Teaching Strategies that Promote Critical Thinking in Dental Programs

Allied Dental Directors' Annual Conference

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June 9, 2014

Introduction and Background

- Susan Daniel
- Shannon Mitchell

Acknowledgments

Phillips Oral Health Care
Cindy Sensabaugh, Sr. Mgr. NA
Professional Education & Academic Relations
And
American Dental Education Association
Tami Grzesikowski
"Everyone agrees that students learn in college, but whether they learn to think is more controversial."

McKeachie, 1992

Poll Everywhere

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

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

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.

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

http://www.ada.org/sections/educationAndCareers/pdfs/dh.pdf
Tracking Critical Thinking Strategies in the Curriculum

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<tr>
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WHAT IS YOUR ROLE?
PAIR SHARE

PLACE NINE YEAR OLD SOCRATES HERE
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

Halpern D, 1991

Paul R & Elder L, 2006
WHAT DO EMPLOYERS WANT?

Proportion of Employers who Say Colleges Should place MORE Emphasis Than They Do on Selected Learning Outcomes

<table>
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<tr>
<th>Skill</th>
<th>Proportion</th>
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<td>The ability to effectively communicate orally and in writing</td>
<td>89%</td>
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<tr>
<td>Critical thinking and analytical reasoning skills</td>
<td>81%</td>
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<tr>
<td>The ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences</td>
<td>79%</td>
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<tr>
<td>The ability to analyze and solve complex problems</td>
<td>75%</td>
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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
Intelligence Tests Do Not Measure Critical Thinking

“Rational thinking can be surprisingly dissociated from intelligence.”

Stanovich K, 2009

• “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

WHAT DO WE KNOW ABOUT TODAY’S LEARNERS?
Barriers to Development of Critical Thinking Skills

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

EVIDENCE

Better Thinking Can Be Learned with Appropriate Instruction

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
Teaching & Learning
To
Think Critically

Four-Part Model
Halpern D 1998, 2004

1. Explicitly teach/learn the skills of critical thinking

2. Encourage/develop the disposition of effortful thinking and learning
3. Direct learning activities in ways that increase the probability of transfer

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

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
Strategies

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

Retention Ratios:
Learning Pyramid

- Lecture 10%
- Reading 10%
- Audio Visual 20%
- Demonstration 30%
- Discussion Group 50%
- Practice By Doing 75%
- Teaching Others 90%

How Is Critical Thinking Taught?
Clearly State Goals and Objectives

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

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

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)
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

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

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
  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.

What will you do to assist, develop and assess faculty?
Engaging Students Through Teaching with Technology

Relationship between Bloom’s Taxonomy and Web 2.0 Tools

http://www.educatorstechnology.com/2013/04/the-modern-taxonomy-wheel.html

Modern Taxonomy Wheel

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/red/teach/index.html
### On Line Educational Platforms

- Black board
- Sakai
- Moodle

### 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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**June 2014**
Thoughts

Comments

Thank You

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