E-LEADER CONFERENCE Bangkok 2018

Philip T. Beckwith – Senior Teaching Fellow

Signature Pedagogies and the HOTSHOT Educator:

A Systematic Literature Review

What is Higher Order Thinking?

http://edge.ascd.org/blogpost/critical-thinking
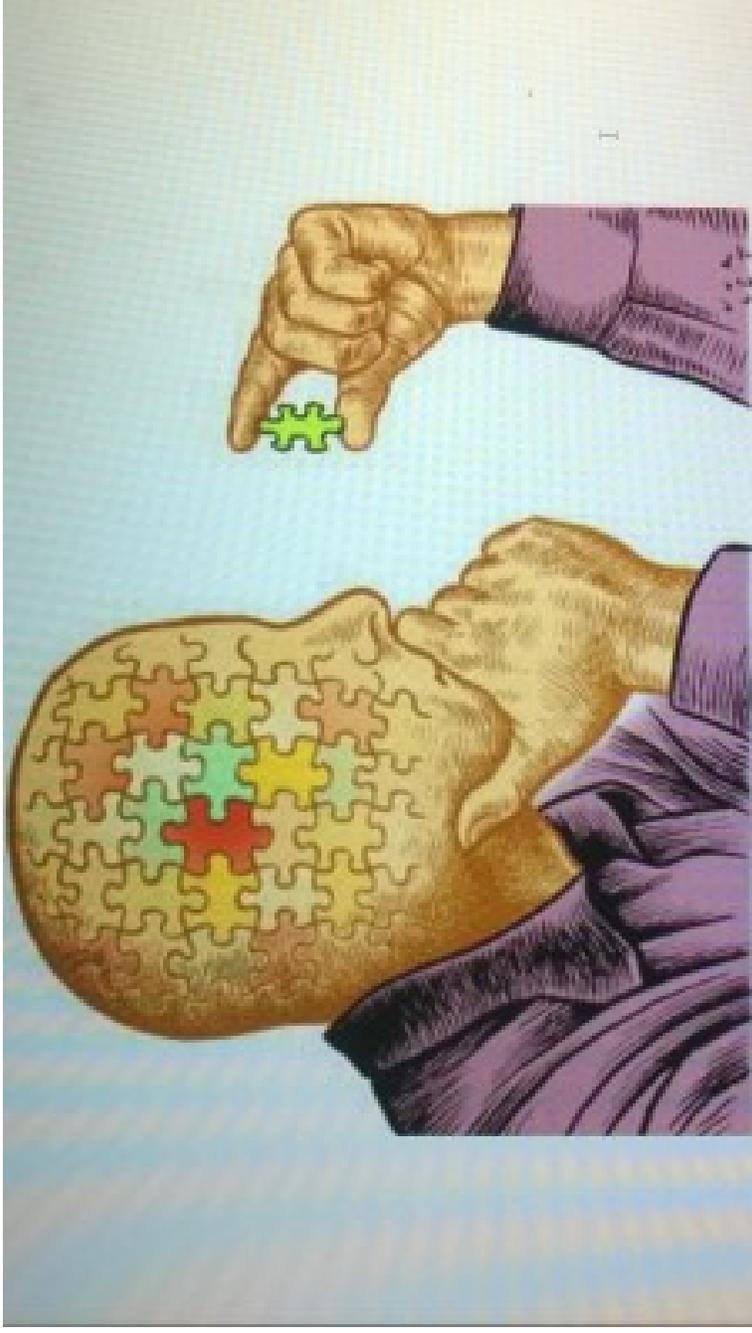
For CASA 2018 I have submitted two papers

Signature Pedagogies and the HOTSHOT Educator: A Systematic Literature Review

Does clinical simulation stimulate Higher Order Thinking and the Skills of Higher Order Thinking in medical education?

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Lewis & Smith (1993) refer to the 'conceptual swamp' when attempting to define Higher Order Thinking Skills

A review of the literature was undertaken

Database used	Search results [medical simulation]	Included [Medical simulation]	Excluded [Medical simulation]	Search results [medical simulation]	Included [Higher Order Thinking Skills]	Excluded [Higher Order Thinking Skills]
Academic search elite	861	15	846	239	3	236
The allied and complementary medicine	0	0	0	2	0	2
CINAHL	282	2	280	26	2	24
EBSCOhost	1	0	1	13	0	13
Educational Research Complete	201	5	95	401	3	401
E-Journals	793	3	790	195	2	191
MEDLINE	1,136	11	1,125	36	0	36
Global health	40	0	40	3	0	0
	3,322	36	3,286	915	12	903

Overview of the literature review

For this literature review Higher Order Thinking Skills has been contextualised within clinical simulation.

Literature excluded (search term: medical simulation)

The systematic review of the current literature returned 3,322 pieces of literature of which 3,286 were excluded, this leaving 36 papers. Having undertaken a cross-reference of the results of the eight databases, nine papers were found to be duplicates, which in turn left 27 papers for review.

Literature informed synthesis (search term: medical simulation)

The 27 medical simulation papers were reviewed and themed as follows:

Themes from the Simulation literature review

Pedagogy
Pereira and Thorpe (2012); Brigden and Dangerfield (2008);Bradley and Postethwaite (2003); Eldaway (2011); Wilford and Doyle (2006); Khan, Pattison, and Sherwood (2011); Weller (2004); Loukas, et al (2010)
27% (n=7)

Historical
Bradley (2006); Deering et al (2010)
7% (n=2)

OSCE assessment
Alinier et al. (2006)
4% (n=1)

Interprofesional learning
Sharma (2013)
4% (n=1)

Medical preparedness
Thomas (2006); Chung et al. (2012);Cheuvront and Whalen (2010); Goolsby, Vest, and Goodwin (2014); Ericsson (2007)
18% (n=5)

Patient safety Mullen and Byrd (2013)
4% (n=1)

Literature reviews
Issenberg et al (2005); McGaghie, et al. (2010); Loyd (2007)
11% (n=3)

Non-traditional thinking
Teteris, et al. (2012); Van sickle, Ritter and Smith (2006); Kaufmann (2003)
11% (n=3)

Teaching strategies
Spooner, Hurst and Khadra (2012); Rosen, McBride and Drake (2009)
8% (n=2)

Fidelity
Curtis, DiazGranados and Feldman (2012); Lumley (2013)
8% (n=2)

Literature excluded (search term: higher order thinking skills)

The systematic review of the current literature was again undertaken and returned 913 pieces of literature, of which 901 were excluded, leaving just 12 papers themed as follows:

Themes from the Higher Order Thinking literature review

- **Student motivation** Miller (2010) 10% (n=1)
- **Problem Based Learning** Goodwin and Wimer (2010); Cabr and Mohamed (2011) 18% (n=2)
- **Teacher evaluation** Sawchuk (2012) 10% (n=1)
- **Teaching strategies** Miri, B. Ben-Chaim, D. and Zoller,U. (2007); Girot (1997);Chabell's (2006) 27% (n=3)
- **Specialist strategies** Grossen (1991); Fernandes, Huang and Rinaldo (2011) 18% (n=2)
- **Technology** Hopson, Simms and Knezek (2002) 10% (n=1)
- **Historical perspective** Lewis and Smith (1993); Chabeli (2006) 18% (n=2)

What did we learn from the literature review?

One deficit of the body of knowledge pertains to the development of Higher Order Thinking Skills through simulation in medical education. Subquestions, which come from the literature review, include, 'What learning and teaching factors enhance Higher Order Thinking Skills in simulation?' And, 'How does simulation improve confidence, proactiveness, preparedness, retention of knowledge, problem solving and the development of mentor and the student interactions?'

It was logical, as a research educationalist, to combine the two research interests, clinical simulation and Higher Order Thinking Skills, in this review. The literature review revealed studies related to simulation and to Higher Order Thinking Skills, but were focused upon student satisfaction or equipment.

Traditional thinking, when describing Higher Order Thinking Skills, comes from the nouns included in Bloom's taxonomy. However, one of Bloom's former students, Pohl, exchanged Bloom's nouns for verbs (Bloom,1956; Pohl, 2000)

The conceptual swamp

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The conceptual swamp

Analysis Clarifications Clinical reasoning Compose Conclusions Creation Creative thinking Critical thinking Critical thoughts Deciphering Decisions Deductions Elucidating Enactments Evaluation Explanations Hypothesize Inquiry Justifications Logical thinking Performances Problem solving Production Reasonable thinking Reflective thinking Revise

Theme 1 (activity nouns)	Theme 2 (synthesis verbs)	Theme 3 (implementation nouns)
Analysis	Compose	Clarifications
Clinical reasoning	Deciphering	Conclusions
Creative thinking	Elucidating	Creation
Critical thinking	Evaluation	Decisions
Critical thoughts	Hypothesize	Deductions
Critical thoughts	Problem solving	Enactments
Logical thinking	Revise	Explanations
Reasonable thinking		Justifications
Reflective thinking		Performances
		Production

Lower and Higher Order Thinking Skills

Lower Order Thinking

Lower Order Thinking (Activity)
Critical thought
Reflective thinking

Lower Order Thinking (Activity)
Critical thought
Reflective thinking

Higher Order Thinking (Synthesis)
Elucidating
Problem solving,

Skills of Higher Order Thinking (Implementation)
Justifications
Production

Higher Order Thinking Skills

Skills of Higher Order Thinking (Implementation)
Justifications
Production,
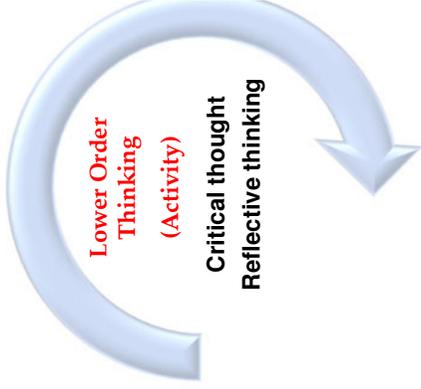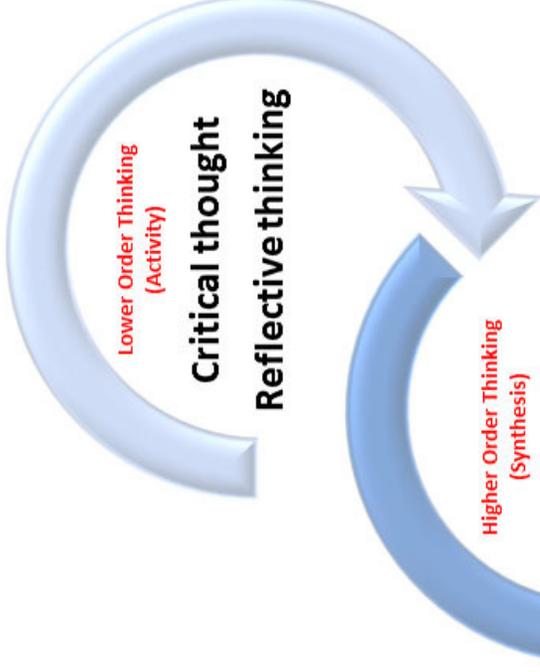
Lower Order Thinking (Activity nouns)

Analysis
Clinical reasoning
Creative thinking
Critical thinking
Critical thoughts
Logical thinking
Reasonable thinking
Reflective thinking
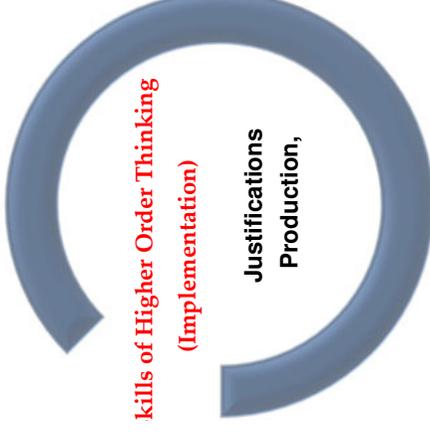
Skills of Higher Order Thinking (Implementation nouns)

Clarifications
Conclusions
Creation
Decisions
Deductions
Enactments
Explanations
Justifications
Performances
Production
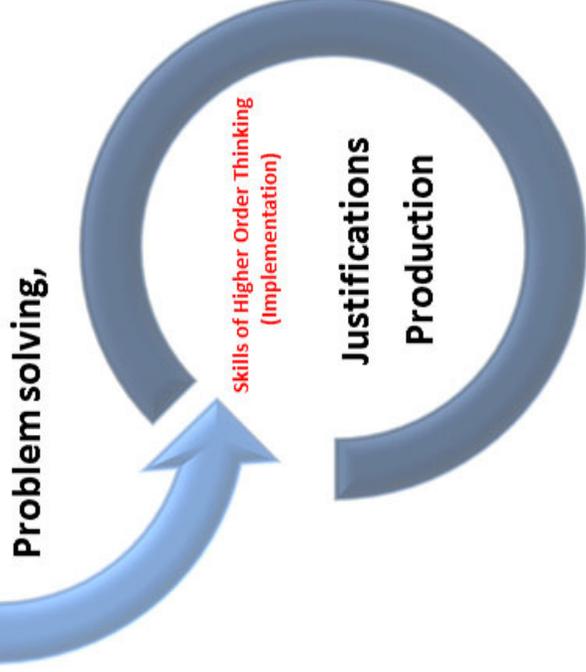
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Lower and Higher Order Thinking

Lower Order Thinking (Activity)

Critical thought

Reflective thinking

Higher Order Thinking (Synthesis)

Elucidating

Problem solving,

Skills of Higher Order Thinking (Implementation)

Justifications
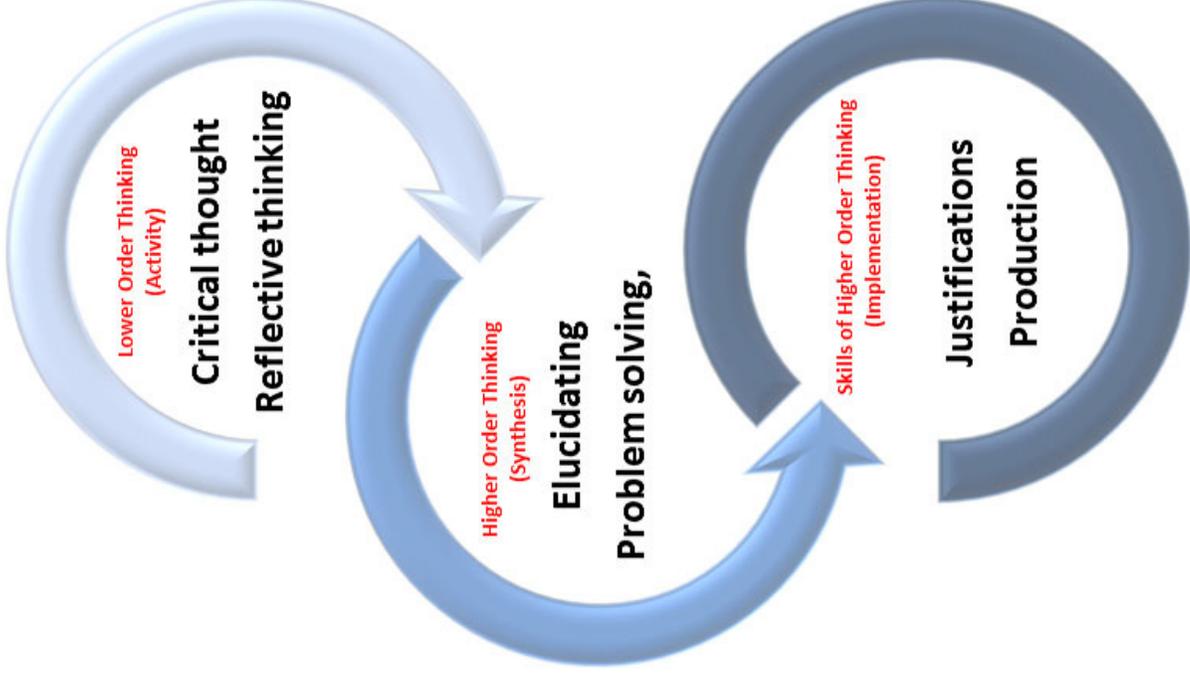
Production

Pyramid of Higher Order Thinking Skills

- Simple application

- Discriminations

- Cognitive strategies

- Analysis

Performances

Products

Explanations

Decisions

Skills of Higher Order Thinking

Successful application of the intellectual skills

Pillars of Lower Order Thinking Skills

Reflective thinking

Metacognitive thinking

Logical thinking

Higher Order Thinking

Creative thinking

Critical thinking

Uncertainties

Dilemmas

Unfamiliar problems

Questions

Activators

Stimulates intellectual skills

Adapted the King, Goodson and Rohani (2008)

The Higher Order Thinking and Skills of Higher Order Thinking Continuum

- Explanations, Decisions
- Performances , Products

- Reflective thinking, Metacognitive thinking
- Creative thinking, Critical thinking, Logical thinking, Intellectual skills

- Questions, Dilemmas
- Unfamiliar problems, Uncertainties

- Simple applications
- Generate Higher Order Thinking activator

- Analysis, Cognitive strategies
- Discussion

- Defining a need
- Investigate the identified need

Skills of Higher Order Thinking

Higher Order Thinking

Activators

Lower Order Thinking Skills

Lower Order Thinking

Engagement

Blooms nouns, the verb revision, Higher Order Thinking, and Higher Order Thinking Skills

Higher order thinking

The noun's of Blooms taxonomy	The Verb's of the revised Blooms taxonomy
Evaluation	Creating
Synthesis	Evaluating
Analysis	Analysing
Application	Applying
Comprehension	Understanding
Knowledge	Remembering

Lower order thinking
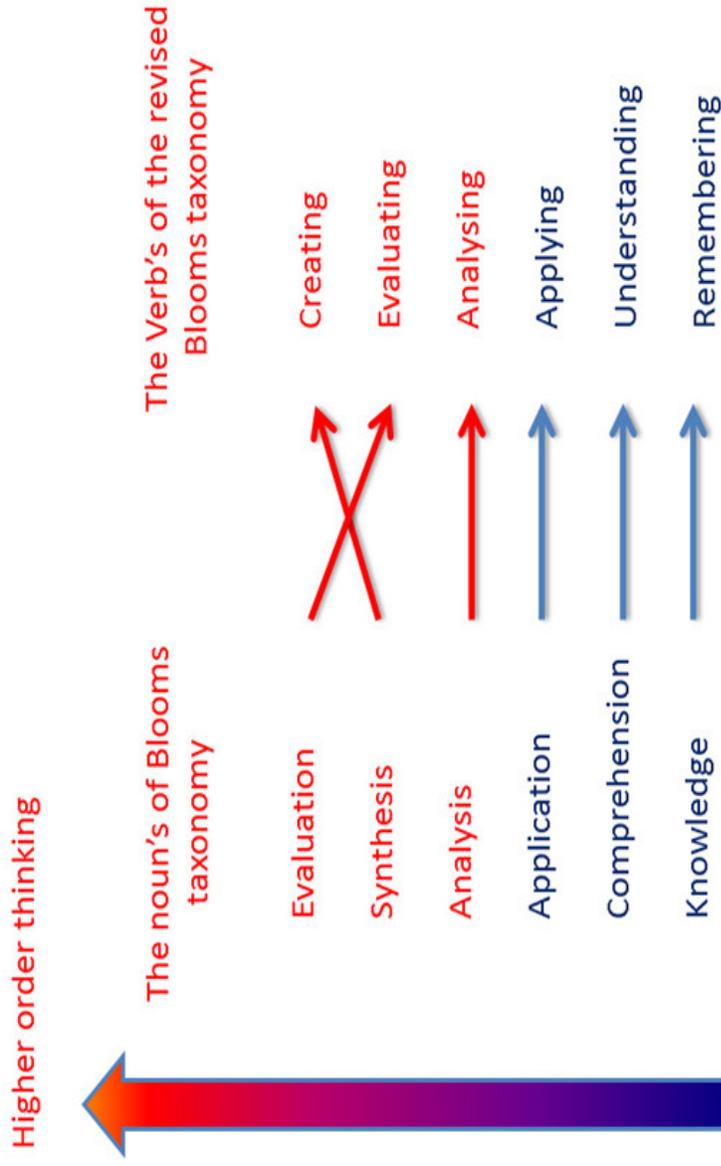
Based on Pohl, (2000). Learning to Think, Thinking to Learn, p.8.

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Higher Order Thinking and the Skills of Higher Order Thinking The HOTSHOT taxonomy

Higher order thinking

Production

Justifications

Problem solving

Elucidating

Reflective thinking

Critical thoughts

Lower order thinking

(Beckwith, 2018)

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We now have the HOTSHOT taxonomy

What are we going to do with it?

To be continued…

Any Questions?

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