

The Didactic Makeover: Keep it Short, Active, Relevant

Molly Rideout, MD,^a Melissa Held, MD,^b Alison Volpe Holmes, MD, MPH^c

The test of a good teacher is not how many questions he can ask his pupils that they will answer readily, but how many questions he inspires them to ask him which he finds it hard to answer.¹

Alice Wellington Rollins

Medical student education is rapidly evolving. Because students have immediate access to instant information online via high quality textbooks, research articles, lectures, and tutorials, the effectiveness of traditional lectures has come into question.²⁻⁵ This presents an opportunity for pediatricians to develop new ways to deliver content to students. Teaching physicians in many institutions are developing interactive forms of learning, with some using entirely problem-based learning formats and others adapting traditional lectures into team-based learning or case-based presentations.^{6,7} Stanford University has been a leader in this field for years and, in partnership with Khan Academy, has developed a program called Stanford Medicine Interactive Learning Initiatives, where medical school faculty can access specialized support to re-design courses and integrate interactive learning.⁸ These large-scale initiatives are transforming the way students learn and how faculty members teach.

We continue the Council on Medical Student Education in Pediatrics series about great clinical teachers providing tools to keep educational sessions short,

active, and relevant to engage students when refreshing or designing learning sessions.

KEEP IT SHORT

Retention of material varies with the length of the lesson. During learning sessions, students remember best what comes first, followed by what comes last, and retain the content presented in the middle the least.⁹ Retention also varies with teaching method, with lectures producing the least amount of retention and teaching to others producing the greatest.⁹

Small Group Learning

Small group learning has been shown to increase students' ability to apply concepts versus learn about concepts.¹⁰ As an alternative to a traditional 1-hour lecture, teachers can use the lecture's learning objectives and reformat them into topics for small group discussion. After a brief 10-minute introduction to a topic, students form small groups and discuss questions or clinical cases that have been created ahead of time. After students spend a set amount of time working through questions or cases, the facilitator elicits responses from the groups about ideas that surfaced during the discussions. Groups present their proposed answers and points of agreement or disagreement to learn together.



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^aDepartment of Pediatrics, University of Vermont College of Medicine, Burlington, Vermont; ^bDepartment of Pediatrics, University of Connecticut School of Medicine, Farmington, Connecticut; and ^cDepartment of Pediatrics, Geisel School of Medicine at Dartmouth, Hanover, New Hampshire

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Address correspondence to Molly Rideout, MD, Department of Pediatrics, University of Vermont Medical Center, MCHV Campus 265 SM5; 111 Colchester Ave, Burlington, VT 05401. E-mail: molly.rideout@uvmhealth.org

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Modified Team-based Learning

In traditional team-based learning, students read material ahead of time.¹⁰ What happens if the students are not prepared? A modified team-based learning approach can be used. Students spend 10 minutes at the first part of a session reading over material individually before dividing into small groups. Original lecture slides can be used as is or adapted for students to review during the self-learning time. After reviewing information, students answer a series of multiple choice questions individually. Subsequently, they join into small groups to review and debate answers. During small group discussions, it is helpful for the teacher to allow the learning to happen without taking center stage, but acting as a “guide on the side”.³ As students process information and teach each other, even (and especially) working through mistakes, true learning occurs.¹¹ After working through questions, groups commit to answers (on paper, scratch cards, or audience response systems if available) and share with the larger group. If time permits, groups can debate 1 or 2 clinical application questions related to the topic.

By keeping it short, with didactic learning limited to 10 minutes at a time, students are more likely to stay focused and learn by applying the material to clinical cases.

KEEP IT ACTIVE

Students have a vast array of learning styles.^{12,13} This can be beneficial for everyone; multiple people looking at the same problem in different ways may shed a clearer light on the entire picture and allow for better consolidation of learning.

Teachers need to be inclusive of different learning styles when designing educational sessions. Some key learning characteristics

TABLE 1 Tools for Interactive Teaching

Active Learning Strategies	Teaching Modalities
Keep it short	<ul style="list-style-type: none"> Small groups 10-min didactic Reformat learning objectives Prepare questions/cases Small group discussions Present back to larger group Modified team-based learning sessions Prepare fact sheet Prepare questions 10-min self-learning Answer questions individually Small groups to discuss/debate questions Present back to larger group
Keep it active	<ul style="list-style-type: none"> Hands-on learning/field trips Laboratory: slides, cultures Respiratory therapist Medication/formula taste test Real-time technology Online videos (seizures, stridor) Online photos of physical findings Look up answers online in real-time Developing clinical questions Create (or have students create) clinical questions Find primary sources to answer clinical questions Present journal articles to group
Keep it relevant	<ul style="list-style-type: none"> Real patient/parent Brief introduction, guest shares story Leave time for questions and debriefing Be mindful of time constraints Simulation Work through cases in teams High fidelity: vital signs and exam findings change Low fidelity: verbal report or role play changes Case-based format Reorganize traditional lectures Clinical scenario for each section Factual material after each case Include photos/videos

include active versus reflective and visual versus verbal.¹² A typical active learner might say, “let’s try it out and see how it works,” whereas a reflective learner might say, “let’s think it through first.” Visual learners learn best by seeing pictures, diagrams, or demonstrations, whereas verbal learners learn best by words, whether written or spoken. Most traditional lectures are geared toward reflective and verbal learners, but many learners are active and visual, which means it is challenging for them to stay engaged in traditional lectures.

Incorporating active learning into traditional presentations to include visual and active learners is relatively

easy. Hands-on experiences, such as a field trip to the laboratory to look at slides or cultures, a visit from the respiratory therapist to demonstrate oxygen delivery systems, or taste testing medications or infant formulas, can keep students engaged.

Technology used in real-time is another way to keep learning active.¹⁴ Students can pull up online videos of physical findings, such as stridor or paroxysmal cough, during presentations to their peers. Choosing a student to “find an answer” to another student’s question during the session and teach the rest of the group is also engaging; this approach connects the group to

the material and reflects the teacher's openness to questioning.

Students can investigate specific clinical questions during learning sessions by searching for journal articles individually or in small groups. Using explicit time limits, students can briefly present answers from primary sources without the expectation of a finished product. In this manner, they are exposed to the reality of having to quickly find studies to support a clinical decision.

KEEP IT RELEVANT

When clinical relevance is apparent, retention of material is likely to be higher.^{2,4} Teachers can ensure relevance by including live patients, using simulation, or developing case-based scenarios.

Sometimes, a real patient or parent is available to visit during the session. After a brief introduction, the patient or parent can provide a short report of his or her medical experience either in the hospital, the clinic, or at home, leaving time for students to ask questions as well as to debrief following the visit. Orienting the family ahead of time about the learning goals of the session and any time constraints is essential.

Simulation is also an effective method to keep learning relevant.¹⁵ Using high-fidelity simulators, students can work in teams developing clinical management skills in a realistic setting where clinical response to therapy change is based on team management decisions. If access to high-fidelity simulators is limited, teachers can use low-technology alternatives, such as dolls, with verbal report on changing symptoms and physical exam findings for diagnoses, such as croup or dehydration.

Another effective method to keep sessions patient-focused is

case-based learning.¹⁶ Traditional presentations can be adapted fairly easily into a case-based format. By dividing content into a few areas, a clinical scenario or clinical question can be developed for each area, with factual material to follow. Time for discussion between cases to allow for questioning is helpful. If photos or videos are included in the presentation, the material will engage visual learners.

Teachers in different settings can use multiple strategies, adapting them as needed for use in outpatient clinics, inpatient wards, emergency departments, and subspecialty clinics. Creating a culture of shared learning, where learners feel free to solve problems and learn from "wrong" answers is 1 step toward effective learning.

Keeping learners engaged in this era of quick access to information and alternative educational modalities is challenging, but critical.¹⁷ Teachers may find that "keeping it short, active, and relevant" is a useful mantra when designing educational sessions (Table 1).

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