

New Evidence on Interdisciplinarity



HOW CAN WE TEACH IT?

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The Issues



➤ Conceptual Debate

- Breadth or depth or both?
- Individual or collaborative or both?

➤ Evidential Sources

- Circular, self-identified, and testimonial cases
- Inconsistent presumptions of disciplinarity or boundaries
- Little comparative evidence of success or quality of outcomes

New Approach/New Perspective



What interdisciplinarity *isn't* may be more important than what it is

Triangulation needed with other *types* of evidence

- Psychology of:
 - Expertise
 - Categorisation
 - Knowledge Transfer
 - Collaborative Cognition

Experts/Expertise...



- Expertise has value beyond ‘more knowledge’ (Chi 2006)
 - Demonstrably better cognitive ability within subject
 - Academic standards make this quality locatable externally

- Experts consistently unable to communicate expert knowledge (Ericsson 2006)

Knowledge Transfer



- **Breadth *instead of* depth a common approach** (Repko 2008; Dane 2010)
 - Transfers only surface ideas (Chi & VanLehn 2012)
 - Slow, many false connections, do not *understand* connections
 - Undermines cognitive gains of expertise in each subject

- **Experts are *better* at transfer**
 - Transfer via deep knowledge connections
 - Faster, more accurate, and can explain/expand ideas
 - Requires *explicit* and *on-going* instruction as expertise is developed

ID is *not* ‘adequacy’ or breadth instead of depth

Breadth is essential, loss of expertise is not

Categorisation



- Experts *less* able to define or agree on boundaries of discipline than **non-experts** (Medin et al. 1997; Becher & Trowler 2001; Hofer 2004)
 - Nuanced personal epistemologies/experience
 - Non-experts see positivistic and problem-specific boundaries

- Always an optimal, most mutually understood, category (Medin et al. 1997)
 - = 'Discipline' in academia

Collaboration



- **Transactive Memory Systems (TMS)** (Lewis and Herndon 2011)
 - Not shared knowledge, shared knowledge of who has what knowledge
- **TMS shows comparatively superior performance** (Zhang et al. 2007)
 - Faster, more reliable, and deeper solutions
 - More creative and nuanced solutions
 - Additive skillsets and expertise
 - Consistently updated expertise

ID is *not* both individual and collaborative

Pedagogies and outcomes are not similar

ID is *not* individual

Collaboration shows the results ID rhetoric claims
(and we already have the term ‘polymath’)

Disciplines: Describe, not Define



- Boundaries, purpose, and properties differ based on expertise and perspective of the observer.
- Can overlap with other disciplines *without* challenging disciplinarity of either.
 - ‘Fish-scales’ (Campbell 2009)
 - Using traits ‘of other disciplines’ is a normal disciplinary activity
- A structure for *core* expertise to be developed, located, and through which *stewardship* of standards is maintained.
 - Phonebook of expertise

ID is *not* exceeding/crossing disciplinary boundaries

Interdisciplinarity is:



- 1. A set of basic skills for working collaboratively across different **personal** expertises.*
- 2. The act of doing such work*

Pedagogies of Interdisciplinarity



- Subject expertise must remain core
- *Learners* must collaborate across subjects
- Explicitly embed skills of (at least...):
 - Knowledge transfer
 - Collaboration skills
 - Goal/task interdependence
 - **Translation of *own* expertise to others**
- These are the Learning Outcomes
 - Demonstration of skills, not knowledge
- Must begin at the beginning and build to the end

Expert Translation



- Literature and practice focuses on:
 - Teaching students to translate external expertise inward
 - **Puts responsibility for expert analysis on non-experts**
 - Fundamental source of surface/failed interdisciplinarity

- A different approach:
 - Teaching students to translate *own* expertise outward
 - **Responsibility for expertise remains with experts**

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