

# Teaching Based on Thinking Fast and Slow

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*Disclosures:* None reported.

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- 2 Qureshi Z, Seah M, Ross M, Maxwell S. Centrally organised bedside teaching led by junior doctors. *Clin Teach.* 2013;10:141–145.
- 3 BMA. European Working Time Directive. 2011. <http://bma.org.uk/practical-support-at-work/ewtd>. Accessed September 20, 2013.

**In Reply to Sinha et al:** We appreciate Sinha and colleagues' thoughtful reply to our article. Clearly both in European and U.S. medical schools, the ongoing duty hours debate is affecting not just postgraduate education but also medical student education—an unintended consequence of these changes to be sure, but one with the potential to significantly impact all future doctors. The authors' point about having logbooks and dedicated observation for procedural skills is well taken and supported by data in our study. We found that medical students reported the highest level of confidence in suturing. During our students' surgical clerkship, dedicated time both for practice and formal testing of this skill is likely responsible for that finding, as we incorporate a formative OSCE into their experience.

One challenge for other procedural skills, at least at our institution and at many others in the United States, is that the patient's primary physician no longer performs many of these tasks. For example, other physicians (neurology/neurosurgery for lumbar puncture, anesthesia for intubation) and ancillary staff (respiratory therapists for arterial puncture, phlebotomy for venipuncture,

and designated RN teams for placement of IVs) have largely replaced interns as the team members responsible for these aspects of patient care. As such, Sinha and colleagues' suggestion that medical students gain increased procedural experience through more dedicated time with interns or newly qualified doctors may not be valid in our system.

The larger question remaining is whether or not broad procedural competence should be a reasonable expectation of all graduating medical students. We continue to believe, as Sinha and colleagues and the respondents to our survey do, that at least for a core set of procedures, this should be a goal. The devil, of course, is in the details of how to accomplish that, and while suggestions like the one from Sinha and colleagues are welcome, the answer unfortunately remains elusive.

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## Teaching Based on Thinking Fast and Slow

**To the Editor:** I read Custers<sup>1</sup> criticism on dual processing theory (DPT) with interest. Yet, his conclusion that “a description of clinical problem solving as the result of two interacting systems [...] gives few clues to [...] what the best approach to teaching clinical problem solving will be”<sup>21(p5)</sup> is disputable and seems to rest on an oversimplification of DPT. In fact, real-life tasks such as medical diagnosis can never be classified as System 1 or System 2 because they contain both consistent aspects (System 1) and variable aspects (System 2). The great advantage of DPT is not that it creates a dichotomous classification for cognitive tasks but, rather, that it acknowledges that System 1 and System 2 processes occur and can be developed in parallel; expertise development is thus more than a sole transition from System 2 to System 1 processing on a cognitive continuum.<sup>2</sup> Combined with a process of cognitive task analysis,<sup>3</sup> in which real-life diagnostic task

performance is analyzed in its consistent and variable aspects, DPT provides a particularly strong basis for teaching.

Four-component instructional design,<sup>4</sup> for example, is a research-based educational model related to DPT that provides highly detailed guidelines for the design of instruction and the teaching of clinical problem solving, among other topics. *Learning tasks* provide the backbone of learning and make an appeal on both System 1 and System 2 processing. *Supportive information* helps learners to perform and learn variable aspects of learning tasks and develops System 2 processing through reflection and cognitive feedback. *Procedural information* helps learners to perform and learn consistent aspects of learning tasks and develops System 1 processing through just-in-time provision of “how-to” information and corrective feedback. Finally, *part-task practice* may help to reach full automaticity of selected System 1 aspects through repetitive practice. In contrast to teaching models based on cognitive continuum theory, this approach allows for the coordinated development of System 1 and System 2 processing in a process of complex learning.

*Disclosures:* None reported.

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## References

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- 2 Van Merriënboer JGG. Perspectives on problem solving and instruction. *Comput Educ.* 2013;64:153–160.
- 3 Van Merriënboer JGG. *Training Complex Cognitive Skills.* Englewood Cliffs, NJ: Educational Technology Publications; 1997.
- 4 Van Merriënboer JGG, Kirschner PA. *Ten Steps to Complex Learning.* 2nd rev ed. New York, NY: Routledge; 2013.

## In Reply to van Merriënboer:

First, I believe it should be kept in mind that neither dual process theories (DPTs) nor cognitive continuum theory (CCT) were specifically developed to provide guidelines for instructional design in an educational context. Neither are they learning theories. Rather, they focus on problem solving or decision making.