

The purpose of this guide is to assist facilitators in becoming more familiar with the educational foundation of case-based instruction, introduces UA COM eTools for facilitating teaching and learning, and offers scholarly resources for further inquiry.

Facilitator's Guide to CBI

Medical problem-solving in
Case-based Instruction

Prepared by: Karen Spear Ellinwood, PhD, JD, EdS

Updated August 18, 2016

Contents

Introduction	1
The Clinical Reasoning Course	1
CRC Educational Framework	1
A structured, reflective approach to problem-solving	1
Course Structure & Instructional Methods	3
Formative Feedback	3
About ThinkShare®	3
ThinkShare® FAQs	4
CRC Facilitator Training	5
Resources for Facilitators	5
References	6
Scholarly Resources on Reflection, Facilitation & Cognitive Error	7

Introduction

This longitudinal course consists of 3 semesters. Students receive a separate grade for each semester reported to their transcript.

This facilitator guide contains a description of the CBI curriculum goals and methods of instruction, online learning tools as well as links to scholarly articles, practical tips for facilitation, video tutorials for logging into and finding ThinkShare™, and other CBI facilitator resources.

The Clinical Reasoning Course

Paul St. John, PhD and Dr. Alice Min, MD, lead an interdisciplinary team in developing curriculum, providing support for case authoring, and facilitator instructional development. Team members are:

- [Paul St. John, PhD](#), Professor, Cellular and Molecular Medicine, Director
- [Alice Min, MD](#), Assistant Professor, Emergency Medicine, Co-Director
- [Herman Gordon](#), PhD Associate Professor, Cellular and Molecular Medicine (eTools)
- [Susan Ellis, EdS, MA](#), Program Manager, Curriculum and Assessment
- [Karen Spear-Ellinwood, PhD, JD, EdS](#) Director, Faculty Instructional Development
- [Sonia de Leon](#), BA, Manager, Preclinical Curriculum
- [Amber Hansen](#), Senior Program Coordinator, Year 1
- [Jennifer Cogan](#), Program Coordinator, Year 2

If you have questions or suggestions, please view the resources and CRC Guides on the website, or contact the course directors.

CRC Educational Framework

The UA College of Medicine emphasizes the importance of engaging in reflection on an ongoing basis to promote the cultivation of reflection in future professional practice. The UA College of Medicine utilizes a structured approach to medical problem-solving in case based instruction to assist students in:

- Developing medical problem-solving skills
- Developing Interpersonal & communication skills
- Engaging in practice-based learning & improvement
- Practicing and building on science concepts and medical knowledge.

Related Resource

- ➡ [CRC Guide: CRC Goals](#)

A structured, reflective approach to problem-solving

The CRC aims to promote reflective teaching and learning by focusing attention and deliberation *in* and *on* the decision making processes, something all professionals are required to do in order to engage in reflective practice (Schön, [1983](#)). Reflective practice, at best, involves reflection at three critical junctures in decision-making: preparation or planning, engagement in activity, and after making and implementing a decision (Plack and Santasier, [2005](#)). This is to ensure that the decision is well-considered and based on evidence and that the person making the decision examines for error and learns from his or her mistakes.

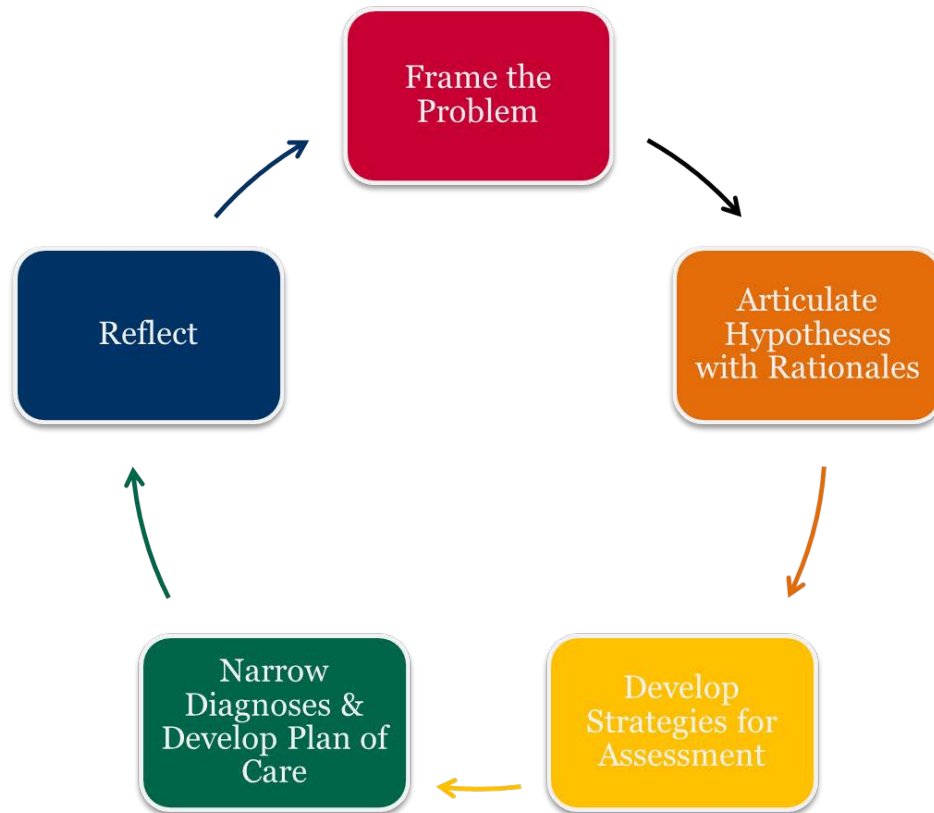


Figure 1. Structured approach to medical problem-solving

To achieve CR course goals, students learn a structured approach to medical problem solving that emphasizes the processes involved and questions that must be asked to resolve each case. This approach is modeled on the scientific method and inspired by the considerations essential to evidence-based decision making. The 5-step medical problem-solving structure we use in CBI (Figure, above) emerged from the pedagogy that underlies the developmental curriculum at the UA College of Medicine.

Each "step" focuses on the process of generating a desired outcome. For example, when students formulate hypotheses and articulate their reasoning for each, they are generating a list of provisional diagnoses. We emphasize process by naming the step for how students will engage in producing that outcome, and not by the outcome itself. But however you would name these steps, by the time students' work through a case they will have engaged in the kind of thinking and critical reflection highlighted by each step.

The purpose of using such a structure is to scaffold students' internalization of a systematic approach to clinical reasoning, much like using the mnemonic VINDICATES does to ensure medical students consider the various systems in developing provisional diagnoses. As students' progress in the curriculum, they will need less scaffolding and greater challenges. CBI instructional methods are designed to reflect increasing challenge with the appropriate tools for meeting those challenges across the curriculum.

For a discussion by clinicians of the concept of reflection and critical thinking in clinical reasoning processes, please see the books, *How Doctors Think* by Jerome Groopman, and *How Doctors Think: Clinical Judgment and the Practice of Medicine*, by Kathryn Montgomery. Click here to view additional practical and scholarly resources.

Related Resource

➡ [CRC Guide: 5-Step Structured Approach](#)

Course Structure & Instructional Methods

The CRC relies on case-based instruction as its primary instructional method. There are large group sessions as well that address how to give constructive feedback to peers, the 5-step structured approach to medical problem solving, and other issues related to the course goals. All of these sessions are interactive; some of them are conducted using team learning methods.

All students engage in small group facilitated discussions about cases as well as use the web based social networking tool, ThinkShare®, to prepare for facilitated sessions. ThinkShare® is designed to promote reflection in and on students' decision making process as they work through each case (see, Schön, 1983). This tool provides scaffolding for first year students by making the structure for problem-solving visible, reminding students what type of thinking is involved at each phase of the medical problem solving process, where they are in that process, what to consider, and the importance of consulting the ideas of others to advance one's own thinking.

The online tool also allows students and facilitators to view all student work before the facilitated session. Facilitators have reported that this helps them to prepare for the session, identify possible errors or issues for discussion, as well as involve less vocal students during discussions. Students' thinking is shared with peers and facilitators. Facilitators are encouraged to review student pre- and post-case reflections to extract guidance for future medical problem-solving and offer the benefit of an experienced perspective. Below are brief descriptions of these e-tools.

First year students participate in 2 small group sessions for the first half of the first semester. The case content correlates with scientific concepts and medical knowledge in the Foundations Block. From the second half of the first semester through to the end of the 3-semester course, students will participate in one small group session per case and work through most of the case online using ThinkShare®.

Related Resource

➞ [CRC Guide: Course Orientation](#)

Formative Feedback

Formative feedback is required. Each semester, facilitators hold 2 meetings with each student, one-on-one. Students complete a self-assessment using the same rubric that facilitators will use to grade their performance in the course. They will upload it to ArizonaMed so facilitators can review it before the meeting. This will help students and facilitators to determine whether they have the same sense of the student's work and progress in the course, identify areas in need of improvement and strategies to help them improve. The self-assessment process serves the concomitant purpose of familiarizing the students with the assessment rubric in a hands-on manner.

Related Resource

➞ [Assessment Rubric](#)

About ThinkShare®

ThinkShare® was designed to encourage students to think metacognitively about the cases before attending and following a facilitated session with peers. ThinkShare® is a web-based social networking tool developed under an award from the NSF (DUE-0942277), entitled "Social Networking to Support Scientific Problem Solving" for use in a UA course called The Art of Scientific Discovery (Principal Investigator, [Herman Gordon, PhD](#)). ThinkShare® has been adapted for use in medical problem-solving for case-based instruction (CBI).

ThinkShare® is based upon the 5-step structure for problem-solving described above, which is adapted from Polya: 1) Frame the problem; 2) Formulate hypotheses with rationales; 3) Develop strategies for assessment; 4) Narrow diagnoses and generate a plan; and 5) Reflect. We view this as an iterative process, encouraging students to apply what they have learned about the process, the case and their problem-solving skills to future cases.

One advantage of ThinkShare® is that it makes this problem-solving process a visible structure, reminding students of what they ought to be considering at each juncture and to continually review and revise their thinking as well as to consult the thinking of peers.

As with every step in ThinkShare® students may view peer entries only after contributing an entry. In addition, as students work through a case in ThinkShare®, for example, they receive releases of new information after entering a response to Step 2 and again after submitting an entry for Step 3. After each release, students are asked to reconsider whether the new information alters their approach or offers new rationales for including or excluding particular provisional diagnoses.

Facilitators review all student entries in their group before the session, which assists them in preparing more strategically for discussion. While CBI ThinkShare™ can help to organize thinking and stimulate peer consultation; it does not replace group discussion.

ThinkShare® FAQs

➡ How is case information released to students in ThinkShare®?

Students receive initial information about the patient's chief complaint and part of the history of the present illness. After a student submits their ideas for how to "frame the problem" (Step 1) and formulates some hypotheses and articulates their reasoning for including these, they receive additional information (usually, the remainder of the patient's history).

Students then update their hypotheses based upon this new information, indicate what they anticipate seeing on a physical examination of this patient, and provide reasons for any changes to their working differential. They also identify what else they need to know and what diagnostic tests they would like to perform in order to differentiate from among these hypotheses.

Once they enter that information (Step 3), they receive new information – the findings on the physical exam. They repeat the process of beginning to narrow the differential, provide reasoning, and pose questions.

They are told that the final release of information will be provided in the small group session. They are encouraged to ask for it and provide an appropriate rationale. Facilitators use their judgment as to when to release the final information based upon student knowledge and ability.

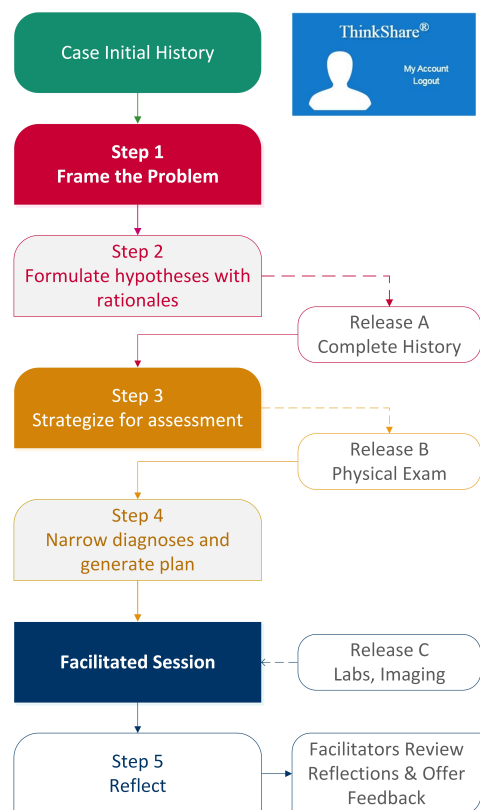
➡ Can students revise their answers?

Students may revise any entry they submit for any step in the process.

After making a revision, only the latest version of a student's entry is visible to his or her peers, but each student may view his or her prior versions of any entry.

➡ How far do students work through the case before coming to the session?

In Year 1, during the first half of the semester (in 2-session cases), students work through the first 3 steps before participating in the first session early in the week (usually Tuesdays). They identify what else they need to learn or know in



order to resolve the case. Each student is responsible to learn that information and bring it with them to the next session (usually Fridays). They do not have to submit what they learn in between sessions in the ThinkShare tool.

From the second half of the first semester through to the last semester, in single-session cases, students work through Step 4 (Narrowing the Diagnoses and Generating a Plan) before coming to the single session.

⇒ Can students see other students' work? Can they comment on it?

Whenever students submit an entry on any step, peer work becomes visible in their online space. They may review what others think and they may comment on peer entries (comments are public).

Unlike facilitators, students do not have access to see prior versions of peer work. They will only see the latest version each student has posted.

⇒ Can facilitators comment? What about sub-facilitators?

Yes! Regular and substitute facilitators may use the comment button. The default for facilitator comments is "private". This button must be unchecked in order to make the comment visible to other students in that group.

However, even private comments to students are visible to all of the facilitators for the group, including the sub-facilitator. This is to ensure communication among all those who facilitate the group to aid in assessing students and providing formative feedback.

Related Resources

- ⇒ [ThinkShare® Guide](#) for more information.
- ⇒ [About ThinkShare](#)
- ⇒ [ThinkShare®](#)
- ⇒ Questions about ThinkShare®, please contact [Herman Gordon, PhD](#)

CRC Facilitator Training

Per the University of Arizona College of Medicine instructional development policy, all faculty who engage in specialized instruction, such as case-based instruction, are required to participate in training.

The CRC facilitator training addresses three components:

- 1) CRC educational framework and case-based instructional methods;
- 2) Orientation to using [ThinkShare® technology](#); and
- 3) Discussion and practice application of the developmental assessment rubric.

Resources for Facilitators

- ⇒ [Course Orientation](#)
- ⇒ [Course Goals](#)
- ⇒ [Student Behaviors](#)
- ⇒ [Case/Session Guide](#)
- ⇒ [5-Step Guide](#)
- ⇒ [Medical Problem Solving](#)
- ⇒ [Online Tool](#)
- ⇒ [About ThinkShare®](#)
- ⇒ [ThinkShare® Guide](#)
- ⇒ [CBI Research](#)
- ⇒ [Facilitator Training](#)

References

Plack, M.M. & Santasier, L.G. (2005). The Reflective Practitioner: Reaching for Excellence in Practice. Commentary, In *Pediatrics*, pp. 1545-1553, accessed at <http://pediatrics.aappublications.org/content/116/6/1546.full.html>.

Schön, D. (1983). The reflective practitioner: How professionals think in action. NY:Basic Books. [[Access at Google Books](#)]

Scholarly Resources on Reflection, Facilitation & Cognitive Error

- ➔ [Encouraging students to examine for cognitive error](#)
- ➔ [An Overview of Cognitive Error Types](#)
- ➔ [\[Saber Tehrani, et al., BMJ Quality and Safety Online First, Apr 2013\]](#)
- ➔ [Socratic question guide](#)
- ➔ [Evidence-based decision making](#)
- ➔ [Facilitation Tips](#)
- ➔ [References on cognitive error](#)
- ➔ Saber Tehrani, et al. An analysis of diagnostic error - 25-Year summary of US malpractice claims for diagnostic errors 1986–2010: An analysis from the National Practitioner Data Bank. BMJ Quality and Safety Online First, Apr [2013](#).
- ➔ Balla J, Heneghan C, Goyder C & Thompson M. Identifying early warning signs for diagnostic errors in primary care: A qualitative study. BMJ Open, 2(5); [2012](#).
- ➔ [The importance of science for physicians \(SCIENCE VOL 329 24 SEPTEMBER 2010\)](#)