

CE Course Handout

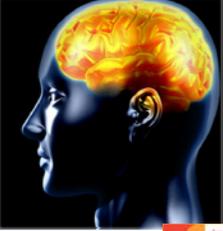
Promoting and Assessing Critical Thinking Throughout the Dental Hygiene Curriculum

Thursday, June 9, 2016
2:30-5:30 p.m.

CLL 2016
93RD ANNUAL SESSION
JUNE 8-14, 2016 / PITTSBURGH, PA

Welcome!

**Promoting and Assessing
Critical Thinking Throughout
the Dental Hygiene
Curriculum**



Course Description

This workshop provides the educator with practical information on critical thinking by looking at the *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.

Learning Objectives

- 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.

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



insightassessment.com

Core Critical Thinking Skills

Skill Name / Definition	Key Definition	Key Definition
Analysis	The organized and systematic breakdown of material or information into its constituent parts, and the identification of the relationships between those parts.	Identifying the meaning of an argument.
Inference	The process of drawing a logical conclusion from premises or evidence. It involves identifying the logical relationship between premises and conclusions, and determining whether the conclusion follows from the premises.	Identifying the logical relationship between premises and conclusions.
Evaluation	The process of assessing the quality of an argument or claim. It involves identifying the strengths and weaknesses of the argument, and determining whether the claim is supported by the evidence.	Identifying the strengths and weaknesses of an argument.
Explanation	The process of providing a clear and concise account of why something happened or why someone did something. It involves identifying the causes and effects of an event, and determining whether the explanation is supported by the evidence.	Identifying the causes and effects of an event.
Self-regulation	The process of monitoring and controlling one's own thinking. It involves identifying one's own strengths and weaknesses, and determining how to improve one's thinking.	Identifying one's own strengths and weaknesses.



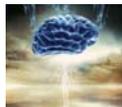
Who is a Critical Thinker?





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

Discoveries

Williams, K. B., Glasnapp, D. R., Tilliss, T. S., Osborn, J., Wilkins, K., Mitchell, S., et al. (2003). Predictive validity of critical thinking skills for initial clinical dental hygiene performance. *Journal of Dental Education*, 67(11), 1180-1192.

Williams, K. B., Schmidt, C., Tilliss, T. S., Wilkins, K., & Glasnapp, D. R. (2006). Predictive validity of critical thinking skills and disposition for the national board dental hygiene examination: a preliminary investigation. *Journal of Dental Education*, 70(5), 536-544.

O'Kelley Wetmore, A., Boyd, L.D., Bowen, D.M. and Patillo, R. (2010) Reflective Blogs in Clinical Education to Promote Critical Thinking in Dental Hygiene Students. *Journal of Dental Education*. 74(12)1337-1350.

O'Kelley Wetmore, A. & Alvin, B. (2013) Predictive Validity of Health Science Reasoning Test for Admissions and Tracking Critical Thinking Skills in Dental Hygiene Students: A Preliminary Report. *Poster Presentation: American Dental Education Association Allied Program Directors' Meeting.*, Portland, Or.

Activity

SELF-ASSESS

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).

Why is CT important to us?

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



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 life-long 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 life-long 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 methods 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

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

Fishbowl Exercise

STUDENT DISCIPLINE PROBLEM RECENTLY FACED

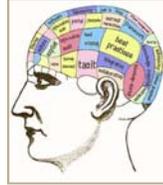


When is CT important?



Reasoning, Judgment, Decisions...

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



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?



Meta-cognition

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.”

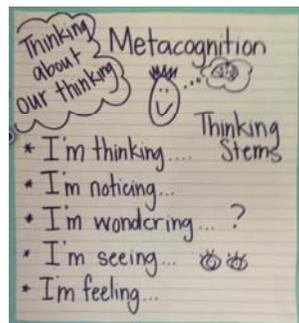
Taylor, S. (1999). Better learning through better thinking: Developing students' metacognitive abilities. *Journal of College Reading and Learning*, 30(1), 34ff. Retrieved November 9, 2002, from Expanded Academic Index ASAP .

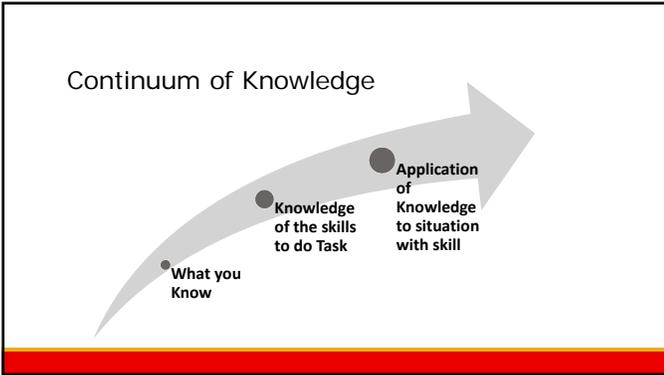
Metacognition

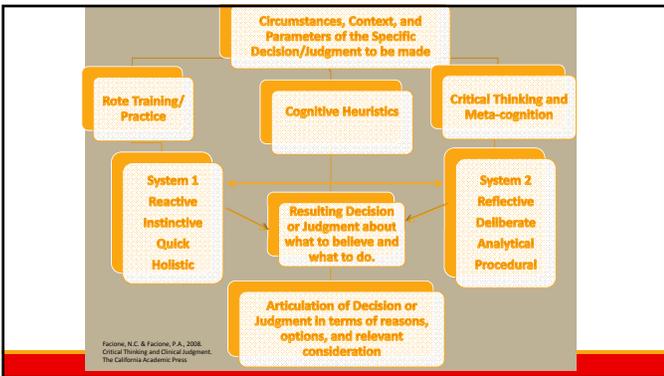
Higher-level of Thinking

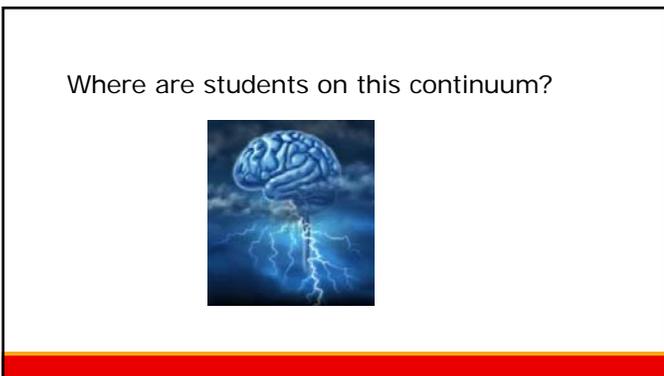
Awareness or analysis of one's own learning or thinking processes

“Thinking about Thinking” or “Knowing about Knowing”









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](#)

How is CT taught?



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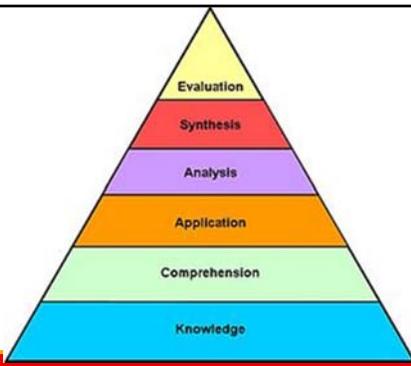
"You must be the new hire. Welcome aboard. Here's our prepackaged curriculum. If time permits, encourage critical thinking."

Challenge for Educators

Nurture 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

Billings & Halstead, Teaching in Nursing, A Guide for Faculty, 2012, 4th Edition, Saunders Elsevier, St. Louis, MO

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

Questioning



Socratic 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)."

Benitez, J. (2013).The Socratic Method. Medical Education. <http://academiclifeinem.com/the-socratic-method/>

"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.

Oh, RC. (2005) The Socratic Method in Medicine—the labor of delivering medical truths. *Family Medicine*. 37(8):537-9.

Reflection



What is 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).



Mezirow's Model of 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.

What is *It*???

When do we use reflection in clinical teaching?

(Mezirow, 1990).

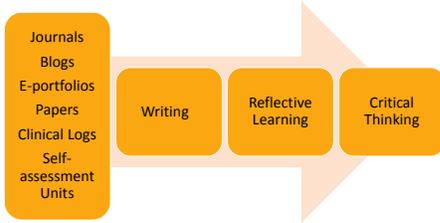
Elements of Reflection

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



(Boud, Keogh, & Walker, 1985)

Reflection and CT



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*



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?

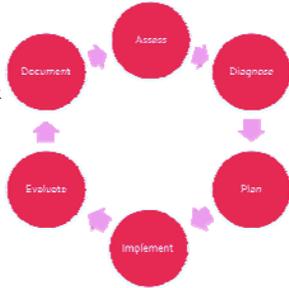


Algorithms



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

- Dentofoms
- Manikins
- Sim Labs
- Examples?





High fidelity Simulation



Human Patient Simulation for Teaching Medical Emergencies in the Dental Office
<https://www.mededportal.org/publication/8259>



What is the ultimate simulation?



Debriefing

Military background
Must for simulated learning
Transformative learning

Examples?



Role-playing



Role-playing

Pre-clinic
Nutritional counseling
Consider video-taping
Motivational Interviewing

Examples?



Web 2.0 Technology



Games



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 Analysis

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



Presentations/Posters



Mapping

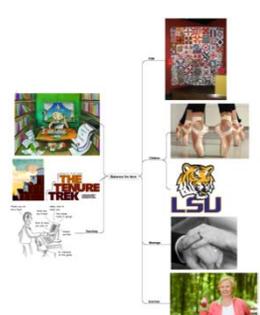


A profile of a human head with a glowing brain, and a smaller image of a brain with a yellow spot.

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
- https://en.wikipedia.org/wiki/List_of_concept-_and_mind-mapping_software

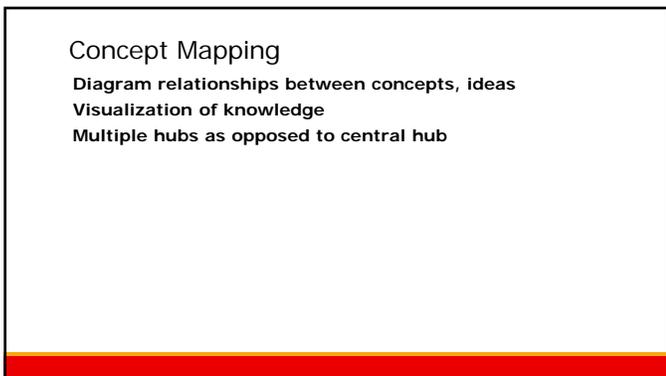


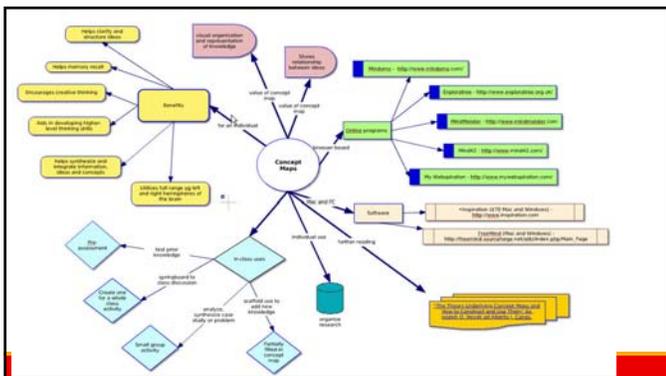
A mind map diagram with a central hub and several branches containing images.



Concept Mapping

Diagram relationships between concepts, ideas
Visualization of knowledge
Multiple hubs as opposed to central hub





Chunking



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

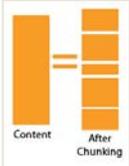
George Miller 1956



Chunking

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

Turn Bits to Chunks



http://thelearningcoach.com/elearning_design/chunking-information/

E-Portfolios



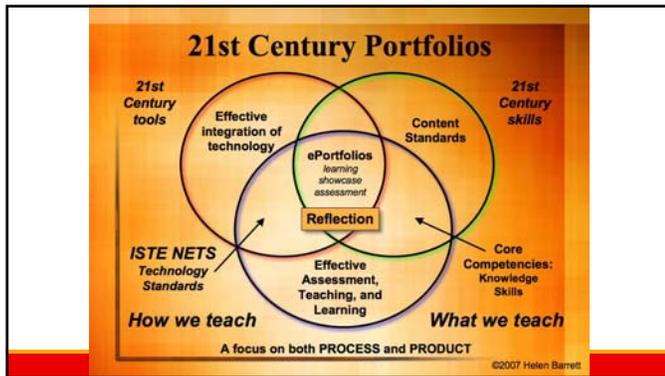

What is an E-Portfolio?

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



Portfolios and CT

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)

"We do not learn from experience...we learn from reflecting on experience."
—John Dewey

"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. They want to do what they believe is the right thing, but their actual knowledge of the definitional and application theories about CT is still in the early stages of development. **Regular and targeted faculty development opportunities are needed.**

Beistel, K.S. and Palmer, L.B., (2014) Exploration of critical thinking in dental hygiene education. *Journal of Dental Hygiene*, Dec 88(6), 394-402

Faculty 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?

Romberg, E. (1984) A factor analysis of students' ratings of clinical teaching. *Journal of Dental Education*, 48(5): 258-262.
Chambers, D.W., Geisberger, M., Leknius C. (2004) Association amongst factors thought to be important by instructors in dental education and perceived effectiveness of these instructors by students. *European Journal of Dental Education*, 8:147-5.

Literature 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
- Explains and uses visual aids for dental terms
- Describes visual examples
- Provides opportunities for discussion, clarification, and review

Davis, B.G. (1993) *Tools for Teaching*. Jossey-Bass: San Francisco, 1993.
Fell, P.H., Guenzel P.J., Knight, G.W. and Geistfeld, J. (1994) Designing preclinical instruction for psychomotor skills (I)—theoretical considerations of motor skill performance and their applications to dental education. *Journal of Dental Education*, 58(11): 806-812.

What students need Role-Modeled in Clinic

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



Ettinger, E. R. (1991). Role modeling for clinical educators. *Journal of Optometric Education*, 16, 60-62

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



Irby D. How Attending Physicians Make Instructional Decisions When Conducting Teaching Rounds. *Academic Medicine*. 67:10, 630-638, 1992.

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

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**.

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"

Step 4 Reinforce what student did correctly

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 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

Questions?
Comments?





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