CE Course Handout

Promoting and Assessing Critical Thinking Throughout the Dental Hygiene Curriculum

Thursday, June 9, 2016
2:30-5:30 p.m.
Promoting and Assessing Critical Thinking Throughout the Dental Hygiene Curriculum

This workshop provides the educator with practical information on critical thinking by looking at who has critical thinking, what is critical thinking, when can educators promote critical thinking, where do health professionals use critical thinking, and lastly, how can we teach and measure critical thinking skills. The facilitator will provide practical tools educators may use in the classroom, clinical, or online environment to encourage critical thinking, a skill deemed crucial in providing care. Additionally, assessment methods will be highlighted to address accreditation standards on critical thinking.

Course Description

• Use empirical evidence to identify the elements of critical thinking.
• Discuss the role of critical thinking in clinical reasoning and clinical judgment.
• Examine pedagogy for promoting clinical thinking skills for students.
• Identify teaching strategies to utilize in the clinical and classroom environment to promote critical thinking.
• Assess methods of evaluating critical thinking using traditional methods as well as Web2.0 technology.

Learning Objectives
What is Critical Thinking?

Definition of Critical Thinking

Critical Thinking (CT) is a persistent, self-governing way of thinking that requires both cognitive skills and affective dispositions or prevailing tendencies to thinking critically.

(P. A. Facione, 1990)
Cognitive skills associated with CT
- Interpretation
- Analysis
- Evaluation
- Inference
- Explanation
- Self-regulation

Core Critical Thinking Skills
Who is a Critical Thinker?

The ideal disposition of a critical thinker is to be ...
- Inquisitive
- Judicious
- Systematic
- Analytical
- Truth-seeking
- Open-minded
- Confident in Reasoning

(Facione, 1990)
Assessing CT

http://www.insightassessment.com/Produ
cts/Products-Summary/Critical-Thinking-
Attributes-Tests/California-Critical-
Thinking-Disposition-Inventory-CCTDI
http://www.insightassessment.com/Produ
cTS/Products-Summary/Critical-Thinking-
Skills-Tests/Health-Sciences-Reasoning-
Test-HSRT
http://www.insightassessment.com/Produ
cTS/Products-Summary/Critical-Thinking-
Skills-Tests/California-Critical-Thinking-
Skills-Test-CCTST

Discoveries


1350.


Activity

SELF-ASSESS
Why is Critical Thinking important?
Why is CT important to me?

The idea of Oprah’s ah-ha moments and why these moments happen...
Could it be due to critical thinking?
Significance of CT to lifelong learning

Why is CT important to You?

Why CT is important for Oral Health Professionals...

Clinical reasoning is the application of critical thinking skills to the provision of clinical care.

Examples?

Clinical reasoning is necessary when providing dental hygiene care based on the dental hygiene process of care (ADPIED).
Evidence of higher order cognitive skills
Intent of the ADA CODA for RDH, DA, and DDS students
Linked to clinical reasoning that you do every day!
Important to lifelong learning

Why is CT important to us?

CODA DH Standards

Standard 2-17 Graduates must be competent in providing the dental hygiene process of care which includes:
a) comprehensive collection of patient data to identify the physical and oral health status;
b) analysis of assessment findings and use of critical thinking in order to address the patient’s dental hygiene treatment needs;
c) establishment of a dental hygiene care plan that reflects the realistic goals and treatment strategies to facilitate optimal oral health;
d) provision of patient-centered treatment and evidence-based care in a manner minimizing risk and optimizing oral health;
e) measurement of the extent to which goals identified in the dental hygiene care plan are achieved;
f) complete and accurate recording of all documentation relevant to patient care.

DH Standard 2 17. Intent:
The dental hygienist functions as a member of the dental team and plays a significant role in the delivery of comprehensive patient health care. The dental hygiene process of care is an integral component of total patient care and preventive strategies. The dental hygiene process of care is recognized as part of the overall treatment plan developed by the dentist for complete dental care.

Examples of evidence to demonstrate compliance may include:
• Program clinical and radiographic experiences
• Patient tracking data for enrolled and past students
• Policies regarding selection of patients and assignment of procedures
• Monitoring or tracking system protocols
• Clinical evaluation system policy and procedures demonstrating student competencies
• Assessment instruments
• Evidence-based treatment strategies
• Appropriate documentation
DH CRITICAL THINKING

Standard 2-24 Graduates must be competent in the application of self-assessment skills to prepare them for lifelong learning.

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

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

Standard 2-25 Graduates must be competent in the evaluation of current scientific literature.

Intent:
Dental hygienists should be able to evaluate scientific literature as a basis for lifelong learning, evidenced-based practice and as a foundation for adapting to changes in healthcare.

Examples of evidence to demonstrate compliance may include:
• written course documentation of content in the evaluation of current and classic scientific literature
• evaluation mechanisms designed to monitor knowledge and performance
• outcomes assessment mechanisms

Standard 2-26 Graduates must be competent in problem solving strategies related to comprehensive patient care and management of patients.

Intent:
Critical thinking and decision making skills are necessary to provide effective and efficient dental hygiene services. Throughout the curriculum, the educational program should use teaching and learning strategies that support the development of critical thinking and problem solving skills.

Examples of evidence to demonstrate compliance may include:
• evaluation mechanisms designed to monitor knowledge and performance
• outcomes assessment mechanisms demonstrating application of critical thinking skills
• activities or projects that demonstrate student experiences with analysis of problems related to comprehensive patient care
• demonstration of the use of active learning methods that promote critical appraisal of scientific evidence in combination with clinical application and patient factors
### Critical Thinking in the Real World

<table>
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<tr>
<th>Core Cognitive Skill</th>
<th>Applied Definition</th>
<th>Practical Application</th>
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</thead>
<tbody>
<tr>
<td>Interpretation</td>
<td>Finding the meaning of an experience</td>
<td>Interpret and analyze the patient's history and needs</td>
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<tr>
<td>Analysis</td>
<td>Synthesis of ideas from complex to basic</td>
<td>Evaluate and infer to diagnose and treat, as well as autonomously self-assess their patient care.</td>
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<tr>
<td>Evaluation</td>
<td>Judge the value of data, knowledge, and/or beliefs</td>
<td>Evidence-based decision making...justifying therapy</td>
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<tr>
<td>Inference</td>
<td>Reason from knowledge/evidence</td>
<td>Evidence-based decision making...justifying therapy</td>
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<td>Explanation</td>
<td>Thoughts that identify the reasoning</td>
<td>Evidence-based decision making...justifying therapy</td>
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<td>Self-regulation</td>
<td>Autonomous thinking</td>
<td>Working without direct supervision</td>
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### Fishbowl Exercise

**STUDENT DISCIPLINE PROBLEM RECENTLY FACED**

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### When is CT important?

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Clinical reasoning requires critical thinking that integrates conceptual knowledge, procedural knowledge, and the higher level of thinking, meta-cognition (Boyd, 2002, 2008; Haden et al., 2006; Hendricson et al., 2006; Kurfiss, 1988).

Types of Knowledge

- **Declarative** knowledge is the factual information that one knows; it can be declared—spoken or written.  
  EXAMPLE?

- **Procedural** knowledge is knowledge of how to do something, of how to perform the steps in a process.  
  EXAMPLE?

- **Conditional** knowledge is knowledge about when to use a procedure, skill, or strategy and when not to use it; why a procedure works and under what conditions; and why one procedure is better than another.  
  EXAMPLE?
Taylor (1999) defines metacognition as "an appreciation of what one already knows, together with a correct apprehension of the learning task and what knowledge and skills it requires, combined with the agility to make correct inferences about how to apply one's strategic knowledge to a particular situation, and to do so efficiently and reliably."

Continuum of Knowledge

What you Know

Knowledge of the skills to do Task

Application of Knowledge to situation with skill

Where are students on this continuum?
How can we promote CT?

Can we teach Critical Thinking?

Maybe if...

- Pedagogy is imperative... Andragogy?
- Teacher must have disposition to CT
- Takes Time!!
- CT skills must be encouraged and modeled
- Helps if student has disposition to CT
- Use of measurements; still being tested in the dental profession genre; looking for connections to traditional outcomes and or evaluation measurements

Current Study at EWU...Discussion
What instructors can do:

- Place students in heterogeneous groups
- Place value on learning concepts rather than facts
- Ask students to share reasoning process
- Encourage reflection
- Model critical thinking
- Utilize active learning principles

Activity

PARTNER WITH NEIGHBOR AND DISCUSS LEARNING ACTIVITIES AND METHODS THAT PROMOTE CT.
How is CT taught?

Challenge for Educators

Nurtare disposition and promote skills...
How do we learn to critically think?

- Questions
- Reflecting/Journaling/ Clinic Logs
- Case Based Learning Strategies
- Learning Contracts
- Algorithm-ADPIED
- Discussion/Debate/Dilemma

Simulation/Standardized Patient  
Role-play  
Games  
Literature Analysis  
Mindmapping/Concept Mapping/Chunking  
Portfolio  
Poster  
Writing

Questioning

"It is a learning tool used via dialogue in the form of questions and answers in various fields to impart knowledge. Its purpose is for the questioner (the person with more seniority) leads the more junior person to arrive at the answer through his/her own analytical thinking (the aha! moment)."

“IDEALS” Six Questions for Effective Thinking and Problem-Solving

1. Identify the problem — “What’s the real question we’re facing here?”
2. Define the context — “What are the facts and circumstances that frame this problem?”
3. Enumerate choices — “What are our most plausible three or four options?”
4. Analyze options — “What is our best course of action, all things considered?”
5. List reasons explicitly — “Exactly why we are making this choice rather than another?”
6. Self-correct — “Okay, let’s look at it again. What did we miss?”

Facione, 2009

Things to Consider...

- Challenge the students using a logical stepwise method to hone CT skills.
- Identify learner’s needs through questioning.
- Engage the learner… either with self-directed learning or sharing clinical pearls.
- Avoid ambiguity.
- Socratic method is NOT for evaluation but to help learner focus on the process.
- Do not use to humiliate as this is not adult learning.


Reflection
Reflection requires the student to utilize cognitive attributes of critical thinking to link past, present, and future experience to learning (Wong et al., 1995).

**What is Reflection?**

- Non-reflector: describe it
- Reflector: reflect on learning from it,
- Critical reflector: critically reflect on how it has affected them, and how it will affect them in the future.

**Mezirow’s Model of Reflection**

- Attending to feelings
- Association
- Integration
- Validation
- Appropriation
- Outcome of Reflection

Elements of Reflection

- Attending to feelings
- Association
- Integration
- Validation
- Appropriation
- Outcome of Reflection

(Mezirow, 1990)

(Reprinted from Boud, Keogh, & Walker, 1985)
Case-Based Learning

Case studies
Relate content to a case study
Assign students to do case studies
Consider virtual case studies

Share Examples
Wetmore A. Implementing a Digital Case Study as a Clinical Assessment Tool in Dental and Allied Dental Education. MedEdPORTAL. 2014. Available from: www.mededportal.org/publication/9672
Learning Contracts*

**Owness of learning on student**
- Requires active participation
- Goal setting
- Trust between student and teacher

**What is an example of a learning contract?**

**Some Questions:**
- What is a learning contract?
- What are the benefits of a learning contract?
- What factors influence the success of a learning contract?

**Algorithms**
Process of Care
- Recognized by ADHA
  DHDx_position_paper.pdf
- Systematic framework for critical thinking
- Students Write-Professionals Do

Discussion/Debate/Dilemmas

Discussion/ Debate/Dilemma
Embed questions in PPT
Use think-pair-share
Assign debate subjects in teams eg. Fluorides
Develop ethical dilemmas and ask students to solve in groups

Examples?
Activities

Pre-clinic/ Clinic  Teaching
Dentoforms  
Manikins  
Sim Labs  
Examples?
Debriefing
Military background
Must for simulated learning
Transformative learning
Examples?

Role-playing
Pre-clinic
Nutritional counseling
Consider video-taping
Motivational Interviewing
Examples?
Games

Use of games both with and without technology requires participation of all parties. May want game to be a low-stake grading. Examples?
Literature Analysis

Literature "Clubs"
Table clinics
Posters Presentations
Partner with Librarians
Examples?

Presentations/Posters
Mind/Concept Mapping/Mindmapping

Diagram of ideas and thoughts
Used for problem solving & decision making
Central hub
Use web tools and or paper/pencil
- inspiration.com
- Xmind
- Mindmanager
- Coggle
Concept Mapping
Diagram relationships between concepts, ideas
Visualization of knowledge
Multiple hubs as opposed to central hub
Chunking

Chunking content for capacity of working memory

Used to be +/- 7 now believed to be +/- 4

If working memory is full other concepts drop out

Especially important in Web-based courses

Consider lecture and activity structure

George Miller 1956

1. Highest level
2. Modules > lessons > topics
3. Screen level
4. Working memory check

Turn Bits to Chunks

http://theelearningcoach.com/elearning_design/chunking_information/
An e-portfolio is an electronic collection of evidence that shows a learning journey over time. Portfolios can relate to specific academic fields or lifelong learning. Evidence may include writing samples, photos, videos, research projects, observations by mentors and peers, and/or reflective thinking. The key aspect of an e-portfolio is reflection on the evidence, such as why it was chosen and what was learned from the process of developing the e-portfolio.

Adapted from Philippa Butler's "Review of the Literature on Portfolios and E-portfolios" (2006), page 2

TYPES OF E-PORTFOLIOS

DEVELOPMENTAL
ASSESSMENT
SHOWCASE
HYBRID
Students reflect about clinical patient encounters and that reflection leads to understanding how the patient encounter affected the student and ultimately whether the student links the experience of the patient encounter to enrich future clinical practice.

(Boyd & Fales, 1983)

"A portfolio without standards, goals, and/or reflection is just a fancy resume, not an electronic portfolio." (Barrett, 1999)
Where do faculty play a role in CT?

**PURPOSE:** Qualitative study explores the perceptions of DH faculty regarding issues surrounding critical thinking (CT) skills integration within their associate degree DH programs.

**METHODS:** 20 faculty participated in the study, as drawn from 11 accredited associate degree DH programs in one Midwest state. Multiple sources of data were collected, including email questionnaires, individual follow-up phone interviews and artifacts. Interpretive analysis was conducted.

**RESULTS:** Faculty generally understood CT, but interpretations varied. Most do not use varied teaching strategies to promote CT skills, and focus on one particular strategy—that of case studies. The participants identified the need for allied health-focused faculty development opportunities, and noted that calibration of instruction was needed. Despite challenges, faculty felt responsible for teaching CT skills, and identified the need for time to build CT skills into the curriculum.

**CONCLUSION:** This study was conducted in response to the ADEA CCI challenge for DH educators to comprehend their own knowledge on the concept of CT related to research-based pedagogical approaches to teaching and learning. Findings revealed a strong desire among the DH faculty in this study to incorporate CT into their work. Regular and targeted faculty development opportunities are needed.

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**Facility Role in Critical Thinking**

- Facilitator of Learning rather than teacher of content
- Faculty thinking aloud with Student thinking aloud as well
- Value student contributions
- Be empathetic to the influence of exercise, sleep, and stress on learners.

**How do you encourage CT within the boundaries of program rules?**
Student Role in CT

Active engaged in learning
Move from passive to active learner
Come to class prepared (anticipatory set)

* I hear and I forget. I see and I remember. I do and I understand. Confucius

Who is an Effective Clinical Educator?

- Provides specific feedback
- Demonstrates interest in teaching
- Motivates
- Translates didactic material to patient care
- Explains difficult concepts clearly
- Shows compassion
- Proactive in treatment of students and patients

What is related to critical thinking?


Who is an Effective Clinical Educator?

- Orientation prior to performing a task
- Formative feedback
- Guiding questions
- Creating an understanding of the desired outcome; technical performance
- Pre-clinic session overview with cognitive hooks and linking
- Explains and uses visual aids for dental terms
- Describes visual examples
- Provides opportunities for discussion, clarification, and review

Litlature suggests that students like...

- Orientation prior to performing a task
- Formative feedback
- Guiding questions
- Creating an understanding of the desired outcome; technical performance
- Pre-clinic session overview with cognitive hooks and linking
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What students need Role-Modeled in Clinic

Clinical Competence
Professional Demeanor
Oral Health Care
Professional-patient Interactions
Ethical values
Social consciousness


Irby’s 5-Step Model of Clinical Teaching

1. Get a commitment from the student
2. Probe for supporting evidence
3. Teach general rules
4. Reinforce what the student did right
5. Correct mistakes


Step 1 Getting a Commitment

Student presents case
You request additional information... not offer your opinion

Examples:
What do think is going on with this patient? Do you need additional information?
If so what? Why is patient non-compliant?
Ask student for a commitment; what should be done? Do you agree or disagree?

YOUR ROLE IS TO INTERACT WITH THE STUDENT AND DIAGNOSE STUDENT LEARNING NEEDS!
Step 2 Probe for Supporting Evidence

- Once student has made a commitment regarding the case
- Asks student how they made the decision
- Ask student to recall “thinking” process
- Ask student what evidence supports decision
  - **DON’T OFFER YOUR OPINION; INSTEAD QUESTION.**
- This step will help you uncover flawed reasoning process which we know never happens in the clinical environment.
- You may have to continue to ask questions to determine the students’ reasoning process

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Example of a Flawed Reasoning Process

Student is charting the existing restorations and other hard and soft tissue findings to complete the dental chart. You arrive to check the chart and find that all 4 second premolars are marked as extracted. When you question the student as to why they were selected their reason is because the first maxillary premolars have bifurcated roots and therefore the DDS wouldn’t want to extract them so they extract all the second premolars. As an instructor it is up to you to then use questions to correct their reasoning and demonstrate why the second premolars are present and all the first premolars have been extracted.

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Step 3 Teach General Rules

You are the expert and they are the novice so you KNOW the general rules. You can translate evidence to a specific model and make a decision.

Example: Again the patient with the missing premolars.

You can ask the student if the patient presents with missing premolars … did you ask the patient if they have had ortho? Look at the crown anatomy? Look at the embrasures clinically and radiographically?

**YOUR JOB IS TO HELP THEM UNDERSTAND A GENERAL RULE NOT TO SAY “In my opinion” OR “I am convinced”**
When a student handles a patient in a manner with positive results, a good teacher:
- Points out the action the student took was correct
- Points out what effect the action had on the patient

Example:
Your dental hygiene therapy was performed well today; you removed all the deposits sub-gingivally and provided effective pain management for your patient. NOT “good job” “you handled the patient well”

Step 4 Reinforce what student did correctly

Step 5 Correct Mistakes
- What are mistakes?
  - Omissions
  - Distortions
  - Misunderstandings
  - Lack of preparation
  - Under-developed psychomotor skills
- Do they realize they made a mistake?
  
YOUR JOB IS TO CORRECT MISTAKES...WHEN? AND HOW?

How to correct mistake
- ASAP ...must be careful with patient in the same area; need to correct however not impinge upon student/client trust

  Good example is: Could you explain to me why...
  NOT I can’t believe you...
In conclusion:

Moving away from the traditional pedagogy is necessary to promote CT.
Active learning strategies may help promote CT.
Initially integration into lecture format may be easiest for instructor.
Use of other strategies depends on subject, teacher, and student.
Student centered learning is the paradigm for adult learning.