

Integration, Competence &
EXPERTISE:
Preparing learners for the future

Nicole N. Woods PhD



Nothing to disclose




THE EXPERT



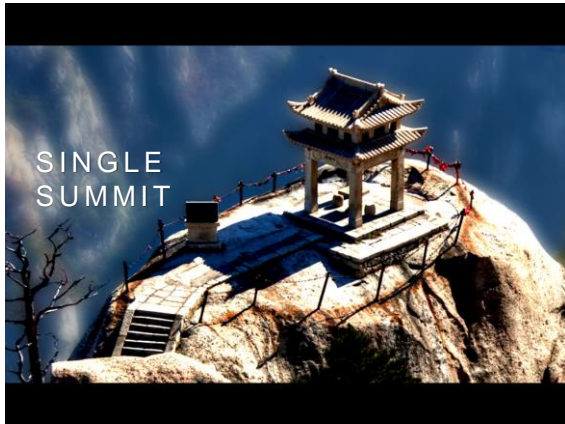
THE PATH



REQUIRED
SKILLS



TIME

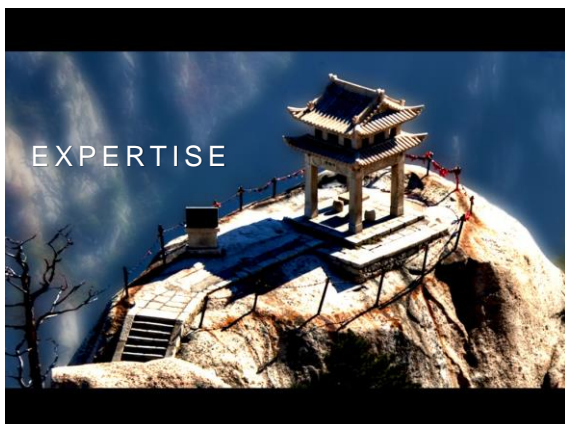


1. Competencies are clearly articulated
2. Competencies are arranged progressively
3. Learning experiences facilitate the progressive development of competencies
4. Teaching practices promote the progressive development of competencies
5. Assessment practices support and document the progressive development of competencies

COMPETENCY-BASED EDUCATION

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COMPETENCY-BASED EDUCATION



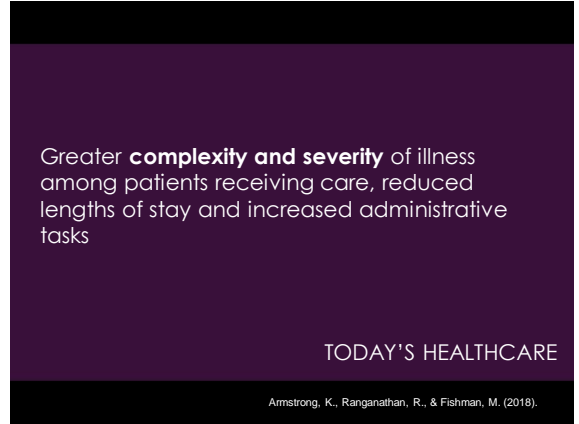
ROUTINE
work

Something you've seen before or know how to deal with



"...when things are proceeding normally experts do what normally works"

Dreyfus & Dreyfus



Greater **complexity and severity** of illness among patients receiving care, reduced lengths of stay and increased administrative tasks

TODAY'S HEALTHCARE

Armstrong, K., Ranganathan, R., & Fishman, M. (2018).




NON-ROUTINE
work

Something you've never seen before or don't know how to deal with



COMPLEXITY
AMBIGUITY
NOVELTY



Adaptive experts use existing knowledge to create new solutions

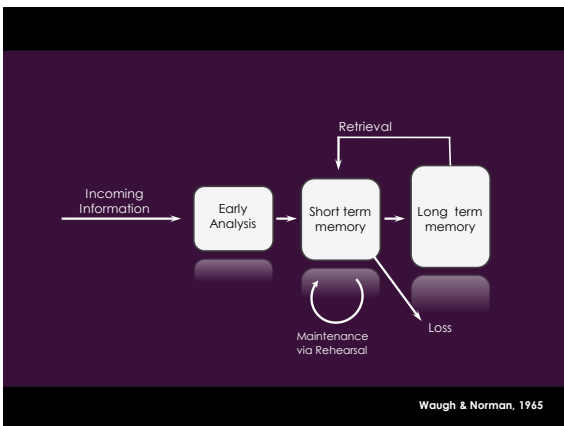
(Hatano & Inagaki, 1984; Bransford & Schwartz, 1999; Bransford 2000; Mylopoulos et al., 2012)



MULTIPLE
TRAJECTORIES



Teaching strategies, learning experiences and assessment practices must prepare learners to handle **routine and non-routine** clinical problems in the future





REPETITIO
encourages *shallow processing*

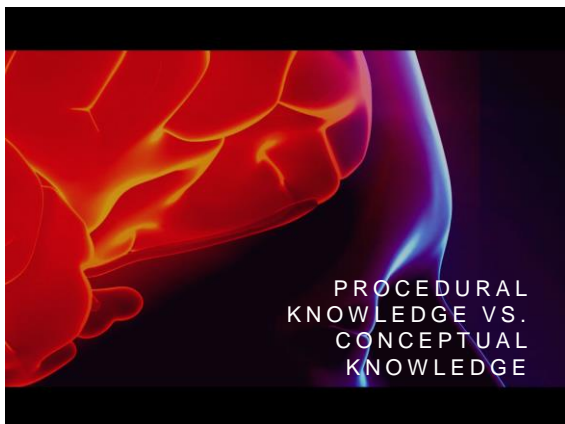


REPETITION
does not necessarily
enhance memory



REPETITIO
can harm later performance

Learning experiences that emphasize repetition (e.g. remediation through repeated exposure) are insufficient for the development of domain-specific knowledge



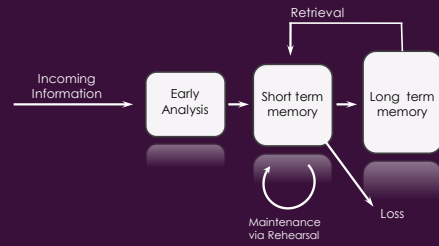
PROCEDURAL
KNOWLEDGE VS.
CONCEPTUAL
KNOWLEDGE

PROCEDURAL
KNOWLEDGE

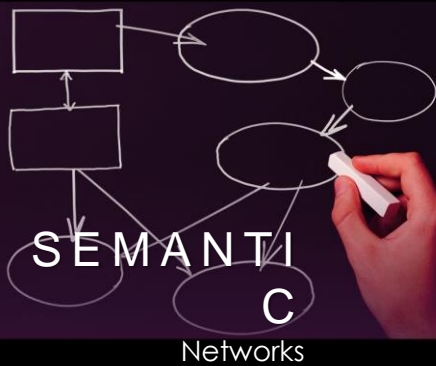
Knowing what to do

CONCEPTUAL KNOWLEDGE

Knowing WHY you're doing it

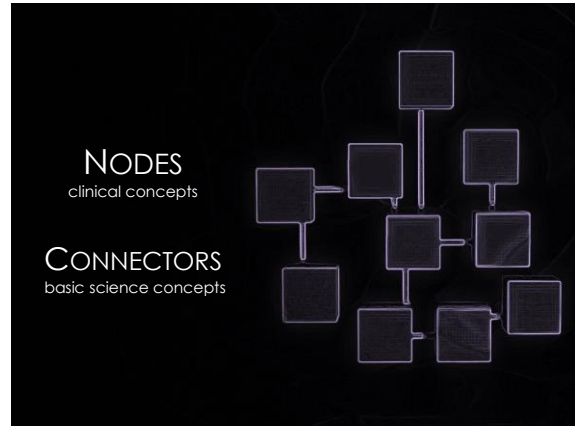
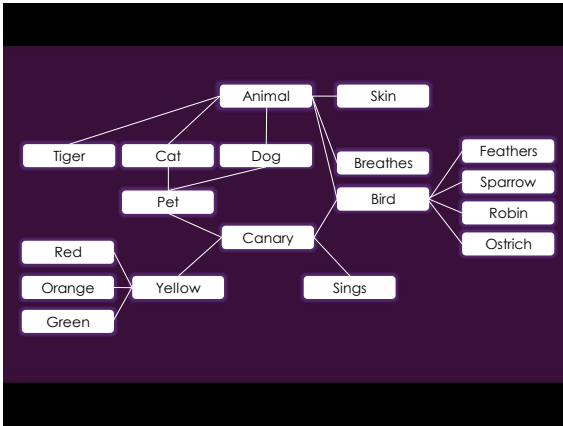


Waugh & Norman, 1965



ABSTRACT CONCEPTS & Specific Experiences

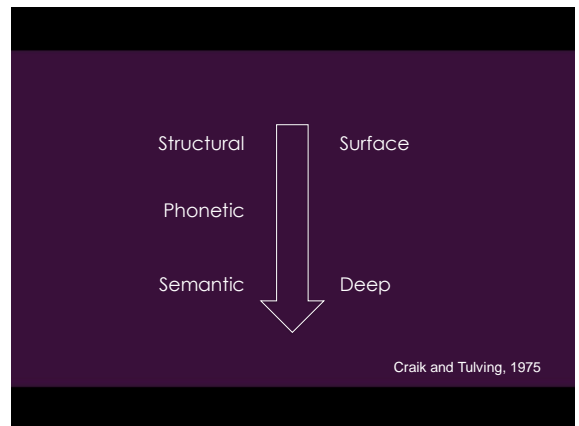
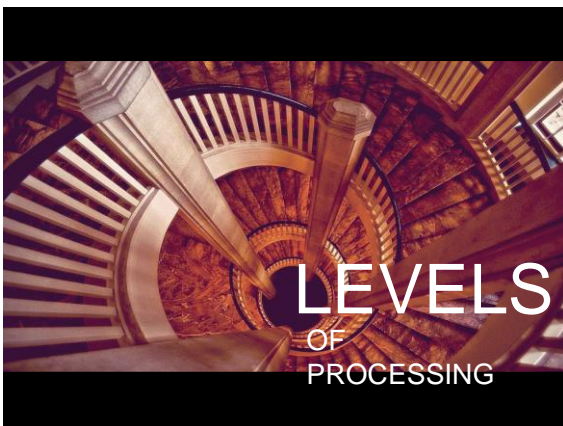


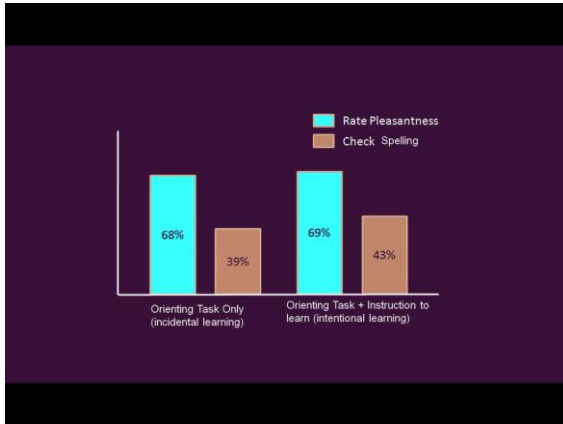


Knowing How and Knowing Why: testing the effect of instruction designed for cognitive integration on procedural skills transfer

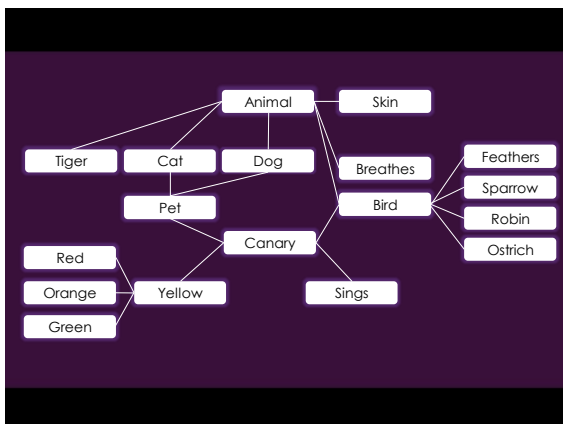
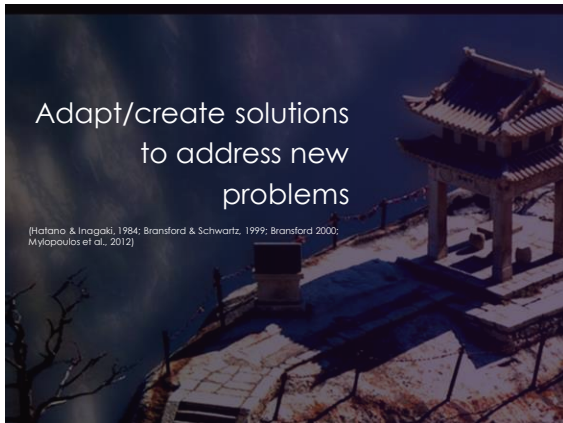
Jeffrey J. H. Cheung^{1,2} · Kulamakan M. Kulasegaram^{1,3} · Nicole N. Woods^{1,3} · Carol-anne Moulton^{1,4} · Charlotte V. Ringsted⁵ · Ryan Brydges^{1,6,7}

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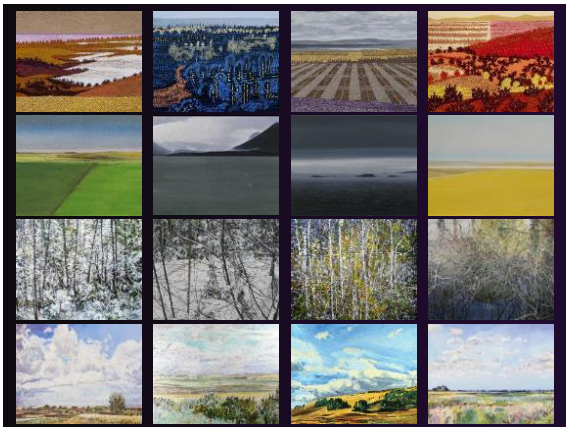


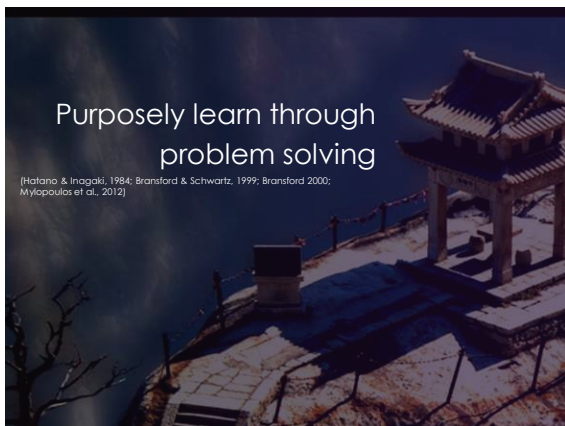
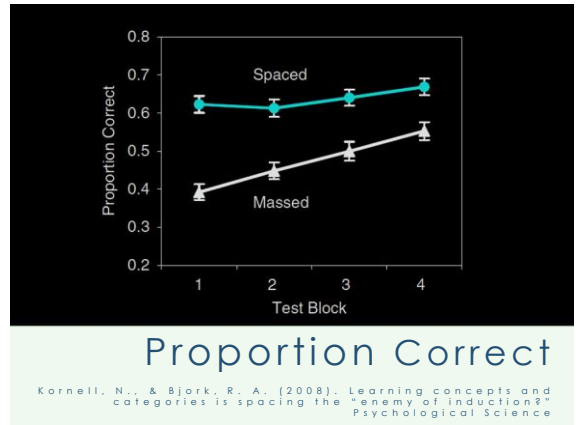
The depth of the memory trace depends on the **meaning you extract** from the stimulus NOT the number of times it is encountered



In solving a large number of problems, it's possible to merely learn to perform a skill faster and more accurately, without developing conceptual knowledge

CBME teaching and assessment must be carefully constructed to foster the development of conceptual knowledge through instruction and assessment that capitalizes on **VARIATION**





A **static 'teach then test' assessment** does not provide crucial information about learning processes, deficient cognitive functions.

[Schwartz, Bransford & Sears, 2005]

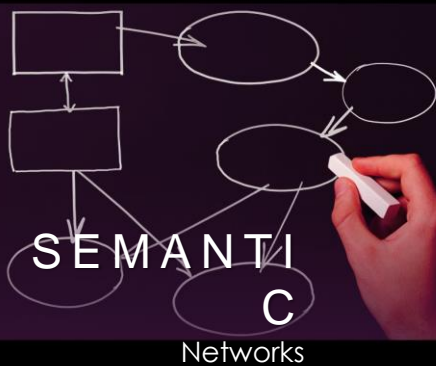
Dynamic
Assessment

vs. Static Assessment

DYNAMIC ASSESSMENT

Assesses the level of internalization (i.e., deep understanding) AND transfer value to other problems of increased level of complexity, novelty, and abstraction

TEACH and **TEST** at the
edges of the semantic
network



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COMPETENCY-BASED EDUCATION

CBME can support training for routine and non-routine problems.

Adaptive experts use existing knowledge to solve routine problems

Conceptual knowledge needed to adapt new solutions for non-routine problems

Support development of conceptual knowledge through integration, contextual variation and dynamic assessment

