

## **“ICON”OCLASTIC ASSESSMENT: ENHANCING SMALL GROUP LEARNING THROUGH REAL-TIME, WEB-BASED FEEDBACK**

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**Purpose:** To track medical students’ learning progress during an interactive, neuroscience case simulation tutorial using real-time qualitative and quantitative feedback designed to allow faculty tutors and mentors to intervene meaningfully during the learning process.

**Introduction:** The Interactive Case-based Online Network (ICON) is a web-based platform embedded in a problem-based learning medical curriculum that is designed to facilitate active learning; to enhance student-faculty partnerships of practice; and to encourage a continuous collaborative environment that bridges learning experiences inside and outside of the classroom.<sup>1</sup> Despite faculty tutor access to students’ online interactions throughout a case, ICON lacks a structure for assessment of student progress and performance in real-time. To take advantage of ICON’s continuous and transparent learning environment as a tool for faculty to adjust and enhance tutorial structure in real-time, we have developed ICONfb, an online system that allows faculty to rate and quantify students’ online contributions to the tutorial as each case progresses. Here we present data detailing the structure of ICONfb as well as several examples of its ability to allow active and individualized modification of tutorial structure in order to maximize learning potential.

**Methods:** Over the course of three academic years, nine tutorial groups consisting of eight students each (n=72) participated in ICON tutorials as part of a medical school second-year neuroscience curriculum. The eight-week curriculum includes seven cases, five of which were analyzed here using the ICONfb system. ICONfb consists of recording all student online contributions and discussions in the Brainstorm and Virtual Contact modules of ICON for each case. Each discussion was classified into a specific sub-category of the medical sciences (epidemiology, basic science, patient safety, etc.). Discussions were evaluated for content related to a priori learning objectives specified for each case and for quality by the faculty tutor.

**Results:** The use of ICONfb demonstrates that student online discussions of hypothesis and differential diagnosis can be categorized and scored to allow assessment of tutorial coverage of pre-specified learning objectives and to demonstrate the balance of time students spend on different areas of the medical sciences. Student discussions are evaluated for quality with a quantitative method that has good inter-rater reliability. Post hoc analysis suggests that by actively altering case content, faculty tutors can shift students’ attention to focus on specific topics or themes. Finally, our analysis shows increased student utilization of the online network across the course.

**Conclusions:** Analyzing the online interactions of students in ICON tutorials with the ICONfb system allows faculty tutors to assess the content areas and learning objectives being covered, as well as providing a reliable measure of the quality of student

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<sup>1</sup> A. Nathoo, P. Goldhoff, J. Quattrochi. (2005). Evaluation of an Interactive Case-based Online Network (ICON) in a Problem Based Learning Environment. *Advances in Health Sciences Education: Theory and Practice*, 10(3), 215-30.

participation and understanding. Faculty can use this information to actively reshape the tutorial to ensure adequate coverage of important topics, a more balanced case discussion, and satisfactory demonstration of understanding of core concepts.

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