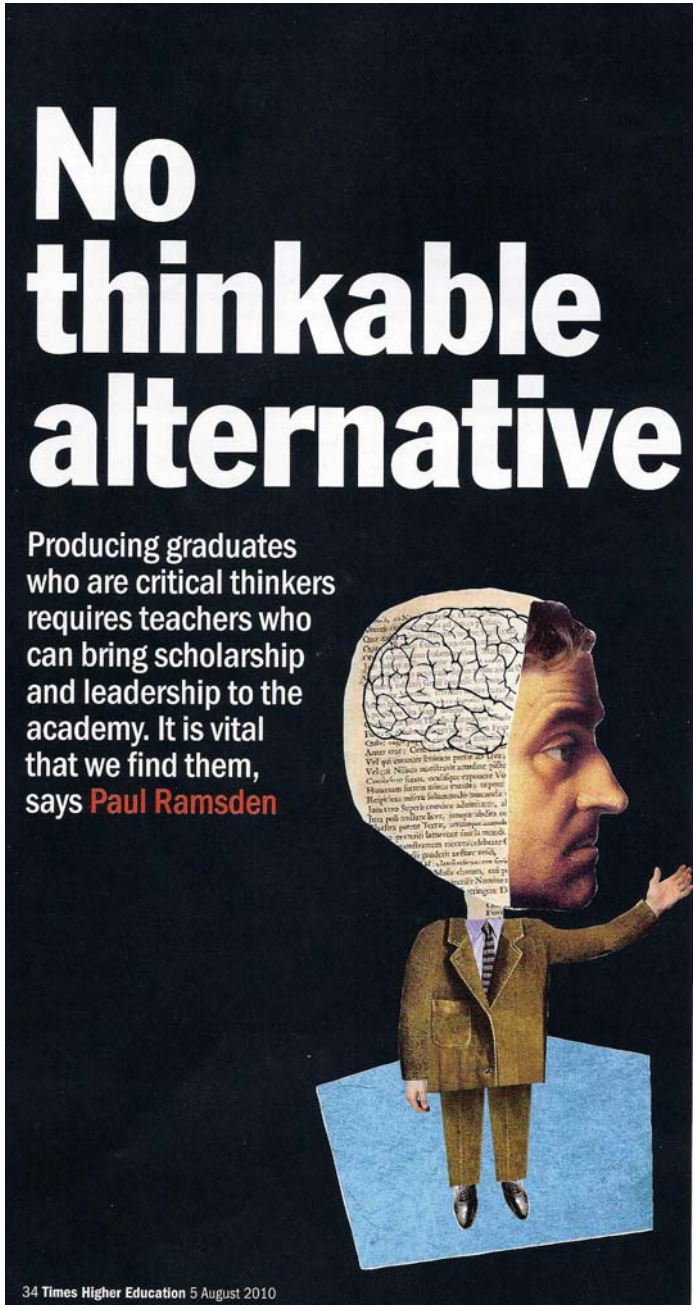
Royal Veterinary College
University of London

Teaching to Learn, and Learning to Teach

Veterinary Education: "We all do it, don't we?"!

Stephen May



5 August 2010

Fail students by producing graduates:

- good at learning facts and solving commonplace problems
- Who wander freely through assessments by faithfully repeating what they have heard and read
- Schooled to succeed, not afforded a higher education!

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Five Concepts of Teaching and Learning

University Chemistry and Physics Lecturers (n = 24)

	No.	%
Conceptual change	1	4%
Conceptual development	2	8%
Acquiring concepts for personal meaning	4	17%
Acquiring concepts for exams	5	21%
Accumulating facts	9	38%
[Unclear (but lower levels)	3	12%]

Prosser et al 1994

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Concepts of Teaching and Learning

Oxford Tutors (n = 12 science tutors)

	Number
Topic development and refinement	0
Critical discussion	5
Demonstration of how the discipline approaches the topic	3
Steering students towards expected Knowledge	4

Ashwin 2006

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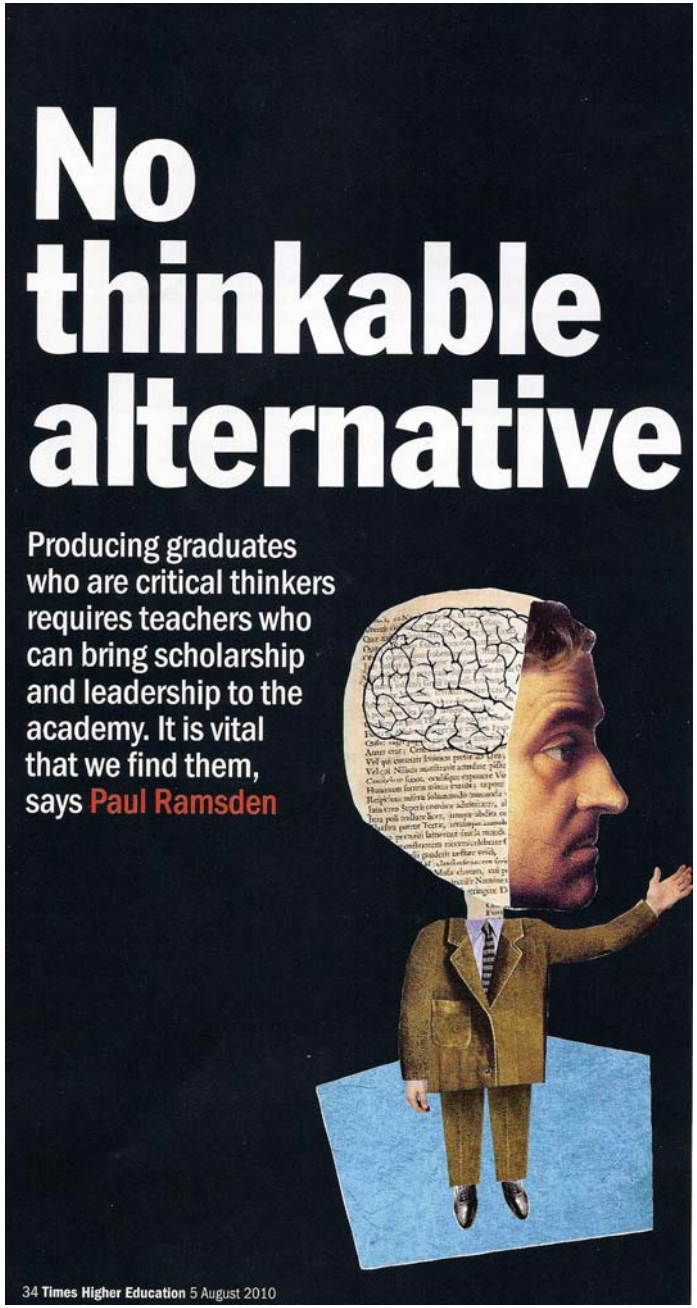

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- Risk not demanding enough of our students
- Comfortable with them possessing “bits and pieces of knowledge”
- *You cannot be wise without knowledge, but you may easily acquire knowledge and remain bare of wisdom”* (Whitehead 1927)

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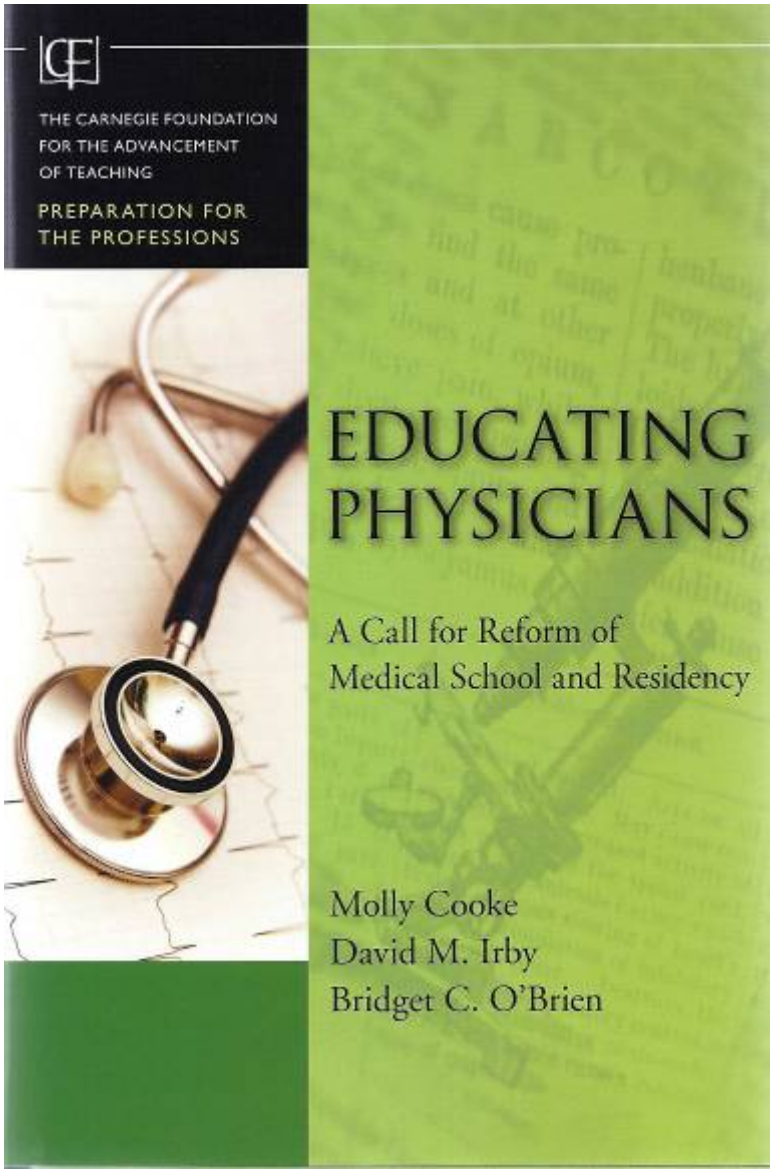

June 2010

" ... the most overlooked aspect of professional preparation was the ***formation of a professional identity*** *with a* ***moral and ethical core of service and responsibility*** *around which the* ***habits of mind and of practice could be organised****".*

Lee Shulman

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Why is "information transmission" such a persistent model in education?

- The "Do unto others as you have had done unto you" pedagogical school
- Easy and unthreatening to encourage one-way communication
- It is easy to get good feedback from the student who does not want to put in too much effort on their own account!

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Why is "information transmission" such a persistent model in education?

Concept of Knowledge

- Individual experience of the subject matter related to the discipline

Concept of Expertise

- Individual experience of, and approach to, clinical practice

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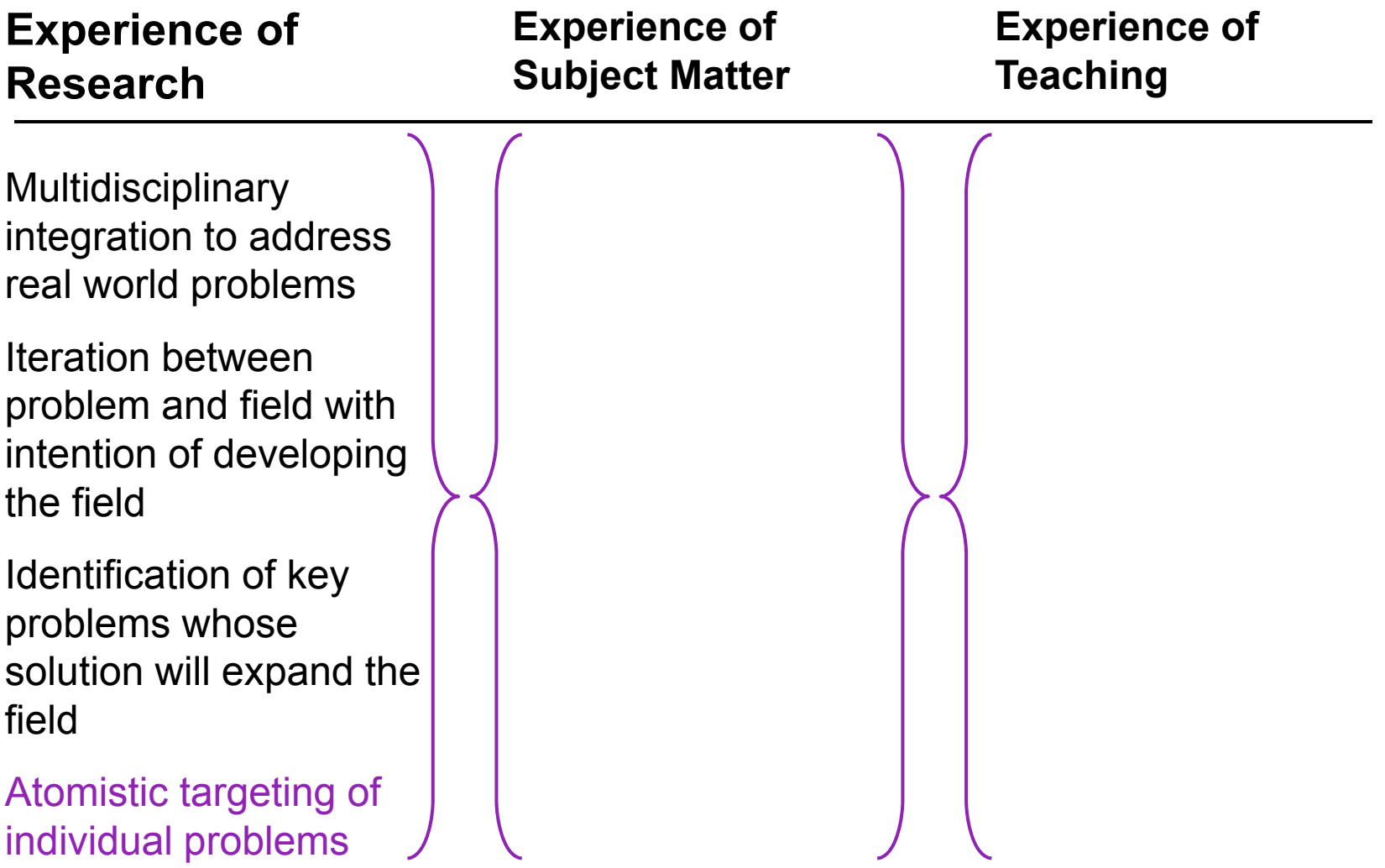
Research – Teaching Nexus



Prosser et al 2008

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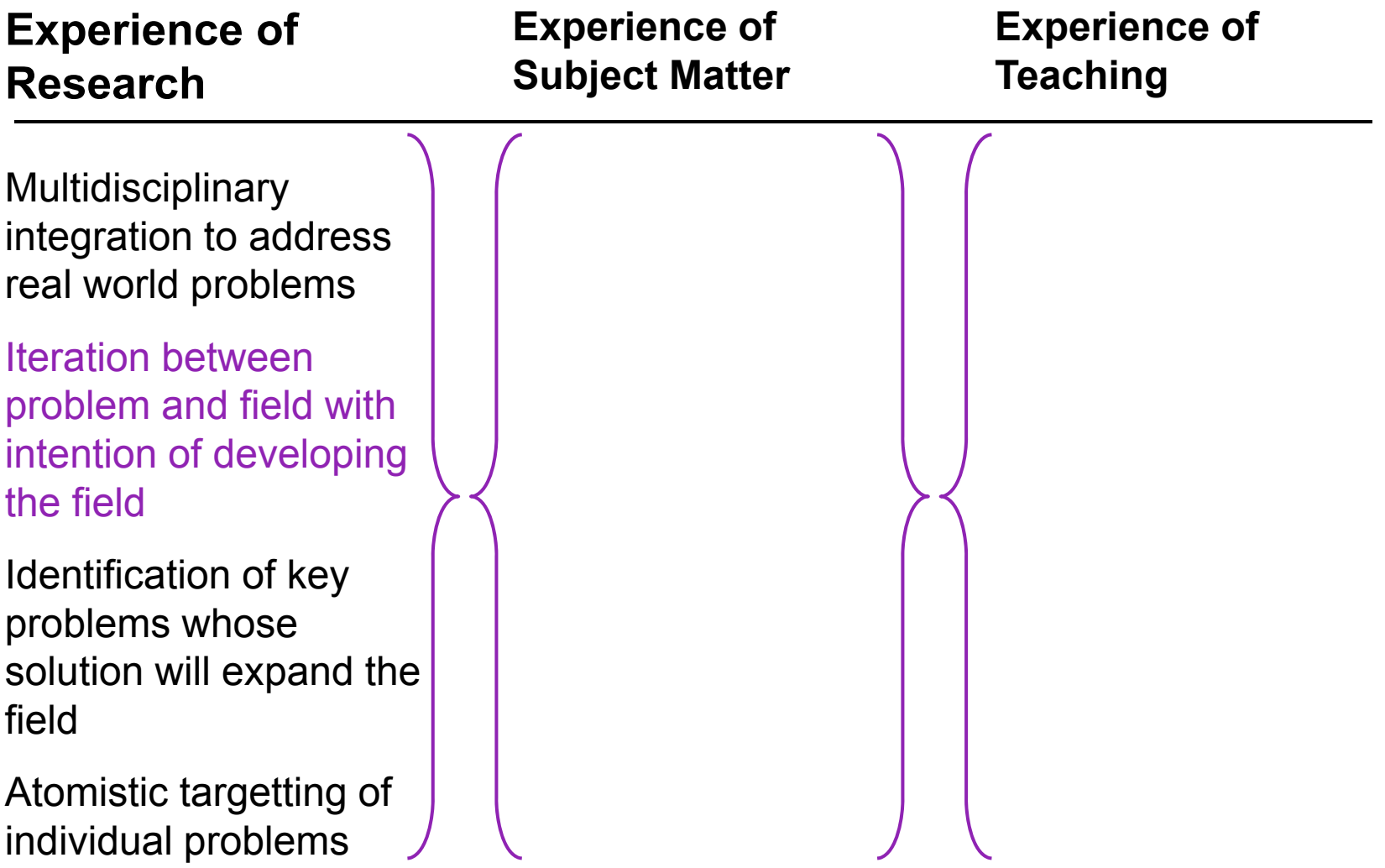
Research – Teaching Nexus



Prosser et al 2008

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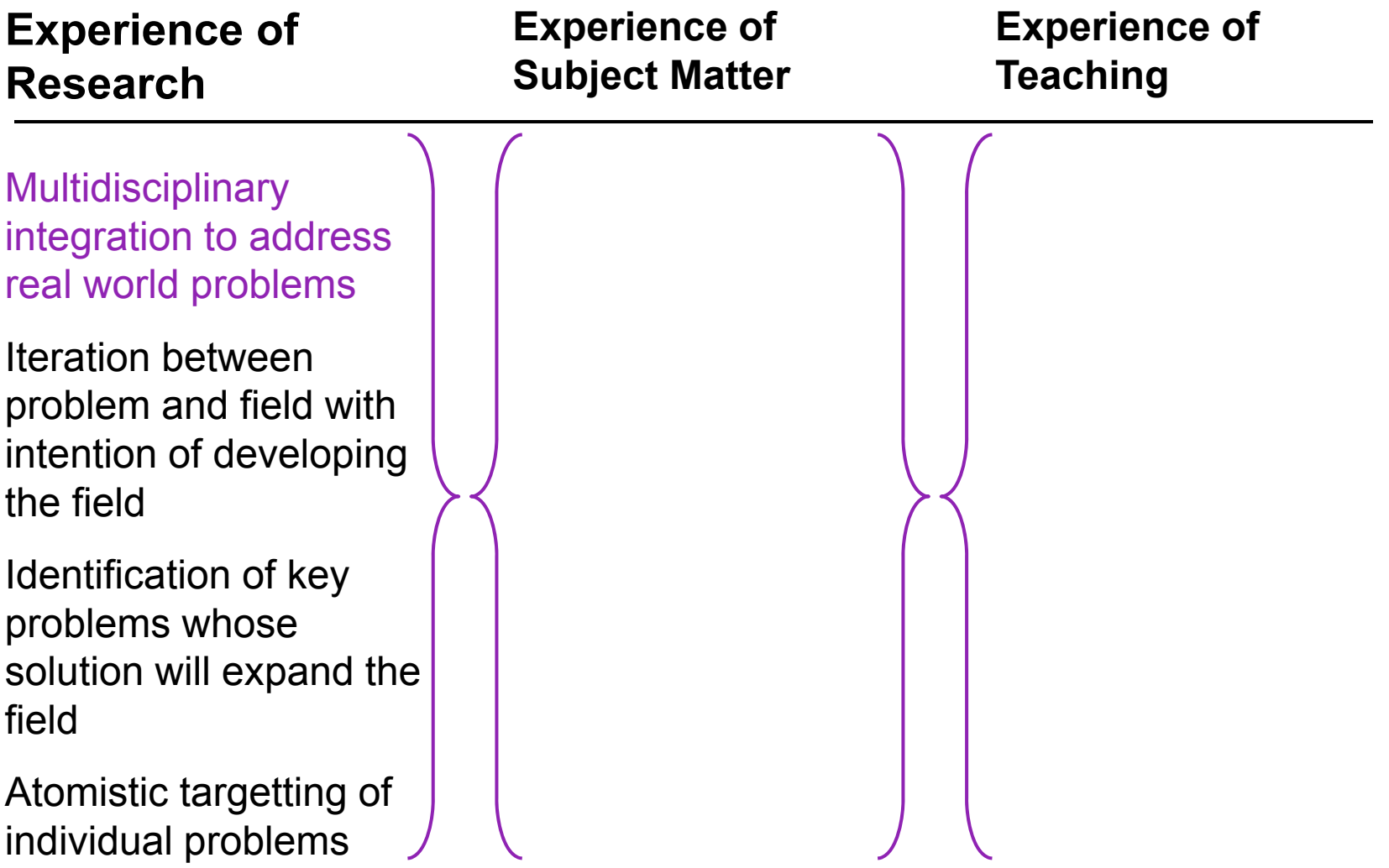
Research – Teaching Nexus



Prosser et al 2008

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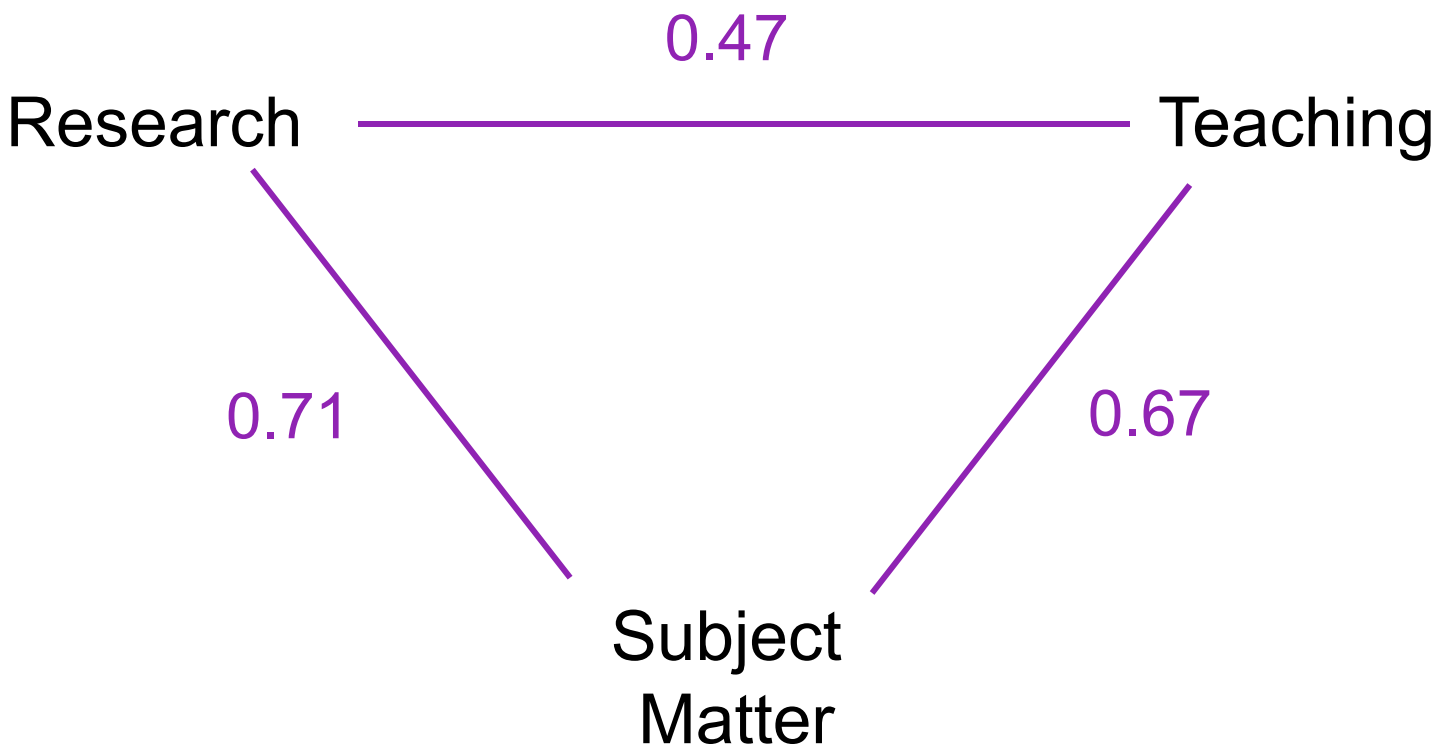
Research-Teaching Nexus



(Somers' d, for model fit)

Prosser et al 2008

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Research – Teaching Nexus

Experience of Research	Experience of Subject Matter	Experience of Teaching
Multidisciplinary integration to address real world problems	Coherent whole generalised to a high level	
Iteration between problem and field with intention of developing the field	Concepts/topics which contribute to an integrated whole	
Identification of key problems whose solution will expand the field	Individual concepts/topics	
Atomistic targetting of individual problems	Facts/techniques	

Prosser et al 2008

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Research – Teaching Nexus

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		Conceptual development
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Prosser et al 2008

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	Individual concepts/topics	
Atomistic targetting of individual problems		Information transfer
	Facts/techniques	

Prosser et al 2008

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Concept of Knowledge

Narrow specialisation; Emphasis on "scholarship of discovery"

Conceptual change

Series of "improvable ideas"; probabilistic

Information

Series of "facts; deterministic

Concept of Expertise

Problem solving
(Adaptive expert)

Routines
(Experienced non-expert)

External authority; rules and protocols; "Evidence-based medicine"

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Lectures – for the benefit of the student or the lecturer?!

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"Learning more by being taught less"

↓ Lectures / ↑ self study → ↓ time to graduation

→ ↓attrition from medical courses

Voluntary self study increases until lecture time reaches 8-10 hours/week. After that, as contact time increases, self study decreases.

Schmidt et al 2009

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Relationship between Teacher (n = 46) and Student (n = 3956) Approaches

Principal Components Factor Analysis

	Factors	
Approach variables	1	2
Students' surface approach to learning		-38
Teachers' student focused / conceptual change oriented		97

The principal components explained 64% of the variance.

Trigwell et al 1999

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Relationship between Teacher (n = 46) and Student (n = 3956) Approaches

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Students' deep approach to learning	-76	
Students' surface approach to learning		-38
Teachers' student focused / conceptual change oriented		97
Teachers' teacher focused / information transmission oriented	66	

The principal components explained 64% of the variance.

Trigwell et al 1999

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The catastrophe which is the "fact accumulation" strategy

Affective consequences – emotional and motivational

Cognitive consequences – thinking skills and judgement

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Affective consequences

	Preference for simplicity	Intrinsic motivation	Social motivation?	Barriers to participation
Preference for complexity – understanding / deep	-0.358**	0.265**	0.376**	-0.246**
Preference for simplicity – memorisation / superficial	-	-0.037	-0.187**	0.293**

**Correlation significant at the 0.01 level

Dale et al 2010

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Cognitive consequences

Dependent learner

- Choice of material
- Meaning of material
- Judgements to be made in complex areas

Continued “just in case” fact accumulation

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Superficial learner beaten before they start!

Problems created by explosion in knowledge and technology

- In 2006, 161 exabytes of digital data generated
- Equivalent to 3 million times the information contained in all books ever written
- Estimated by end 2010, will have risen to 988 exabytes

No-one can “know it all”, or even a fraction of “it”!

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TIMESONLINE

From The Times
June 2, 2009

Warning: brain overload

Scientists fear that a digital flood of 24-hour rolling news and infotainment is putting our primitive grey matter under such stress that *we can no longer think wisely* or empathise with others

John Naish

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Where Academic Leaders have gone wrong!

Educational Development

- Emphasis on the “how” rather than the “why”

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"Fragile Knowledge"

Naïve knowledge - Persistent conceptual simplicity and error, often after (and despite) considerable instruction

Inert knowledge
- Often layered on top of naïve
- Facts remembered for exams
- Not available for other uses
- Not integrated, easily forgotten

Perkins 1995

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"It isn't enough to ask teachers what they do, for what they do and what they say often diverge. One must get at what teachers do through direct, recorded observation …

The confrontation with directly observable data often produces an educational shock, as teachers discover that they act according to theories of action different from the ones they espouse."

Schon 1988

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Where Academic Leaders have gone wrong!

Educational Development

- Emphasis on the “how” rather than the “why”
- Generic rather than discipline based pedagogies

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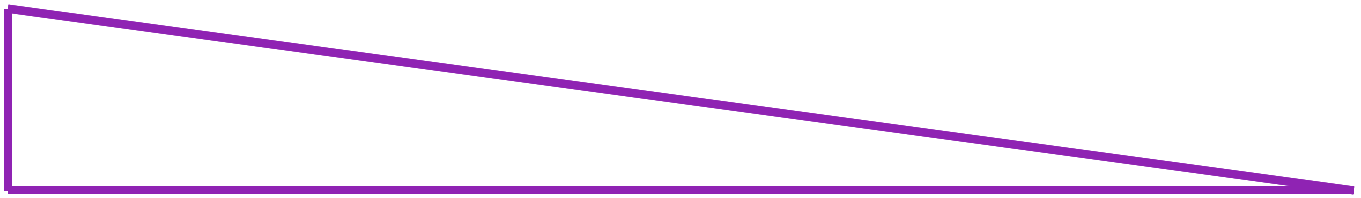
Teaching - the most demanding of all roles of the academic!

Vygotski → Bruner

"Scaffolding"



Interest → Engagement → Comprehension → Completion

Theory of the task

Theory of the performance characteristics of the learner

} Pattern of instruction and judgements on intervention generated by interaction

Wood, Bruner and Ross 1976

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Dual, triple, quadruple processing?

- Patient needs
- Clinical skills capability
- Student needs
- Pedagogical skills

Mamede et al 2007

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Opportunistic learning around laboratory work and case material

"The Teaching Script"

- Different themes for different stages of learner (Irby 1994)

  e.g. for old pony, with pedunculated lipoma:

- Preclinical student – shock and cardiovascular collapse
- Clinical student – differentiation between surgical and medical cases
- Senior clinical scholar / resident – arrival at diagnosis

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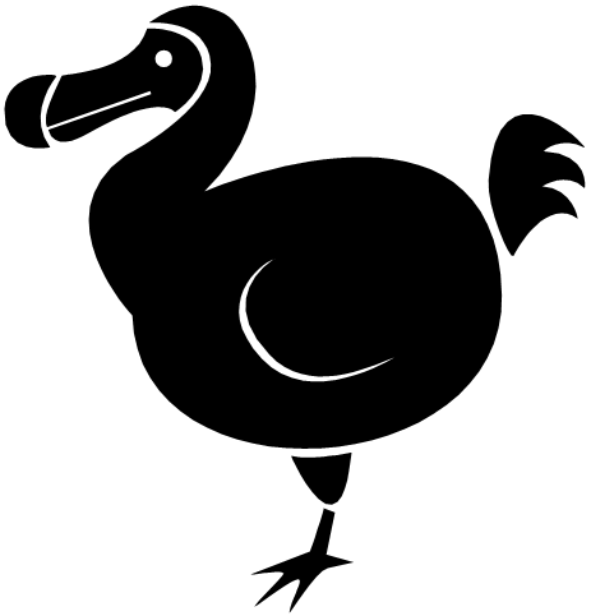

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Where Academic Leaders have gone wrong!

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- Generic rather than discipline based pedagogies

Departmental Direction

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Departmental Leadership and Approaches to Teaching Science, Engineering and Health Sciences

- Heads described themselves as supportive of teaching
- Frequently perceived as non-supportive by lecturers
- In consequence, lecturers more likely to adopt an information transmission approach
- So heads must not only say they are supportive, but be perceived by pedagogically articulate junior staff as genuinely supportive

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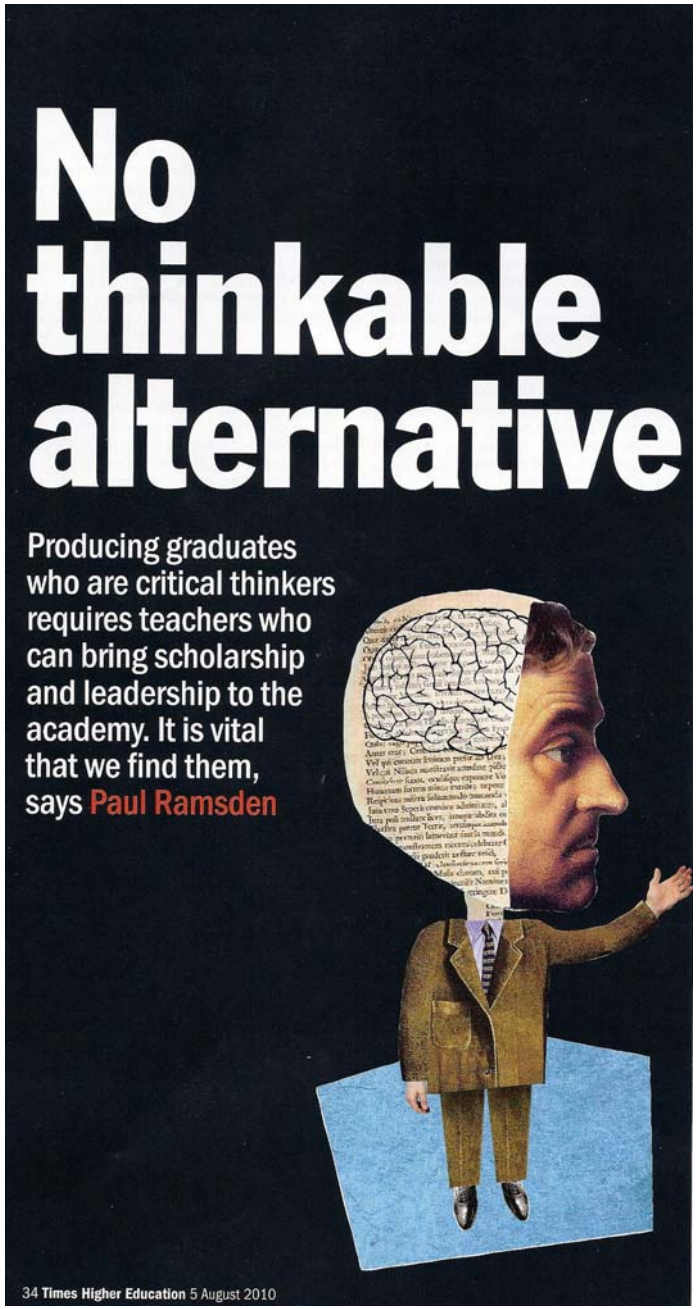
Trigwell et al 2000



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- Never fool students into thinking there is an easy path to success
- Inspire students to do more than they ever thought they could
- Encourage students to share with others the remarkable feeling that understanding brings

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"… through seeking we may learn and know things better. But as for certain truth, no man hath known it … for all is but a woven web of guesses"!

Xenophanes of Colophon, c.570-c.475 BC

(translated by Karl Popper)

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