Teaching Effectively with Technology

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What do you want students to know (or be able to do)?

How do you want students to spend their time?

How will you measure student learning?

How will you get students learning from and with each other?

Online Learning and the Mind

Three aspects that fit well with technology

Attention

(ALMOST) NOTHING HAPPENS WITHOUT IT

Attention and memory are highly intertwined. Teaching memorably means capturing students' focus first.

Memory

NOT THE ONLY AIM, BUT ONE IMPORTANT AIM

Content knowledge and higher thinking aren't mutually exclusive. We know a lot about how to build better recall in less study time.

Thinking

IT CAN BE TAUGHT – BUT THROUGH CONTENT?

Thinking skills don't fall out of content knowledge, but sometimes we teach as though they do. The right kind of practice is crucial.

Attention

How do we capture student focus and use it as effectively as possible?

Principles to remember:

Attention

How do we capture student focus and use it as effectively as possible?

Principles to remember:

Attention involves the brain's mechanisms for prioritizing and allocating resources

Attention

How do we capture student focus and use it as effectively as possible?

Principles to remember:

Attention drives memory

Attention

How do we capture student focus and use it as effectively as possible?

What gets in the way:

- Excessive cognitive load
- Poor mastery ("automaticity") of lower-level processes
- Dysfunctional multitasking, mistaken beliefs about attention

Applying the Principles

Ask Students to Respond

Nothing focuses us on the task at hand like having to respond. SRS (clicker) systems and phone polls are options for F2F classes; online, alternating text with questions can keep students involved.

Automate Lower Level Processes

Ask yourself: What can be mastered to the point of needing less attention? Create assignments that require and reward practice; consider incentivizing speed.

Address Myths

Some have been told that they are part of a "digital native" generation with special abilities. Help them question this idea.

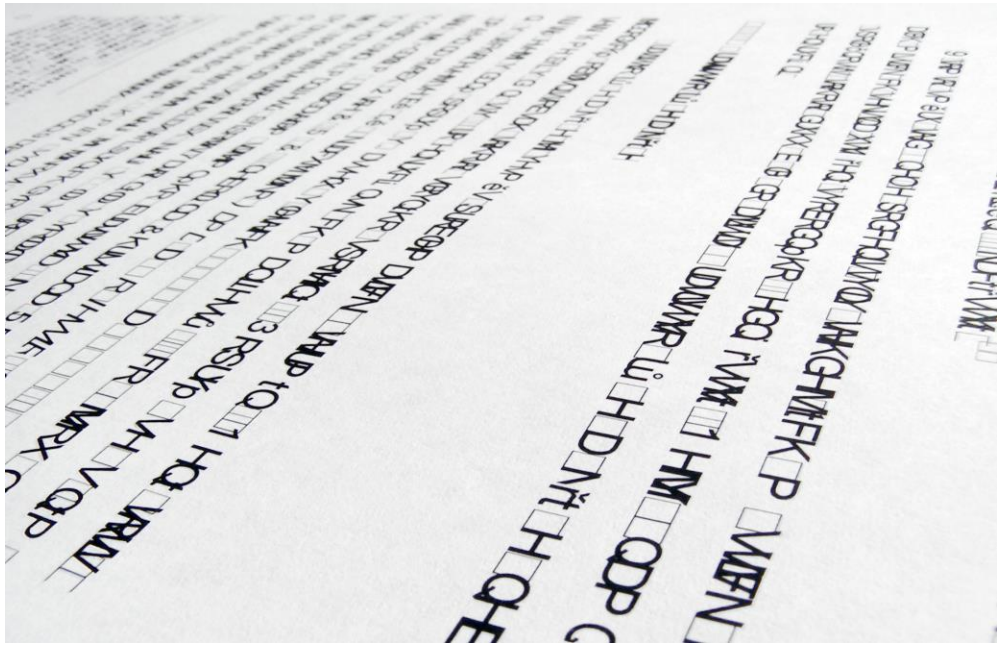
ATTENTION *matters*

Attention Matters!™ is a freestanding module that takes about 1-2 hours for students to complete. It uses interactive activities and video demonstrations to show students the limitations of attention and address common misconceptions about how attention and memory work. Contact Michelle Miller or John Doherty, john.doherty@nau.edu, for more information.

Memory

How do we make our material memorable – in less study time?

Principles to remember:



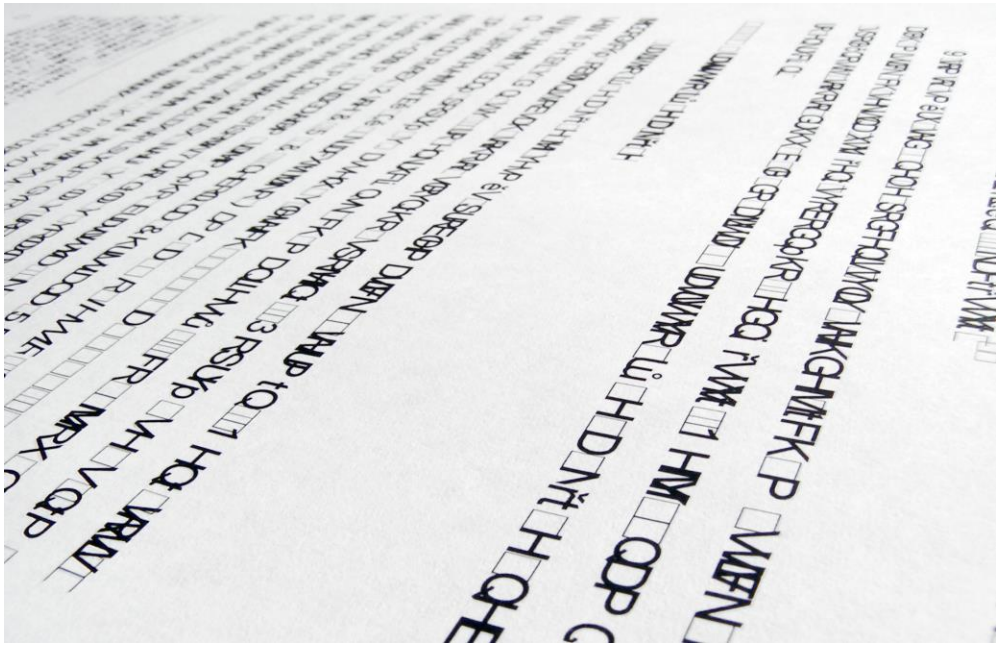
Memory

How do we make our material memorable – in less study time?

Principles to remember:

Goal relevance

- What is memory *for*?
- Context
- Depth of processing



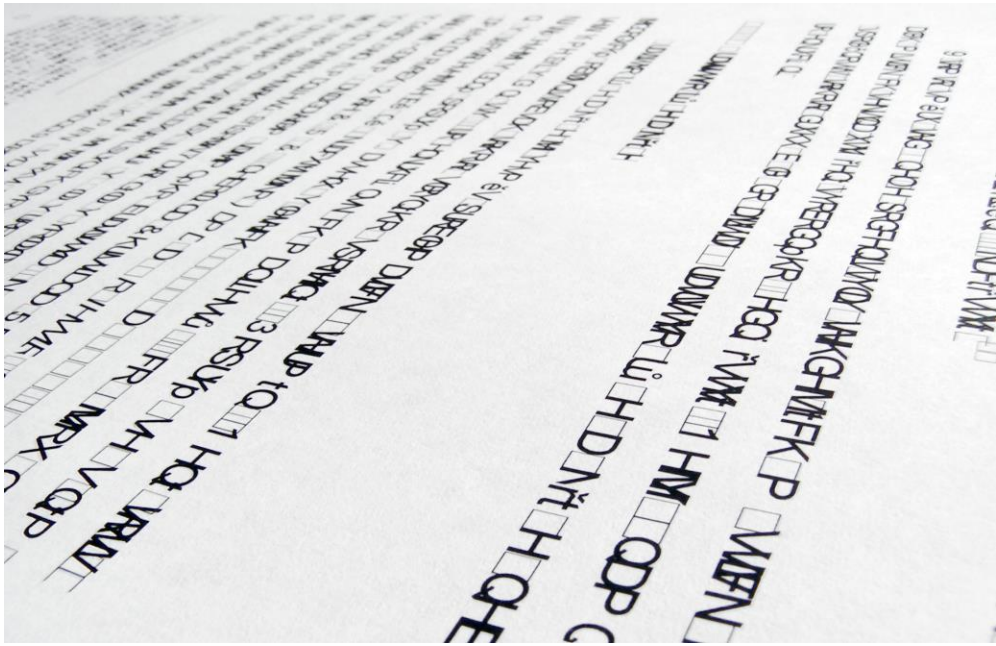
Memory

How do we make our material memorable – in less study time?

Principles to remember:

Visual superiority (usually)

- But: Don't worry about "learning styles"



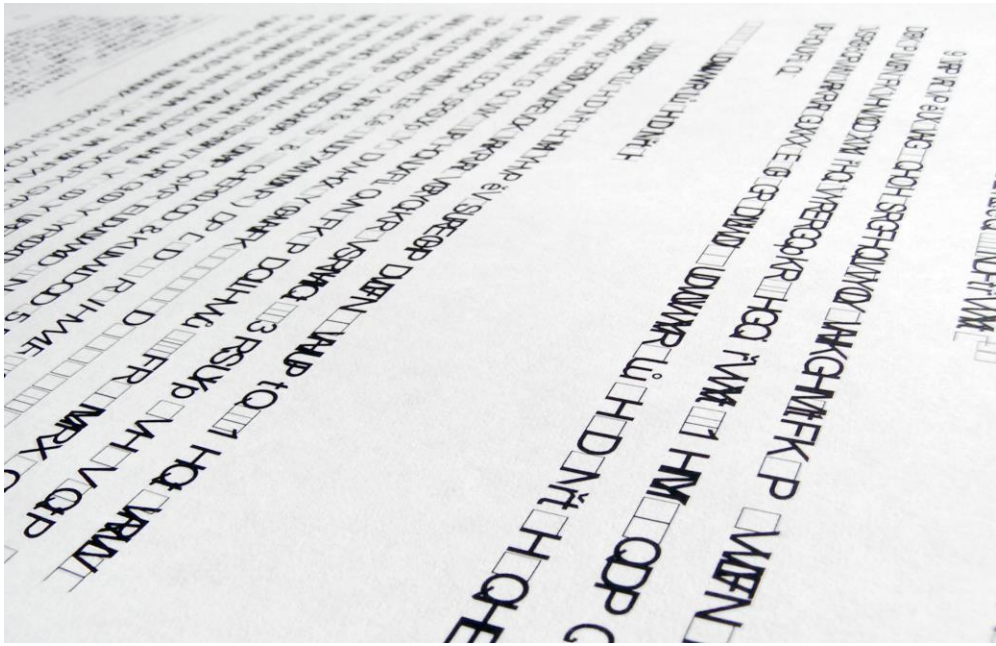
Memory

How do we make our material memorable – in less study time?

Principles to remember:

"Big Three"
applied memory findings:

- Testing effect
- Spacing effect
- Interleaving



Would you sequence studying like this:

Or like this:

Applying the Principles

Harness the Testing Effect

Pre-class reading quizzes, repeatable quizzes and self-quizzing tools help build memory faster. Consider spot grading for open ended questions. Choose tools & resources that feature quizzing; expect to reorient student approaches to this kind of testing.

Space It Out

Use technology to stagger deadlines and encourage shorter, more frequent sessions. Especially if material involves categories or problem types, try interleaving.

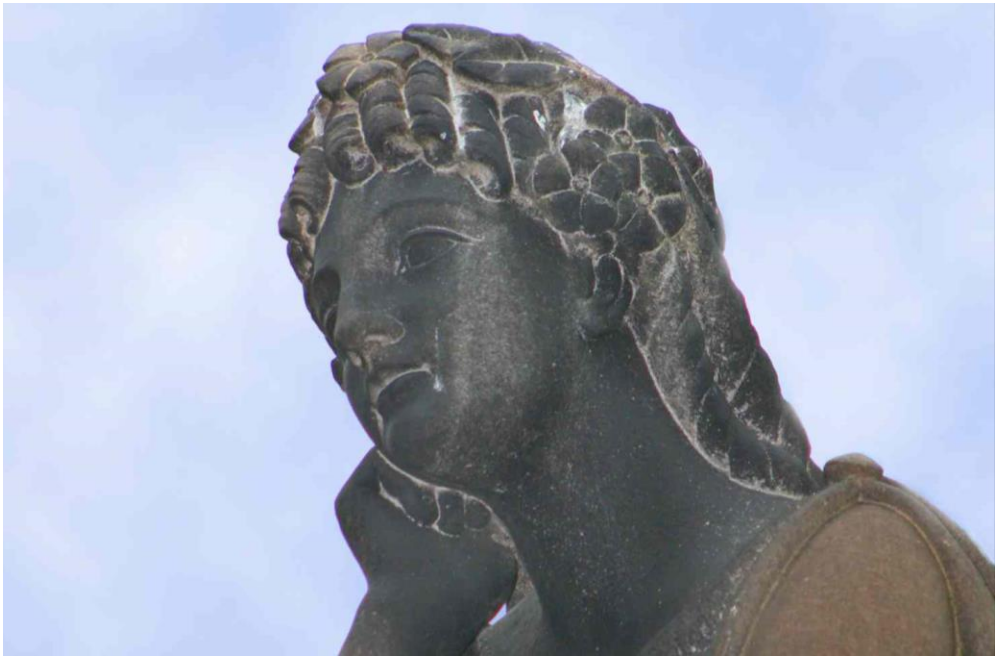
Push Powerful Processing

Assign students to synthesize information in discussions; ask students to relate material to themselves. Provide visuals – especially materials such as interactive diagrams or illustrations coupled with audio narration.

Thinking

How do we balance thinking skills and content knowledge so they complement one another?

Principles to remember



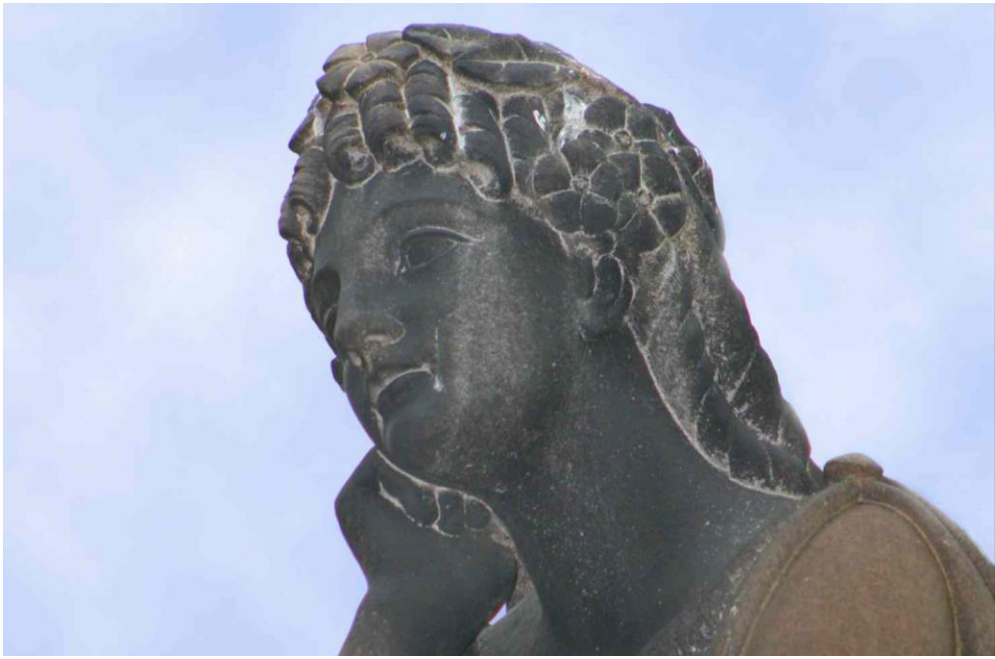
Thinking

How do we balance thinking skills and content knowledge so they complement one another?

Principles to remember

Thinking includes diverse skills and processes:

formal reasoning, problem solving, analogies, critical thinking...

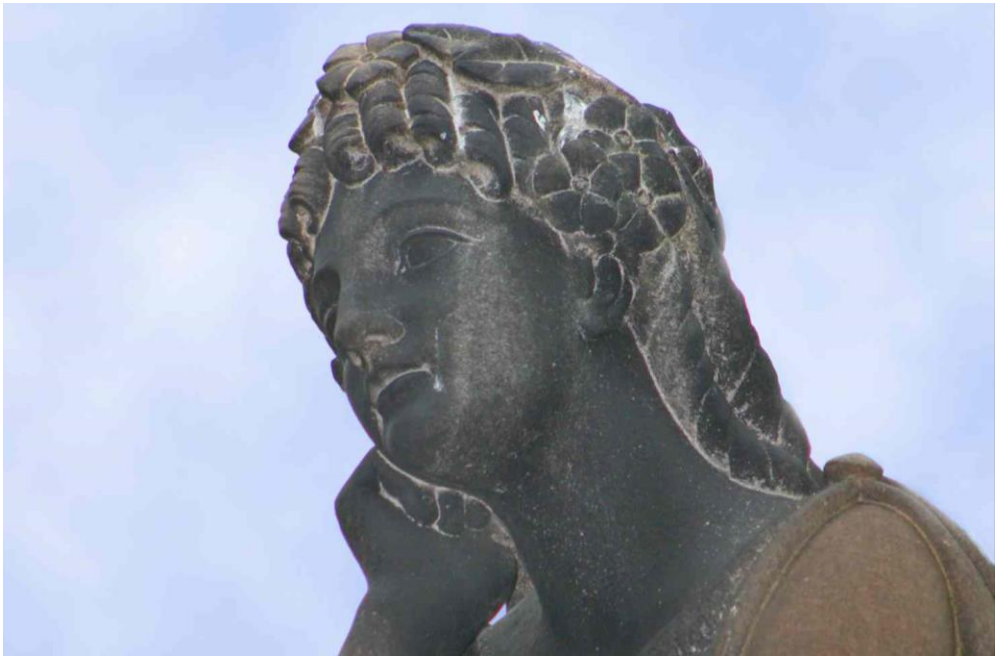


Thinking

How do we balance thinking skills and content knowledge so they complement one another?

Principles to remember

Thinking skills can be context-specific, and rarely transfer as well as we assume



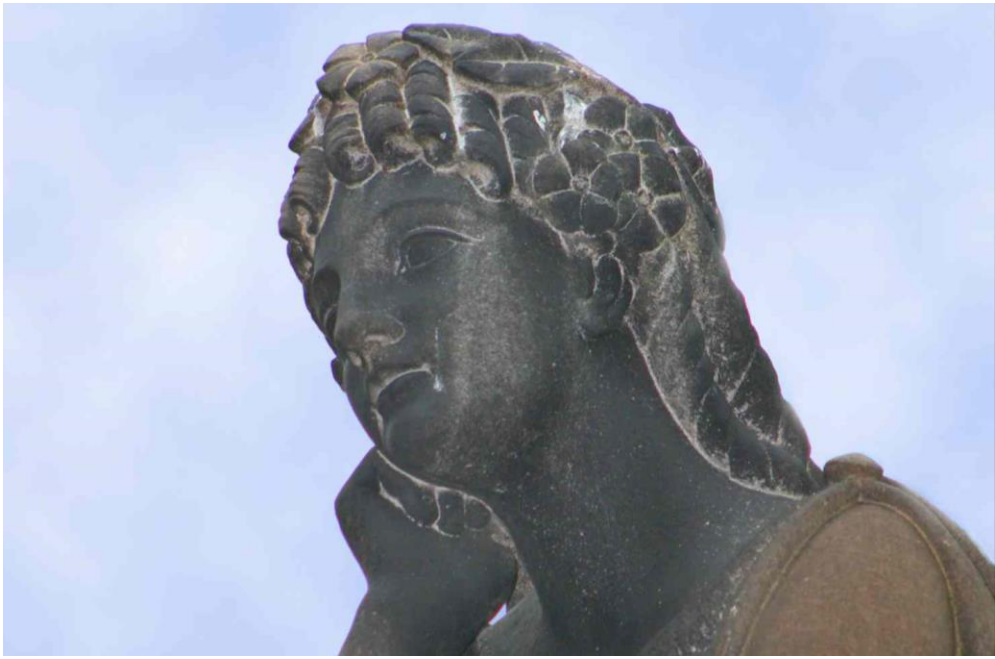
Thinking

How do we balance thinking skills and content knowledge so they complement one another?

Principles to remember

Focus on the underlying *structure* of problems aids transfer

- Repeated practice across contrasting examples



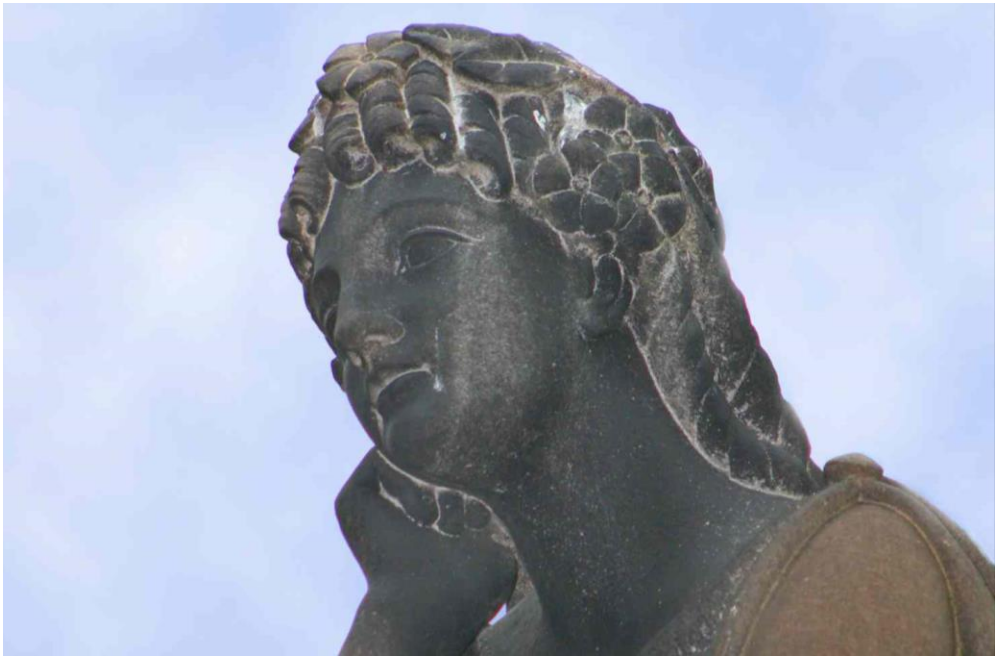
Thinking

How do we balance thinking skills and content knowledge so they complement one another?

Principles to remember

Critical thinking is particularly tough to address

- Multiple barriers (just ask faculty...)
- Cuing (*when to* versus *how to*)



Applying the Principles

What's the Skill?

Reflect on what students should be able to *do* at the end of the course. This counters the tendency to focus exclusively on content. Then, align planned learning activities to these skills. For example, if critical reading is important, use group annotating tools.

Aim for Transfer

Present as many problems as students need to develop mastery. Vary surface details across problems. Try quizzing.

Use Scenarios

Are there online tools that simulate important skills? Could case studies, problem based learning or role playing work?

Example: Virtual Email Client

Rebecca Mushtare, SUNY Oswego – ART 317, Web Media 1

"Clients" students work with on their designs:

- Individual personas
- Email addresses

Practical Questions

Things to ask ourselves as we choose technologies and design online courses

What do you want students to know (or be able to *do*)?

- How will you promote the right *thinking skills*?
- How will you promote *transfer*?
- Are there any skills that ought to be *automatic?*

How do you want students to spend their time?

- How will you keep students *focused*?
- How will you maximize *spaced study*?
- How will the activities build on students' *existing knowledge and goals*?

How will you measure student learning?

- How will activities take advantage of the *testing effect*?
- How will assessments function to *deepen and advance learning*?

How will you get students learning *from* and *with* each other?

- How will you use *discussion* to strengthen thinking skills?
- How can you create an online *community* that supports effort and deep learning?

Thank You –
and keep up the good work!

Want More?
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