolded Instruction  Gradual Release

Teacher Direction

Student autonomy

The professional reply is NOT: “We don’t have enough time!”

+ RATHER the ‘backward design’ question is: What should we do with the time we have in order to accomplish autonomous transfer - college and work ready?

example: getting your driver’s license

Harvard

+ The aim of a liberal education is to unsettle presumptions, to defamiliarize the familiar, to reveal what is going on beneath and behind appearances, to disorder young people and to help them to find ways to re-orient themselves. A liberal education aims to accomplish these things by questioning assumptions, by inducing self-reflection, by teaching students to think critically and analytically, by exposing them to the sense of alienation produced by encounters with radically different historical moments and cultural formations and with phenomena that exceed their, and even our own, capacity fully to understand.

+ From Harvard’s new statement of purpose for undergraduate education
Grant Wiggins: Understanding by Design

**Skidmore**

+ The Skidmore English department invites students to consider questions and to frame their own. Throughout the curriculum, English majors learn to read closely, think critically, challenge assumptions, practice methods of interpretation and research, analyze the formal qualities of texts, approach texts from various perspectives, place texts in various contexts, and write with clarity, coherence, and precision. As the English major progresses from introductory to capstone courses, students are offered increasingly sophisticated and elaborate writing and analytic tasks and called upon to perform steadily more original, inventive, independent work.

**Scarsdale HS English (cont.)**

+ Our approach, which is student-centered, becomes more student-directed over the four years. We aim for students to become increasingly responsible for their own education, to become independent learners conscious of what they need to know and knowledgeable about how to learn it.

**The brutal facts of boredom**

+ “Today's high school students say they are bored in class because they dislike the material and experience inadequate teacher interaction, according to a special report from the High School Survey of Student Engagement (HSSSE). The findings show that 2 out of 3 students are bored in class every day, while 17 percent say they are bored in every class.”

+ More than 81,000 students responded to the annual survey. HSSSE was administered in 110 high schools, ranging in size from 37 students to nearly 4,000, across 26 states.

**Plus ça change...from Goodlad’s A Place Called School over 25 years ago**

+ “The only subjects getting ratings of ‘very interesting’ from more than a third of junior and senior high school students taking them were the arts, vocational education, physical education and foreign languages.”

+ “It was especially distressing to see that the kinds of classroom practices found most often in school were liked by small percentages of students.”

**Relation to boredom**

+ From Goodlad’s A Place Called School, 25 years ago:

  + “What do students perceive themselves to be learning? We asked them to write down the most important thing learned in school subjects...Most commonly students listed a fact or topic...

+ Noticeably absent were responses implying the realization of having acquired some intellectual power...

**Note how this relates to the issue of boredom**

+ When the work is passive and irrelevant - regardless of how theoretically important the content - a majority of students will not engage.

+ There is NO excuse for boring classes - it is not an inherent quality of learning important content in school

+ It is a sign of poor curriculum design and lack of awareness of best practice in instruction - both in our control.
From the research: one of chief findings -

* The teaching of metacognitive skills should be integrated into the curriculum. Because metacognition often takes the form of an internal dialogue, many students may be unaware of its importance unless the processes are explicitly emphasized by teachers.
* Research has demonstrated that children can be taught these strategies, including the ability to predict outcomes, explain to oneself, note failures to understand, activate background knowledge, plan ahead, and apportion time and memory...
  + How People Learn, p. 14, 21

Research in HS-college achievement

- This study relates the performance of college students in introductory science courses to the amount of content covered in their high school science courses. The sample includes 8310 students in introductory biology, chemistry, or physics courses in 55 randomly chosen U.S. colleges and universities.
- Students who reported covering at least 1 major topic in depth, for a month or longer, in high school were found to earn higher grades in college science than did students who reported no coverage in depth. Students reporting breadth in their high school course, covering all major topics, did not appear to have any advantage in chemistry or physics and a significant disadvantage in biology. Care was taken to account for significant covariates: socioeconomic variables, English and mathematics proficiency, and rigor of their preparatory high school course.
- We conclude that teachers should use their judgment to reduce coverage in high school science courses and aim for mastery by extending at least 1 topic in depth over an extended period of time.

AP History Redesign

- The redesign project will produce a more inclusive and more engaging program of study for each discipline. To achieve this, the commissions have identified:
  + A coherent and conceptual framework for the course appropriate to the field of history
  + Key historical themes for each course that are to be studied in depth
  + The essential historical thinking skills that are to be supported by instruction and measured on the exams Teaching practices that are most successful at developing understanding
  + Potential ways to incorporate more fully the study of historical scholarship into the courses

AP History Redesign

- The process of AP history redesign has been informed by:
  + A College Curriculum Study conducted to identify opportunities to improve AP by incorporating some of the best examples of successful college curriculum
  + National and select state standards
  + Established learning science approaches to curriculum and assessment design -
    + Learning and Understanding (National Research Council, 2002)
    + Understanding by Design (Wiggins and McTighe, 2005)

Stop asking if we’re there yet. We’re nomads, for crying out loud!

for further information...

- Contact me:
  + grant@authenticeducation.org

- Resources:
  www.authenticeducation.org
  + Summer Institutes
  + online courses: www.authenticeducationonline.org
  + BIG IDEAS: free online journal for information and resources, blog, samples, links
  + Curriculum Framer: electronic design template and 100+ model units: http://demo.curriculum-framer.com
  + Pearson/ubd site: http://dev.pearsonubd.com/programs.htm

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