

Teaching Strategies that Promote
Critical Thinking in Dental Programs

Allied Dental Directors' Annual
Conference

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June 9, 2014

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Introduction and Background

- Susan Daniel



- Shannon Mitchell



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Acknowledgments

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Tami Grzesikowski


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"Everyone agrees that students *learn* in college, but whether they learn to *think* is more controversial."

McKeachie, 1992

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Poll Everywhere

Which of the following strategies is effective in the development of critical thinking skills?

- a. Jigsaw
- b. Pair share
- c. Muddiest point
- d. Fish bowl
- e. Analytical paper
- f. All of the above

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Enter slide show mode (F5) to view your live poll.

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Two Questions

1. What do you want to take away from today?
2. What teaching activities or methodologies do you use to assist in the development of critical thinking?


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Goals

- Promote Critical thinking strategies that faculty can incorporate into teaching and learning.
- Integrate technologies explored during the workshop into classroom teaching strategies to promote critical thinking

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What characterizes your most memorable learning experiences?

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Accreditation Pre-doctoral Dental

2- 9 Graduates **must** be competent in the use of critical thinking and problem-solving, including their use in the comprehensive care of patients, scientific inquiry and research methodology.

Intent:
Throughout the curriculum, the educational program should use teaching and learning methods that support the development of critical thinking and problem solving skills

June 2014 http://www.ada.org/sections/educationAndCareers/pdfs/predoc_2013.pdf




ADA Accreditation Dental Hygiene Standard 2-24

Graduates must be competent in the application of self-assessment skills to prepare them for life-long learning.

- **Intent:**
Dental hygienists should possess self-assessment skills as a foundation for maintaining competency and quality assurance.

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Standard 2-24

Examples of evidence to demonstrate compliance may include:

- written course documentation of content in self-assessment skills
- evaluation mechanisms designed to monitor knowledge and performance
- outcomes assessment mechanisms

June 2014 <http://www.ada.org/sections/educationAndCareers/pdfs/dh.pdf>

Tracking Critical Thinking Strategies in the Curriculum				
Program Competency	Course Name/Number	Course Outcome/Objective	Critical Thinking Strategy Used	Type of Evaluation Used to Measure Outcome
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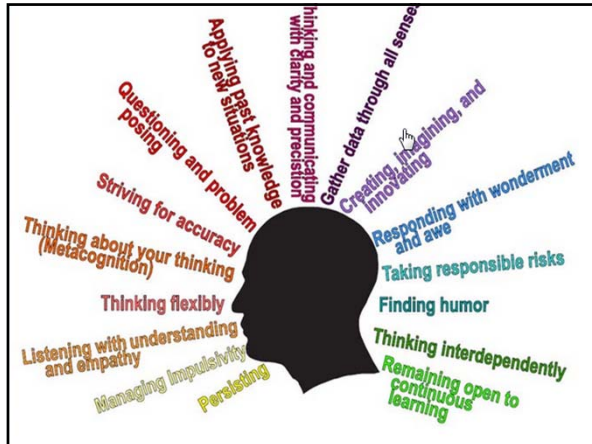
PLACE NINE YEAR OLD SOCRATES HERE

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WHAT IS YOUR ROLE?
PAIR SHARE



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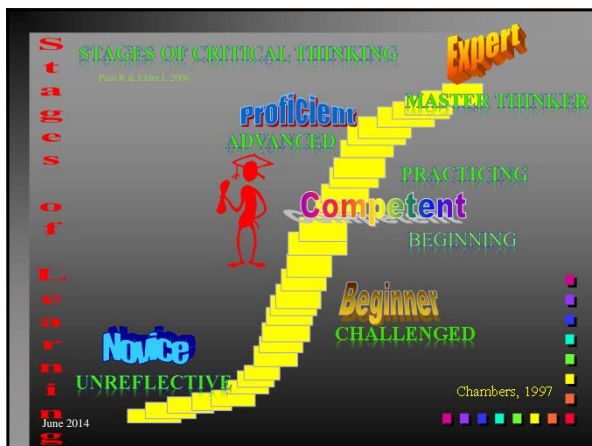
What is Critical Thinking? (CT)

- Attempting to achieve a desired outcome by thinking rationally in a goal-oriented fashion
- Used in the following:
 - solving problems
 - formulating inferences
 - calculating likelihoods
 - making decisions



Albem D., 1931


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WHAT DO EMPLOYERS WANT?


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Employer Survey

Proportion of Employers who Say Colleges Should place MORE Emphasis Than They Do on Selected Learning Outcomes	%
The ability to effectively communicate orally and in writing	89
Critical thinking and analytical reasoning skills	81
The ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences	79
The ability to analyze and solve complex problems	75

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Employer Survey

- 33% of new employees lacked the skills needed for entry level positions
- 31% lacked the critical thinking skills necessary for employment

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Intelligence Tests Do Not Measure Critical Thinking

"Rational thinking can be surprisingly dissociated from intelligence."

Stanovich K, 2009

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Intelligence Tests Do Not Measure Critical Thinking

- "IQ & SAT measure only a small set of the thinking abilities that people need."
- "IQ tests are good measures of how well a person can hold beliefs in short-term memory and manipulate those beliefs, but they do not assess at all whether a person has the tendency to form beliefs rationally when presented with evidence."


Stanovich K, 2009

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WHAT DO WE KNOW ABOUT TODAY'S LEARNERS ?


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Barriers to Development of Critical Thinking Skills

- US Educational System
- Individual Personality
- Background
- Position
- Gender
- Age
- Socioeconomic Status


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EVIDENCE

Better Thinking Can Be Learned with Appropriate Instruction

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CAUTION

Human's Tend to Preserve Beliefs

Evidence is often secondary to beliefs


Accept evidence that supports beliefs and ignore evidence that goes against beliefs

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Teaching & Learning
To
Think Critically

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Four-Part Model

Halpern D 1998, 2004


1. Explicitly teach/learn the
skills of critical thinking

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2. Encourage/develop the
disposition of effortful
thinking and learning

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3. Direct **learning activities** in ways that increase the probability of **transfer**

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4. Make **metacognitive** monitoring explicit and overt by reflecting on and analyzing the way one thinks

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Strategies

- Students make frequent summaries as a check on comprehension
- Present a brief problem to solve
- Use reciprocal peer-teaching
- Students find relevant information and rate it for degree of relevancy

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Strategies

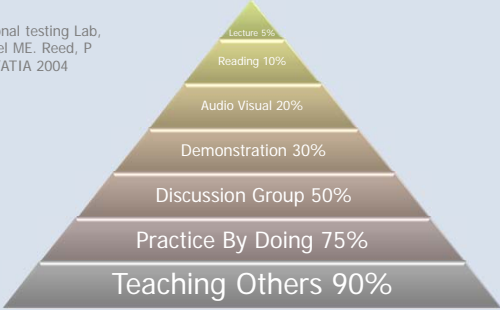
- Use different perspectives
- Post questions on list serves, etc.
- Ask patients to repeat instructions

Halpren D, 2013

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Retention Ratios: Learning Pyramid

National testing Lab,
Bethel ME. Reed, P
TAM/ATIA 2004




Learning Method	Retention Ratio
Lecture	5%
Reading	10%
Audio Visual	20%
Demonstration	30%
Discussion Group	50%
Practice By Doing	75%
Teaching Others	90%

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How Is Critical Thinking Taught?



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Clearly State Goals and Objectives

- Focus on skills to be learned
- Publish in syllabus and post on electronic Blackboard/Sakai
- State objective in measureable terms, Upon completion of this class the student will.. (NOT BE ABLE TO)

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Teaching and Assessing Guidelines


- Motivate
- Identify opportunities to infuse CT
- Use guided practice, explicitly modeling and scaffolding
- Align assessment with practice of CT skills
- Provide feedback and encourage reflection

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Identify Opportunities to Infuse CT

Practice time for development of CT skills is required

- Argument analysis
- Critical reading
- Evaluate information on the internet
- Distinguish science from pseudoscience
- Practice CT skills in clinical practice (patient care)




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Use Guided Practice, Explicitly Modeling and Scaffolding CT

- Provide worked examples of problems
- Writing samples displaying good CT
- Real-world examples of good/bad thinking found in the media
- Think aloud as they evaluate arguments
- Scaffolding – providing guidelines, rules
 - Scientific and non-scientific evidence

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Reflection Improves CT Instruction

- Use feedback and assessments to address deficiencies in performance and improve instruction
- CT Teaching and assessment rarely work the first time, faculty must be flexible, make adjustments to improve

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Conference Style Learning

- Faculty take role of a conference facilitator
- Student must read all required material prior to class
- Class consists of students asking questions of each other, discussing these questions
- Faculty direct and steer discussion by posing strategic questions to facilitate students knowledge from each other's ideas

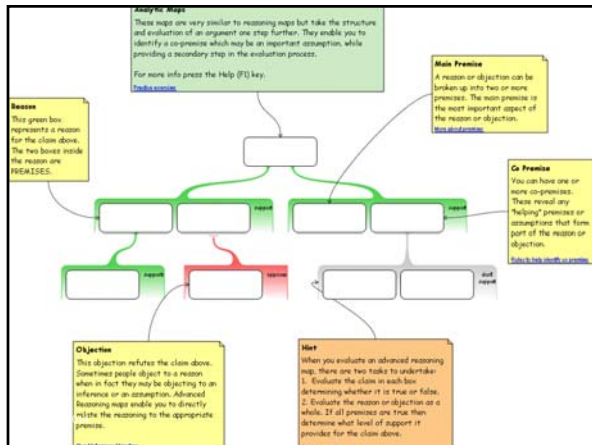
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Underwood & Wald 1995



Concept Maps

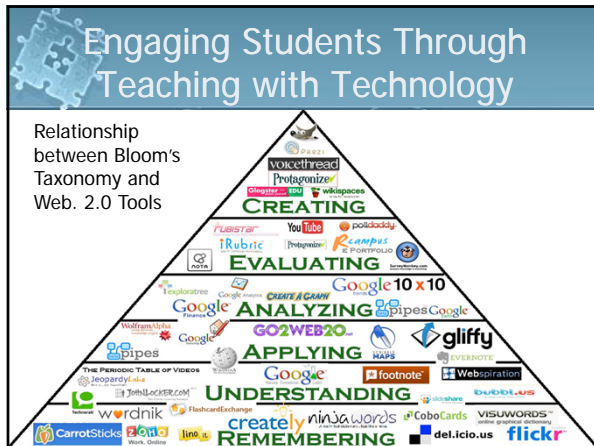
- Drawings or diagrams illustrating mental connections students make between a major concept and focus of the instructor and other concepts that the students have learned
 - Select stimulus as the starting point for map
 - Brainstorm terms/short phrases closely related to stimulus
- Argument Map

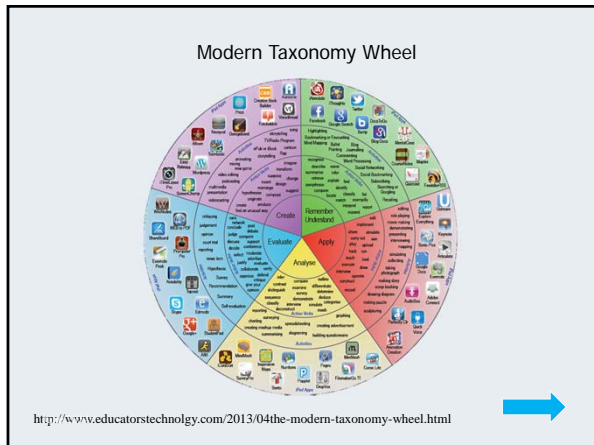




What will you do to assist, develop and assess faculty ?

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Technology Assessment

Is a three stage focused process:

- Stage 1 technical characteristics
- Stage 2 aspects of diagnostic or therapeutic efficacy
- Stage 3 clinical, economic, and social interests.

University of Virginia Health Science Center Department of Radiology
 Med-ed.virginia.edu/courses/rad/teach/index.html

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On Line Educational Platforms

- Black board
- Sakai
- Moodle

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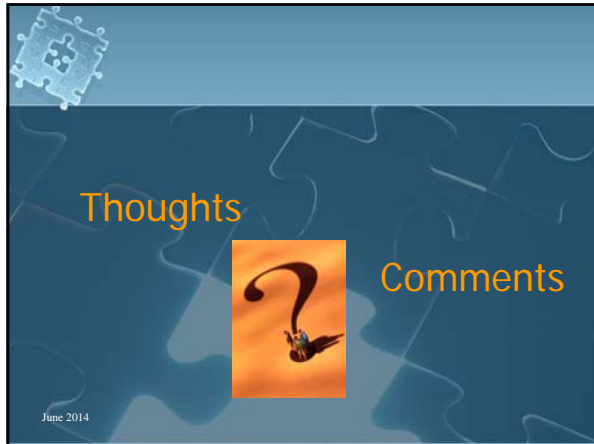
- MOOCs
 - Massive Open Online Course →
 - Aimed at unlimited participation via the web
- MedEdPortAL →
 - Peer Review Online tools
- Khan Academy →
 - A free world-class education for anyone anywhere

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Tracking Critical Thinking Strategies in the Curriculum

Program Competency	Course Name/Number	Course Outcome/Objective	Critical Thinking Strategy Used	Type of Evaluation Used to Measure Outcome

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Thoughts



Comments

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This slide features a dark blue background with a light blue puzzle piece icon in the top left corner. The word "Thoughts" is written in orange on the left, and "Comments" is written in orange on the right. In the center, there is a square image with an orange background and a black question mark. The date "June 2014" is in the bottom left corner.



Thank You

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This slide features a dark blue background with a light blue puzzle piece icon in the top left corner. The text "Thank You" is in orange at the top. Below it, "Contact information:" is in white. Two contact entries follow: "Susan J. Daniel, RDH, PHD" with the email sjdaniel@odu.edu, and "Shannon H. Mitchell, RDH, MS" with the email shannon_mitchell.unc.edu. The date "June 2014" is in the bottom left corner.
