

Towards Technology for Learning in a Developing World

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Content of the talk

- An experiential framework for learning
- Closed learning
- Radical Empiricism
- 'understanding backwards and forwards'
- Conjunctive relations
- Empirical Modelling

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private experience / empirical / concrete

interaction with artefacts: identification of persistent features and contexts
practical knowledge: correlations between artefacts, acquisition of skills
identification of dependencies and postulation of independent agency
identification of generic patterns of interaction and stimulus-response mechanisms
non-verbal communication through interaction in a common environment
directly situated uses of language
identification of common experience and objective knowledge
symbolic representations and formal languages: public conventions for interpretation
public knowledge / theoretical / formal

An Experiential Framework for Learning (EFL)

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From top to bottom of the EFL

- from the private to the public
- from the subjective to the objective
- from the provisional to the assured
- from the particular to the general
- from the pre-articulate to the conceptual and symbolic

*Importance of such transitions recognised,
but educational technology doesn't promote*

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Closed learning

- associated with the bottom of the EFL
- "what can be learnt is what can be taught"
- can be identified with core elements of science, engineering and management
- a view of learning characteristic of the "developed" world
- presumes a transition from top to bottom has been made prior to learning

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Beyond closed learning

- significance recognised, but not enabled by educational technology as conceived
- tend to view *instruction* and *construction* as alternative paths to the same goal:
cf. 'exploratory' & 'expressive' modelling
- learning activities at the top of EFL can't be observed through the lens and filter of the objective, the rational and the symbolic

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Beyond closed learning

- learning activities at the top of the EFL have affinity with the arts & humanities
 - technologies to support exist in practice (e.g. in software for graphic art, music)
- BUT these are not well-supported by our accepted conception of computing, which favours rules, methods and objects that pervade developed worlds ...*

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Radical Empiricism (RE)

- “a philosophic attitude” William James (1910)
- RE has suffered criticism and neglect
- RE invokes the word 'experience' to refer exclusively to what is given moment-by-moment in the perception of a person
- what is given in experience is more than discrete sensory elements – it encompasses *relationships of a conjunctive nature*

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Understanding backwards

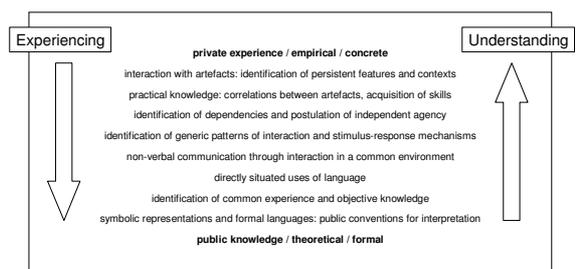
Kierkegaard:

'we live forwards, but we understand backwards'

William James:

“Understanding backwards is, it must be confessed, a very frequent weakness of philosophers, both of the rationalistic and of the ordinary empiricist type ...”

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“Understanding backwards” and the EFL

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James on Kierkegaard

Kierkegaard:
'we live forwards, but we understand backwards'

William James:

“Understanding backwards is, it must be confessed, a very frequent weakness of philosophers, both of the rationalistic and of the ordinary empiricist type. [RE] alone insists on understanding forwards also, and refuses to substitute static concepts of the understanding for the transitions in our moving life.”

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How RE regards knowledge

- RE sets out to relate all knowledge and understanding to its origin in personal experience
- contends that all knowledge is ultimately rooted in the perception of conjunctive relations
- puts the primary focus on personal, private and subjective activities

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Conjunctive relations

connections between experiences that are directly given in personal experience

cf. there is an unavoidable discontinuity in my experience "when I seek to make a transition from an experience of my own to one of yours ... [I] have to get on and off again, to pass from the thing lived to another thing only conceived"

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Examples of conjunctive relations

"connections between experiences that are directly given in personal experience" – as is the relationship:

- between an object's location and its shadow
- between notes of a musical score and keys on a keyboard
- between a name and a pet animal
- between two experiences of the same place at different times
- between experiences of two places on the same journey

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Nature of conjunctive relations

- highly personal in nature
- dependent on context and observer
- operating in the realm of the pre-articulate
- in need of no additional explanation
- having extremely broad semantic content

... qualities particularly relevant to learning activities outside the scope of closed learning

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"If from the top of a long cold barren hill I hear the distant whistle of a thrush which seems to come up from some warm woody shelter beyond the edge of the hill, this sound coming faint over the rocks with a mingled feeling of strangeness and joy, the idea of the place about me, and the imaginary one beyond will all be combined together in such a manner in my mind as to become inseparable."

From an essay by Hazlitt (1835)

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Motivating Empirical Modelling

- complementing rather than compromising those attitudes and attributes of the developing world that defy closed learning
- privileging personal agency for exploration and experiment
- supplying principles and tools to liberate the personal elaboration of conjunctive relations

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Empirical Modelling (EM)

Body of principles, tools and models developed at the University of Warwick over 15-20 years, primarily through graduate theses and undergraduate projects

For more background, see

<http://www.dcs.warwick.ac.uk/modelling>
and posters on educational themes at
<http://empublic/projects/beynonKaleidoscope2005>

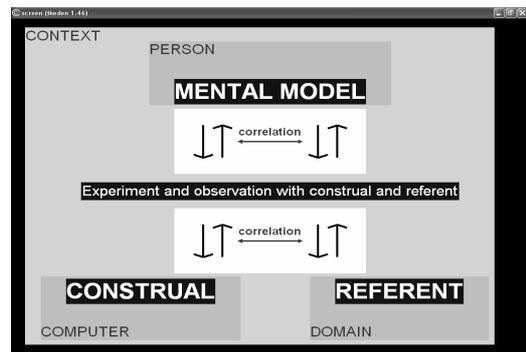
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Underlying principle of EM

The modeller fashions a conjunctive relation between experience of interacting with a computer-based artefact (to be called the modeller's **construal**) and a complementary experience to which the artefact refers (to be called its referent)

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Model making as construing



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Practice of EM

- artefact is developed as a family of definitions – a *definitive script* – whose variables are the counterparts of observables in the referent
- model-building is incremental, creative, iterative and experimental in character
“modelling with definitive scripts”

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Linking the RE and EM agendas

- RE: accounting for all phenomena with ultimate reference to conjunctive relations apprehended in personal experience
- EM: accounting for even the most complex forms of concurrent systems modelling by modelling with definitive scripts

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Characteristics of EM ...

- EM is much closer in spirit to modelling with spreadsheets than to programming
- it is similarly well-oriented to educational use, especially in a constructionist idiom
- EM artefacts are always open to extension and reinterpretation, constrained only by what the modeller can effect and imagine

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Concluding remarks

The undeveloped and developing world as the natural habitat of Empirical Modelling:

- programming as the counterpart of railway engineering, management and use
- EM as akin to walking or bird-watching ... activities where awareness and human engagement are of the essence

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