Considering "Nonlinearity" Across the Continuum in Medical Education Assessment: Supporting Theory, Practice, and Future Research Directions

Reference:

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Background
The conception of competence as the appropriate assembly of knowledge, skills, and attitudes, as well as the psychometric approach to assessment may be overly simplistic. Rather, competency, in clinical reasoning for example, requires the combination of different abilities in such a way that the whole is bigger than the sum of its parts. This is confounded as clinical practice is uncertain, ambiguous, chaotic and is as well a social process. So the authors question the assumption that competence is linear ("the more knowledge a physician possesses, the more competent they are"); and other individuals, the system, and their interactions are noise.
Purpose

The authors propose:
  a. That the interactions between a physician and their environment and the individuals within it impacts how medical competence is identified, taught, and assessed.
  b. Alternative models to devise a program of assessment might better reflect the complexity of medical practice (not be adequately captured by a psychometric model)

Type of paper

Other: perspective / commentary / review

Key Points on the Methods

A review (not systematic) of the literature relating assessment, education theory and in the concept of nonlinearity, using assessment of clinical reasoning as an exemplar.

Key Outcomes

Nonlinearity is a relationship with multiple paths or outcomes, interactions and a non-relationship between stimulus and response.

This is typical of the practice of medicine and medical education: multiple outcomes for a given process may be acceptable. Specifically the assessment of clinical reasoning must look at the (nonlinear) process, not just outcome.

Theories that involve nonlinearity include script theory, concept mapping, self-regulated learning and situated cognition.

The authors apply these concepts to assessment strategies:
  1. Script concordance tests: acknowledges that expert clinicians have illness scripts that differ and even simple clinical situations may have an element of uncertainty.
  2. Concept maps: graphic representations that learners draw to show understanding of the meaning of a set of concepts; an organized visual schema of related concepts.
  3. Work based assessment needs a narrative to explain or describe the context to capture nuances “explicit documentation of physician, environment/system and patient factors, as well as their interactions.”
  4. Look at process as well as outcome – direct observation needed.

Key Conclusions

The authors conclude that medical education and practice are full of nonlinearity that is not adequately captured using current assessment methods. The principles of nonlinearity provide a useful lens for medical education and practice. Approaches that assess the process in addition to the outcome can assist with assessing nonlinearity.
Spare Keys – other take home points for clinician educators

This paper gives an excellent overview of some of the major theories in medical education.

Nonlinearity provides an interesting lens for CEs to approach the common challenge of how to assess a learner in the messy world of clinical medicine

Shout out

To all the authors of this article.

JCEHP is a well-established journal for CPD but we have not reviewed anything from it for Key LIME – it’s a great place to look for ‘learning in practice’ papers – but it’s an odd place for this article!