Critical thinking for transformation:
An extension to the 5-steps of evidence-based practice incorporating ways of thinking and practising

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Background

Critical thinking

Getting stuck!

Clinical Skills

Reflective practice

Getting stuck!

Information literacy

Getting stuck!

Understanding bias & research

Getting stuck!

Stats & numbers

Getting stuck!

Getting stuck!

Critical thinking

Critical thinking

Critical thinking

Figure 1. Evidence-based Practice Cycle

Aims – Threshold Concepts

Liminal Space

Figure 2. Representation of individual student liminal threshold concept learning journeys (Meyer & Land, 2003, 2004) (Figure based on Kabo and Baillie 2010, p. 307)
Methods

Constructivist, interpretivist paradigm

Qualitative Research
• Recruitment, consent and interviewing of experts and students
• Regular submission of reflective journals by 8 case study participants
• Interviews and audio journals transcribed >>> qualitative textual data

Data analysis
• NVIVO: transcribed interviews and reflective journal entries
• Abductive thematic analysis

Theoretical framework
• Threshold Concept Framework + Vygotskian theory

Figure 3. Diagram depicting an abductive analysis process
Theoretical Framework: Vygotsky

Fig 4. Conceptual learning according to Vygotsky

Non-spontaneous, academic concepts
Scientific concepts, theoretical learning

Dialectic interaction
Semiotic mediation
Psychological tools

Consolidated, internalised concepts

Spontaneous, everyday concepts
Situated, experiential learning

Fig 5. Image portraying zones of development (after Zaretskii, 2009)

Subject-specific field of activity

Learner
ZAD
ZPD
ZFD
Instructor

ZAD: zone of actual development
ZPD: zone of proximal development
ZFD: zone of far development

“…inner speech is speech for oneself; external speech is for others.”

Vygotsky 2012, p. 239

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Limitations

• Sole-researcher
• Qualitative study of few participants at one university medical school
• Abductive research methodology is novel

➢ Process undertaken was rigorous
➢ Results considered valid and transferable
➢ “A significant contribution to knowledge in the area of threshold concepts both in terms of our conceptual and methodological understanding of liminality.”

This research offers fresh avenues of research for EBP teachers, a new theoretical framework for qualitative research of threshold concepts, and an extension of the knowledge and ways of teaching EBP for healthcare professionals.

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Results: The Conceptual Elements of EBP, Medical Biostats & Research

A complex interlinked web of conceptual disciplinary elements:

- Simple ideas, simple concepts, fundamental ideas, simple and complex threshold concepts.
- Over-arching elements necessary for expert identity, e.g. ways of thinking and practising.
- Threshold capability, skill, and modelling concepts.

- **Statistical significance** is a classic example of a threshold concept.
- **Understanding Bias & Study Design** is a major, complex, integrated threshold concept.
- **EBP as a clinical practice** is an over-arching threshold.
Results: Complex inner speech as a questioning, interrogating tool

Suppose I tell you about a new concept, the first thing you’re going to think about is: ‘What is this?’ And that’s your inner voice – that’s a question: ‘Well, what is this?’

Yeah, it’s automatic. Somehow, I need to talk it out. I need to talk out loud, because I think no one else - not many people around me do that. It’s a bit of both, yeah, dialogue and argument.

When I’m talking to myself it’s very similar to … if I’m talking to someone in order to explain that new concept, - - - because when I’m talking to myself, I’m thinking of myself as another person…

CS6, Interview 2

CS1, Interview 2

CS2, Interview 2
Results: Inner voices for conceptual learning

The Devil's Advocate
…there is this part of me who is this devil’s advocate, challenges [my] understanding of things.

The Questioner
'How do you respond?' 'How would this principle apply to that?'

The Clarifier
…you are picking on your particular faults, the particular gaps in your knowledge…

The Teacher
…often it’s your own voice that’s kind of explaining to yourself.

Figure 6. Depiction of the main processes of dialogue for learning
Critical thinking to initiate transformative learning

Figure 7. The pre-liminal critical thinking steps to initiate transformative learning

Step 1 Assessment of the situation
- Evaluation, clarification
- Decision as to how to proceed

Step 2 Categorisation
- Categorisation of ideas
- Breaking down ideas

Step 3 Evaluation of progress
- Evaluation of the component parts and assessment of ability to progress

… and then by talking to myself I'm trying to bring it all together, so it's one whole new concept.

(CS1, Interview 2)
Critical thinking for transformation

So, … when you put it all together it all makes sense. I guess that’s when that ‘eureka’ - you see the whole instead of just the parts. (Case 2, Interview 2)

Figure 8. The three liminal critical thinking steps for transformation
Figure 9. Summary model of transformational conceptual learning

Pre-liminal
Instigative

Sub-liminal
Explorative

Liminal
Reconstitutive

Post-liminal
Consequential

New conceptual elements

Figure 10. Main influences on transformational shifts from novice to expert identity

CRITICAL THOUGHT
- Critical self-reflection
- Critical action
- Critical reason

INTERNALS
- Inner dialogue
- Self-teaching
- Self-hearing
- Self-argument

SHIFT

Identity as expert

Cognition
Neural Pathways
Working memory

Externals
- Feedback from learning activities and other artefacts
- Teacher instruction
- Teacher dialogue
- Peer to peer dialogue
- Narrative-audio-writing-diagrams
- Clinical practice

Integration of new with previously understood conceptual elements occurs throughout the learning


ZFD
Seeds of development

ZAD
Buds of development

ZAD
Fruits of development
The Bottom Line

Inner struggle is necessary for transformation.

Focus on the student as **Learner-Teacher** and encourage argumentative self-instruction:

1. Mapping/scaffolding of troublesome concepts to assist individual student’s liminal journey using narratives, analogies, mapping the learning journey and key concepts.

2. Develop supportive learning activities to challenge & encourage students to use their inner self-teaching for troublesome concepts.

3. Transformation to expert practitioner is also difficult & transformational >>>> focus support on clinical tutor/peer support within the clinical environment.
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Abductive analysis process:

“…abduction starts with consequences and then constructs reasons: “The surprising fact C is observed. But if A were true, C would be a matter of course. Hence, there is a reason to suspect that A is true. (Peirce 1934:117)”

Timmermans & Tavory, 2012, p.171

Uses the researchers cultivated knowledge in the analysis rather than denying it.
“Abduction thus depends on the researcher’s cultivated position.”

…
“Unanticipated and surprising observations are strategic in the sense that they depend on a theoretically sensitized observer who recognizes their potential relevance.”

T&T, 2012, p. 173
Vygotsky on language and thinking
(Vygotsky, 2012)

“…inner speech is speech for oneself; external speech is for others.” Vygotsky (2012, p. 239).

• Classified as a monologue compared to external speech which is mostly social dialogue.

• Inner speech is for self - for "intellectual perception" for mastery of non-spontaneous concepts and to enable conscious learning processes.

• Words and language are “psychological tools” of the mind to mediate basic thought processes for more complex processes.

• Critical thinking and conceptual learning are inherently linked.
Additional Figure 1: Conceptual learning according to Vygotsky
Additional Figure 2. Zones of Development (Vygotsky, 2012)
(Figure based on Zaretskii 2009, p. 82)

ZAD: zone of actual development;
ZPD: zone of proximal development;
ZFD: zone of far development

Points of learning difficulty

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Additional Figure 3. Visual representation of learner progression through conceptual thresholds as zones of development (After Zaretskii, 2009, p. 82)

ZAD: zone of actual development; ZPD: zone of proximal development; ZFD: zone of far development