In Case-based Collaborative Learning (CBCL), students and facilitators share responsibility in exploring, uncovering, and applying knowledge in order to create in-depth and lasting understanding of complex concepts and organizing principles. Through guided inquiry, creative problem solving, and advanced preparation, students assume active responsibility for their own intellectual development.

The packet presented here is the result of scholarly and real-time classroom exploration of effective CBCL facilitation behaviors by the HMS Academy’s Peer Observation of Teaching Interest Group. Our aim in developing the observation worksheet and accompanying compendium was to identify and define the principles and behaviors needed to lead a successful CBCL session, thereby establishing a shared understanding of this student-centered, collaborative pedagogic approach.

The Peer Observation Worksheet outlines 7 categories of effective CBCL facilitation strategies, each supported by demonstrable examples of these behaviors. On the second page of the worksheet, we have included 8 elements of effective instruction that should form the basis of any instructional session. The Compendium further identifies and defines for the CBCL facilitator and the peer observer the varied, demonstrable behaviors associated with each category. We have included a comprehensive listing for each category as individual facilitators may demonstrate any combination of behaviors. In addition, we have tried to distinguish elements that fall under the course director’s responsibility for overall content and organization from behaviors associated with a particular faculty member’s management of a session.

Having studied Case-based Collaborative Learning over a two-year period, the crucial element our interest group identified as essential to running a successful CBCL session is for the course director and faculty to establish a safe learning environment – one in which students are encouraged to reveal their thought processes and feel comfortable with taking intellectual risks and openly expressing what they know and don’t know. Without such an environment any student self-directed exploration, collaborative problem solving, or expression of curiosity will be hindered.
# Peer Observation Worksheet of Case-Based Collaborative Learning

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<tr>
<th>Category/Behavior</th>
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<td>• Team learning; Near-peer teaching</td>
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<td>• Learner calibration (a.k.a. self-graded mini-quiz)</td>
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### Elements of Effective Instruction

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<td>B. Clearly states learning objectives and plans for in-class time, making organization of session transparent to students</td>
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<td>C. Effectively manages time to address learning objectives</td>
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<td>D. Demonstrates enthusiasm about topic and promotes student engagement</td>
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<td>E. Uses effective strategies to manage group dynamics</td>
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<td>F. Is available to students during classroom activities; conducts in-class formative assessment to ensure students are making appropriate progress and provides immediate feedback</td>
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<td>G. Highlights main teaching points or asks students to summarize or put main points in own words</td>
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<td>H. Provides closure to the session (e.g. leaves time at end of session for final reflections or questions, informs students about upcoming sessions, or notes office hours or extra help)</td>
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<td>I. Other observations:</td>
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We have included a comprehensive listing of behaviors associated with each category. A facilitator may demonstrate any combination of these behaviors.

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- Starts session by asking students which parts of the pre-assignment they found most challenging or need further clarification. Alternatively, students form groups and discuss what they found most challenging about completing the assignment. Students clarify confusing concepts or teach each other how they arrived at answers.
- Starts the class with a “Think, Write, Share.” Instructor poses a problem or case to the class; students are then given time to write or map their ideas, after which they are asked to share their reflections in small groups or with the whole class.
- Assessment Types
  - Knowledge readiness quiz -- A mini-quiz of selected questions administered at the start of class and collected to evaluate individual pre-class learning
  - Mini-needs assessment -- An assessment of the entire class’ understanding of pre-class learning. Usually conducted verbally at beginning of class; may be performed using an audience response system.
  - Student self-assessment -- Students are asked to complete a questionnaire to evaluate their own understanding of the pre-class material and identify gaps in their knowledge
### Category/Behavior

#### 2. Prompts deeper learning by using one or more of the following active learning strategies:

- Uses higher-order questioning or asks questions such as “Why?” “What if?” or “How does this happen? Why?” to further students’ understanding and critical thinking
- Asks students to clarify, elaborate further, make connections, or reason through their responses
- Alters case or question to see if students can apply their knowledge to different situations
- Challenges students’ existing ways of thinking or points out exceptions to the rule
- Asks students to dive deeper into material by discovering patterns, making hypotheses, or building conceptual frameworks.
- Encourages student to apply conceptual frameworks and newly-learned concepts to novel situations, patient cases, and authentic problems.
- Rather than leading students to a single “correct” answer, uses questions to promote active learning and stimulate critical thinking about a topic. As an example, the instructor avoids responding to answers with comments such as “that’s correct” or “that’s wrong,” but probes the students so that he/she can clarify or elaborate upon his/her thinking: “You’re on to something. Tell us all how you got there. What if I changed the scenario slightly to... then what?”
- If the class doesn’t answer a question the instructor poses, he/she will wait and then ask the class to identify what is most confusing about the question.
- Uses questions to stimulate active engagement and discussion by having students build upon their classmates’ answers, suggest counterpoints, or ask related questions.

Examples of questions that promote deeper learning include:

- “Why?”
- “What if?”
- “How and why does this happen?”
- “Can you tell me more about that?”
- “Can you walk me through your thought process?”
- “Why did you choose b over c?”
- “Consider a patient with x instead of y. How would you think about it then?”
- “What do these cases have in common?”
- “How does this case differ from the previous one?”
- “How does this case relate to those we discussed last session?”
Professor Chris Christiansen’s Typology of Questions*

• Open-ended: What are your reactions…? What aspects were of greatest interest to you…? Where should we begin…?

• Diagnostic: What is your analysis of the problem? What conclusions did you draw from the data?

• Information seeking: What is…?

• Challenge (testing) questions: Why do you believe that? What evidence supports your conclusion? What arguments might be developed to counter that point of view?

• Action questions: What needs to be done to…?

• Questions on priority and sequence: Given X… what is the first step to be taken? The second? Third?

• Prediction questions: If your conclusions are correct, what might be the reaction…?

• Hypothetical questions: What would have happened if…?

• Questions of extension: What are the implications of your conclusions…?

• Questions of generalization: Based on your study, what do you consider to be the major…?

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- Repeats student question to the rest of the class. This is done to:
  - validate the importance of the question
  - clarify the question
  - build on the question

- Purposefully holds off on answering question – “Let’s hold on that and see how your question plays into the next part of our discussion.”

- Explores student’s thought process before answering:
  - That’s very interesting. Can you take that thought a step further? Or step back?
  - What are the factors that led you to that conclusion?
  - How does your answer relate to the framework up on the board?

- Asks students to respond to each other:
  - Sarah, why do you think Peter chose that response? Do you agree?
  - What might be another answer?
  - Who can elaborate further?

- Relates student’s question back to the conceptual framework or core concept
  - I’m glad you raised that as it relates back to …
  - How does Joe’s question relate to our discussion of …?

- Uses student’s question as a means to assess the level of understanding of the class:
  - Who else has a question about …?
  - Before I answer that, let’s review …
  - Mary, please explain how you arrived at that conclusion.

- Admits own uncertainty/knowledge limit
  - I don’t know, let’s think that through together.
  - This is a difficult area for most people, but let’s consider what we do know.

- When reviewing multiple choice answers, discusses correct and incorrect responses to clarify errors in students’ understanding and reasoning.

- Collects multiple answers to a question before revealing correct response.

- Calls attention to how the student’s thinking about a particular problem can be applied to other scenarios.
4. Use a variety of learner-centered activities to engage students in the application, transfer, or generation of knowledge and core concepts.

Examples:
- Open-ended questions
- “Warm” calls
- “Think-Pair-Share” or “Write-Pair-Share” activities
- Team learning
- Near-peer teaching
- Mini-quiz

- Open-ended questions, such as:
  - How? Why? What?
  - What else can you tell me about …?
  - What do you think about …?
  - How would you explain …?
  - Can you give me an example?
  - Can you describe how that would …?

- Warm call
  - Provides students the opportunity to sign-up ahead of time to be called upon in class without raising their hands
  - Students who volunteer to be called on may be incentivized with extra credit
  - Students who choose not to sign up may still explicitly indicate a willingness to answer a question

- Think-Pair-Share or Write-Pair-Share
  - Instructor poses a question that students must consider alone or write about, and then discuss with a partner before settling on a final answer to be shared with the rest of the class.

- Audience Response
  - Using either smartphone devices (high tech) or show of hands in front of chest (low tech)
  - Asks students to form buzz groups first and then vote
  - Uses a Google Doc Form in order to collect answers to discuss later in session

- Team Learning
  - Involves small groups of students working collaboratively to solve problems and practice applying concepts
  - Students learn from each other as they work together on activities that require shared decision making and articulation of complex concepts
  - Exercises that encourage higher-order thinking, application and practice
• Near-Peer Teaching
  o Time designated for students to teach each other and help fellow students get past confusion
  o Instruction is provided by students who have just recently grasped the material themselves
  o In small groups or pairs, students take a low-stake assessment (quiz) and then share and discuss answers with each other
  o Time in class for notes sharing or prep work sharing
  o When feeling “stumped” by a question posed by instructor, student can “call a friend”

• Instructor gives low-stakes, cumulative assessment of prior sessions to engage students in spaced and accumulated learning

• Students author test questions (and answers) that they pose to other class members.

• Students engage in a physical activity – e.g. demonstrate physiological reaction, feel for pulse, etc.
5. Conducts frequent, “non-graded” assessment of students’ understanding to allow for immediate feedback and inform real-time instruction. Examples:
   - Audience response polls
   - Group quiz
   - Partnering with student
   - “Assessment while walking around”

- Assessment while walking around --
  - While students are engaged in small group work, instructor identifies learning gaps and provides just-in-time teaching
- Audience Response Polls
  - Uses mobile phones or the internet to collect students’ answers or feedback in real-time
- Group Quiz
  - Small groups of students work together to answer questions on a short quiz
- Partnering with a student
  - Instructor sits next to a student in class and actively guides student while he/she answers a question or assesses a situation
- Instructor stresses to students that he/she is interested in seeing how they got to an answer rather than the answer itself. “Show your work.”
- After determining students have achieved appropriate level of understanding, instructor delivers a new challenge to advance students’ understanding of topic – new mini-case to discuss or higher order question to answer.
6. **When co-teaching with other faculty, does so in a coordinated and collaborative manner.** Examples:
   - Lends insights from own specialty and experience
   - Builds upon other faculty’s responses as if having a conversation
   - Provides support to students when not taking the lead in a discussion or activity

- Faculty members model how to respond to an open-ended question or undifferentiated patient case.
- Faculty offer diverse, but equally relevant answers, to a case.
- Faculty question each other to unveil underlying thought processes.
- Faculty demonstrate interconnectivity among multiple specialities and how to think together as a healthcare team.
- Faculty members each lead a team of students in friendly, in-class competition.
- The faculty member who is not currently taking the lead walks around the class, partners with the student, or physically joins the students in the “audience.”
7. **Blends facilitated instruction with student self-directed learning**
   (e.g. promotes exploration, analysis, and/or evaluation of topic; prompts students to find solutions to unanswered questions or steers them in right direction)

- Sequences learning so that activities increase in complexity.
- Provides guidance and support as students work through a problem together -- does not jump in with the “right” answer.
- Allows class time to explore a new or novel question raised by students.
- Provides students with opportunities to explore new or complex concepts using a variety of approaches that address a range of learning preferences – e.g. active engagement and discussion, reading, writing, reflection, chunking knowledge vs presenting entire framework, working through cases, demonstrations, or observations.
- Demonstrates patience if a student seems confused; allows time for student to think through issues and acquire own understanding.
- Gives student-groups time and space to plan, think, and do.
- Suggests areas of further study or questions students should answer on their own.
- Ends session with a synopsis of key concepts, provided either by students (preferably) or instructor.
- Has students identify their own understanding and areas of confusion about in-class work before handing it in to instructor.
- Maintains a “parking lot” of important unanswered questions; highlights these at the end of class and encourages students to pursue answers.
Bibliography for CBCL Worksheet Compendium


Monahan N. Keeping introverts in mind in your active learning class. Faculty Focus. 2014. Available online www.facultyfocus.com


Prober CG, Kahn S. Medical education reimagined: A call to action. Acad Med. 2013;88-


