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Choose Your Own Adventure: Leading Effective Case-Based Learning Sessions Using Evidence-Based Strategies

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Abstract

Introduction: Learning how to lead engaging teaching sessions is critical for faculty development and for optimizing teaching opportunities. We developed an interactive workshop to provide an evidence-based framework for designing and facilitating case-based discussions. **Methods:** This workshop was designed as a 150-minute large-group session, though a 90-minute session is possible. Six to 10 students per facilitated group is optimal. Faculty training requires approximately 30 minutes prior to the session. Associated materials include guidelines to prepare faculty facilitators and participants for the large-group discussion and small-group practice sessions with role-plays. Also included are two prompting cases, a template for designing a large- or small-group session, a form to guide constructive feedback in the role-plays, and an evaluation form. **Results:** This workshop was accepted for presentation at two national conferences in 2016: the Pediatric Academic Societies Meeting (PAS) and the Pediatric Hospital Medicine Conference (PHM). Average responses to "Workshop was a valuable use of my time" were 4.93 out of 5 (PAS) and 4.45 out of 5 (PHM). Average responses to "I learned information I can apply at my home institution" were 4.93 out of 5 (PAS) and 4.80 out of 5 (PHM). **Discussion:** This large- and small-group teaching module has been incorporated into multiple pediatric residency programs and rated as highly effective by learners. Learning how to develop engaging, objective-focused group teaching sessions is an essential skill that residents, chief residents, fellows, and faculty must master to make the most of teaching opportunities.

Keywords

Workshop, Adult Learning Theory, Faculty Development, Teaching Rounds, Case-Based Learning, Clinical Reasoning, Resident as Teacher, Noon Conference

Educational Objectives

By the end of this module, learners will be able to:

1. Tailor case-based discussions to address varying learning preferences.
2. Apply evidence-based techniques to facilitate case-based group discussions.
3. Effectively use questioning techniques to promote clinical reasoning during a case-based discussion.

Introduction

Medical education commonly employs case-based learning (CBL) as a pedagogical method. The literature suggests that teachers enjoy CBL, and students believe it improves both learning and retention through the "application of knowledge to clinical cases . . . enhancing the relevance of their learning and promoting their understanding of concepts."[1] In practice, however, CBL conferences such as morning reports and noon conferences frequently depend on didactic routines linked to historical educational formats that often do not incorporate evidence-based teaching methods. Therefore, we developed a practical, interactive workshop to provide an evidence-based framework for designing and facilitating case-based

Appendices

A. Choose Your Own Adventure Template.pptx
B. Facilitation Tips.doc
C. CYOA Tempate Role-Play Example.docx
D. Case 1 First Page Only .docx
E. Case 2 First Page Only .docx
F. Feedback Instrument.docx
G. Workshop Evaluation Form .doc
H. Case 1 With Stop Points .docx
I. Case 2 With Stop Points .docx
J. Clinical Reasoning Theoretical Concepts.docx
K. References.docx
L. 90-Minute Format.doc
M. 150-Minute Format.doc
N. Resource A-Introductory PowerPoint.pptx
O. Resource B-Introductory PowerPoint With Theoretical Concept_Slides .pptx

All appendices are peer reviewed as integral parts of the Original Publication.

discussions in both small- and large-group settings.

As part of the workshop development process, a literature review revealed that a foundational framework for CBL does not exist. Subsequently, we reviewed key educational theories and clinical reasoning teaching principles to help inform the development of our model, the Choose Your Own Adventure (CYOA) template. During the literature review process, we identified both cognitive constructs (adult learning theory, information process model, cognitive load, illness scripts, and dual process)[2-6] and noncognitive constructs (distributed cognition, situated learning, learning preferences, and control value theory).[7-9]

The workshop's educational approach combines short didactic and facilitated instructional sessions, self-reflection, interactive discussions, and CBL facilitation exercises. Additionally, we developed a novel feedback instrument to promote real-time feedback for facilitators. A multi-institutional group of pediatric educators presented this workshop at the 2016 Pediatric Academic Societies (PAS) Meeting and the 2016 Pediatric Hospital Medicine (PHM) Conference. The suggested target audience for this resource includes residents, chief residents, fellows, and faculty interested in developing their case-based facilitation skills.

Methods

The workshop focuses on maximal interaction with limited didactic portions in order to encourage active engagement and peer collaboration. First, we provide a brief, evidence-based overview of CBL strategies and then engage workshop participants in immersive, hands-on CBL facilitation exercises in small groups. We have facilitated the workshop with a diverse group of pediatricians at two national conferences; participants comprised generalists, subspecialists, and junior and senior faculty, as well as medical students, residents, and chief residents.

It is recommended that workshop coleaders meet at least once prior to the workshop to delineate roles and establish a shared understanding of how each can facilitate discussions in small groups. We suggest planning to have at least one facilitator per six to 10 participants.

The workshop requires the following equipment:

- Laptop/desktop computer with projector and screen.
- One easel or whiteboard, with markers, for each small group/table.
- Workshop packet for each participant in a two-sleeve folder. See below for folder organization.

The left side of the folder should include the following handouts to be used during the workshop:

- One sheet blank/scratch paper.
- CYOA template (Appendix A).
- Facilitation tips handout (Appendix B).
- CYOA template role-play example (Appendix C).
- Clinical Case 1 (Meckel's): first page only (Appendix D).
- Clinical Case 2 (Kawasaki): first page only (Appendix E).
- Facilitator feedback instrument (Appendix F).
- Workshop evaluation form (Appendix G).

The right side of the folder should include the following handouts to be used by participants after the workshop:

- Clinical Case 1 (Meckel's): alternative formats for each case (Appendix H).

- Clinical Case 2 (Kawasaki): alternative formats for each case (Appendix I).
- Clinical reasoning theoretical concepts handout (Appendix J).
- Bibliography (Appendix K).

Room Setup

Arrange tables in a room to accommodate six to 10 participants at each table, with a whiteboard or easel available to every table. Tables should have a minimum of six participants in order to fill all roles in the small-group activities. One folder should be placed at each seat. The time lines for both the 90- and 150-minute workshops are included (Appendices L & M, respectively); however, users can modify each depending on the number of participants and available time. Time permitting, we suggest the 150-minute format to allow for an additional small-group activity.

Workshop Outline

- A. Introduction and objectives: 15 minutes.
  - All facilitators introduce themselves.
  - One facilitator reviews the workshop learning objectives and outline using the Resource A-Introductory Powerpoint presentation (Appendix N) for the 90-minute format or the Resource B-Introductory PowerPoint With Theoretical Concept Slides presentation (Appendix O) for the 150-minute format.
  - A second facilitator moderates a brief large-group discussion focused on participants' prior experiences with case conferences, asking, "What do you find particularly effective or ineffective about how case conferences are conducted at your institution?"
  - Interactive didactic using the PowerPoint presentation in Appendix O presents the core concepts of clinical reasoning (for the 150-minute format). Appendix N should be used for the 90-minute format, and the facilitators should reference the clinical reasoning theoretical concepts handout and reference list (Appendices J & K, respectively).
- B. Review facilitation tools and allow brief practice: 25 minutes.
  - Explain the facilitation tips handout and the CYOA handout (Appendices A & B, respectively), allowing enough time for participants to review both documents.
  - Two facilitators role-play the development of a case conference using the case of a 2-year-old with stridor (Appendix C).
  - Have each participant use the CYOA handout to choose one to two learning objectives and select an engagement activity using the case of a 6-year-old with acute onset limp or a different case, as the facilitators see fit. The facilitator from each table should ask two to three participants to share their approach.
- C. Small-Group Activity 1: 35 minutes (omit this activity and skip to Small-Group Activity 2 if using the 90-minute time line).
  - One facilitator explains Small-Group Activity 1 (see below).
  - Participants read Case 1 (Meckel's case; Appendix D).
  - Participants work in pairs using the CYOA handout (Appendix A) to plan an approach to presenting Case 1, including choosing a hook, learning objectives, and engagement activity.
  - Facilitator engages pairs to share their strategies for the case at their tables.
  - Large-group report-out: The large-group facilitator asks two to three pairs from the small groups to share their approach with the entire group, highlighting the multiple ways of presenting the same clinical case. Announce the concrete examples in the folder that demonstrate further examples of how to approach the case examples (Appendices H & I, respectively).
- D. Small-Group Activity 2: 50 minutes.
  - The large-group facilitator explains Small-Group Activity 2 and introduces the feedback instrument (Appendix F).
  - Participants read Case 2 (Kawasaki disease case; Appendix E).

- Participants work in pairs to use the CYOA handout (Appendix A) to plan a CBL approach, again choosing a hook, learning objectives, and an engagement activity for presenting this case.
- Pairs report their approaches within their small groups, and then, with the guidance of the facilitator, each small group collectively selects one approach to use for this case.
- Two volunteers serve as CBL presenters to trial the strategies decided upon by the small group.
- These two presenters rotate to an adjacent table with one additional participant (feedback volunteer).
- The two presenters use the approach chosen to present a mock case conference using the whiteboard/easel with the help of phrases and techniques described in the facilitation tips handout (Appendix B). Allow no more than 20 minutes, and encourage presenters to skip or condense parts of the presentation as desired.
- During the case presentation, the feedback volunteer observes and takes notes, afterwards giving feedback to the two presenters using the feedback instrument (Appendix F) as a guide.
- Large-group report-out: One facilitator askes participants about their experience: What worked well? What was difficult? What were the "Aha!" moments? What will you do differently in preparing case conferences as a result of this workshop?

- E. Conclusion: 20 minutes.
  - Large-group discussion on key points and top themes, including strategies for implementation in home institutions.
  - Instruct participants to fill out the workshop evaluation form (Appendix G).

Results

The workshop was peer-reviewed and accepted for a 150-minute presentation at the 2016 PAS Meeting. Approximately 40 individuals attended the session, with a total of 27 evaluation forms returned at the conclusion of the session (response rate: 68%). The evaluation form, constructed by the workshop creators, utilized a 5-point Likert scale (1 = *strongly disagree,* 5 = *strongly agree*) to assess participant response. We also presented the workshop at the 2016 PHM Conference in a 75-minute session with a significantly larger audience *(N* = 117). Seventy-four participants returned the evaluation forms (response rate: 63%). Modifying the original workshop given time constraints, this session included only one practice case during the small-group sessions. The data gathered from the evaluations returned at both the PAS Meeting and PHM Conference workshops are shown in the Table.

Table. Workshop Evaluation Scores by Session

	Average Score[a]	
Statement	**PAS Meeting (*N* = 27)**	**PHM Conference (*N* = 74)**
Workshop met objectives.	4.93	4.3
Workshop was a valuable use of my time.	4.96	4.45
Handouts and resources were useful.	4.88	4.67
I learned information I can apply at my home institution.	4.93	4.8

Abbreviations: PAS, Pediatric Academic Societies; PHM, Pediatric Hospital Medicine.
[a]5-point Likert scale (1 = *strongly disagree,* 5 = *strongly agree*).

Several open-ended questions at the end of the evaluation form asked participants to provide specific examples of strategies or opportunities for change in regard to their approach to case conferences. General themes included learning strategies for preplanning case conferences (i.e., setting clear objectives and goals for the session), focusing on nontraditional objectives for more common cases (i.e., economics, high-value care, ethics), keeping case conferences simple and focused, expanding engagement activities, and using feedback forms for case conference leaders.

Specific examples highlighting these reported changes in behavior after participation in the workshop

included the following:

- "Make sure to state objectives at start."
- "Have facilitators state why they are choosing a given case (aka hook), and not always work through a case from start to finish."
- "Focus on different learning objectives and not just on content or knowledge based ones."
- "Use facilitation tips handout to better guide the conversations."
- "Choosing 1-2 objectives and not trying to cover too much."

Participants reported that the most valuable aspects of this workshop were the following:

- "The handouts/toolkit/CYOA template."
- "Practicing and getting feedback from others."
- "Great systematic approach to AM report."
- "Loved hearing different approaches during debriefing sessions."
- "I enjoyed how workshop facilitators modeled things prior to each activity."

Suggestions for improvement made by participants were as follows:

- "Have facilitators give clearer instructions for small group activity #1 and #2."
- "Show us how to engage uninterested learners."
- "Spend more time introducing the folder materials."
- "Provide more examples from the 'pros' on how to facilitate a session well."
- "Have a PPT slide with instructions, not just verbal instructions."

Discussion

Combining adult learning theory with immediate facilitation feedback, we designed a workshop that targeted matching both cognitive and noncognitive constructs in an approach to CBL. Despite learner and teacher preference for promoting the use of CBL in medical education, few resources exist for training facilitators in leading or guiding a case-based discussion. This toolkit, developed from these key educational concepts, allowed participants in the workshop to test and experiment with different techniques in real time, branching out from a historical approach to CBL.

We found that participants identified multiple ways to approach what they perceived as boring or standard topics through new methodologies. Intentionally, one of our sample cases was a straightforward, uncomplicated, classic case of Kawasaki disease, a presentation that would be familiar to most of the audience. Using the CYOA toolkit, participants not only planned specific learning objectives but focused on developing a hook and incorporating alternative engagement activities. This allowed for more explicit targeting of narrowly focused learning objectives beyond the traditional approach of creating a differential and also for tailoring of the experience to different levels of learners.

Additionally, we discovered that one of the strengths of our workshop is the immediate feedback for the facilitator. The just-in-time feedback instrument provides an opportunity for in-the-moment learning and growth for the facilitator; the instrument focuses on key behaviors such as communicating goals, creating engagement, developing an optimal learning environment, and encouraging participants to commit to their thought processes and next steps. Workshop participants recognized that everyone, whether a new chief resident or a seasoned attending, benefits from specific and timely input on their facilitation.

Limitations to our workshop include a significant minimum time requirement and obtaining an adequate number of trained facilitators to maximize engagement in and flow of the workshop. The two conferences where we presented our workshop had different time allotments: 150 minutes at PAS and 75 minutes at

PHM. The shorter time allotment limited our ability to obtain buy-in from attendees and made it difficult to clarify instruction within the small-group breakout sessions. Additionally, we found that a targeted ratio of facilitators to small-group participants was essential for flow within small groups, clarity of activities, and participant investment. As a result, we would recommend a minimum of 90 minutes and on average one facilitator for six to eight small-group participants.

Ultimately, the robust attendance and positive reception for our workshops demonstrated the desire for additional training in adult learning theory and advanced techniques in medical education, especially in conjunction with an easy-to-approach framework for CBL facilitation. Designed to allow replication at participants' home institutions, this workshop can have a positive impact on residents and faculty teaching skills and on the effectiveness of CBL conferences.

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Prior Presentations
The workshop materials were distributed to participants when we facilitated this workshop at the 2016 Pediatric Academic Societies Meeting and the 2016 Pediatric Hospital Medicine Conference.

Ethical Approval
Reported as not applicable.

References

1. Thistlethwaite JE, Davies D, Ekeocha S, et al. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide no. 23. *Med Teach.* 2012;34(6):e421-e444. http://dx.doi.org/10.3109/0142159X.2012.680939
2. Knowles MS. *Andragogy in Action: Applying Modern Principles of Adult Learning.* San Francisco, CA: Jossey-Bass; 1984.
3. Pauker SG, Gorry GA, Kassirer JP, Schwartz WB. Towards the simulation of clinical cognition: taking a present illness by computer. *Am J Med*. 1976;60(7):981-996. https://doi.org/10.1016/0002-9343(76)90570-2
4. van Merriënboer JJG, Sweller J. Cognitive load theory in health professional education: design principles and strategies. *Med Educ.* 2010;44(1):85-93.https://doi.org/10.1111/j.1365-2923.2009.03498.x
5. Bowen JL. Educational strategies to promote clinical diagnostic reasoning. *N Engl J Med.* 2006;355(21):2217-2225. https://doi.org/10.1056/NEJMra054782
6. Eva KW. What every teacher needs to know about clinical reasoning. *Med Educ.* 2005;39(1):98-106. https://doi.org/10.1111/j.1365-2929.2004.01972.x
7. Durning SJ, Artino AR. Situativity theory: a perspective on how participants and the environment can interact: AMEE Guide no. 52. *Med Teach.* 2011;33(3):188-199. http://dx.doi.org/10.3109/0142159X.2011.550965
8. Pashler H, McDaniel M, Rohrer D, Bjork R. Learning styles: concepts and evidence.*Psychol Sci Public Interest. 2008;9(3)*:105-119. http://dx.doi.org/10.1111/j.1539-6053.2009.01038.x
9. Artino AR, La Rochelle JS, Durning SJ. Second-year medical students' motivational beliefs, emotions, and achievement. *Med Educ.* 2010;44(12):1203-1212. https://doi.org/10.1111/j.1365-2923.2010.03712.x

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