

The value in muddling around modelling

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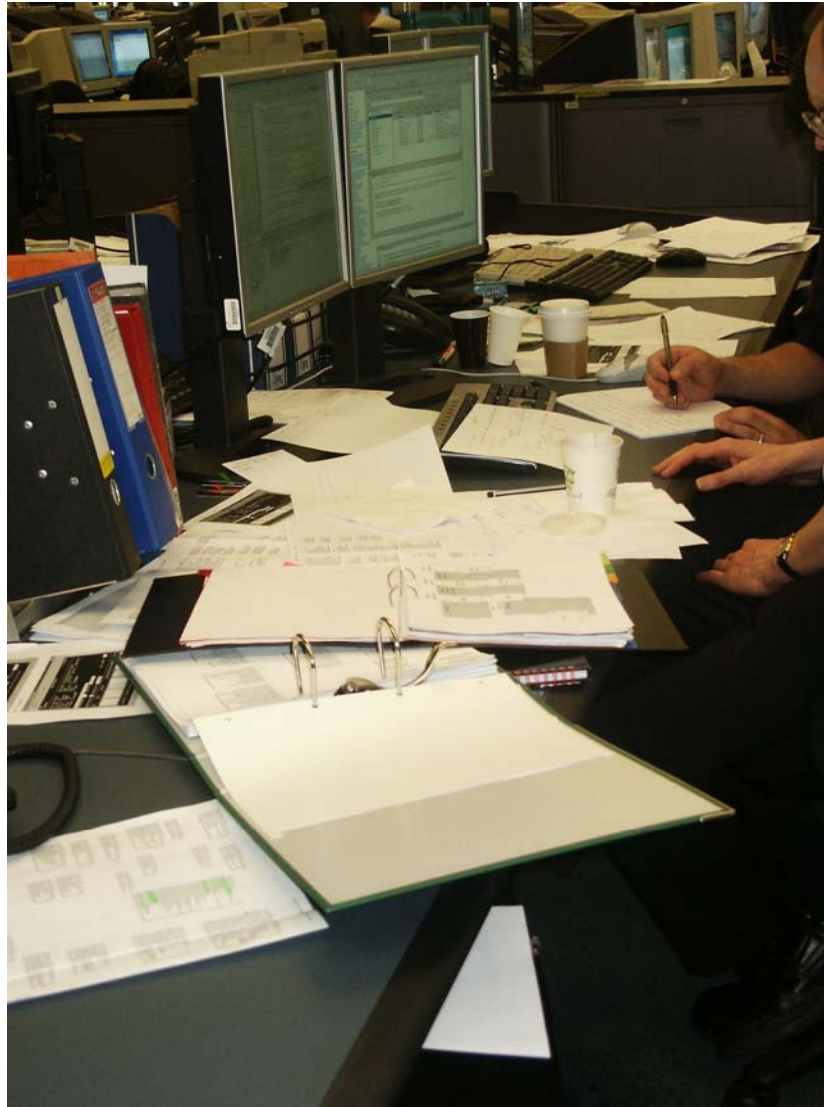
Helen Sharp

Kevin Lynch



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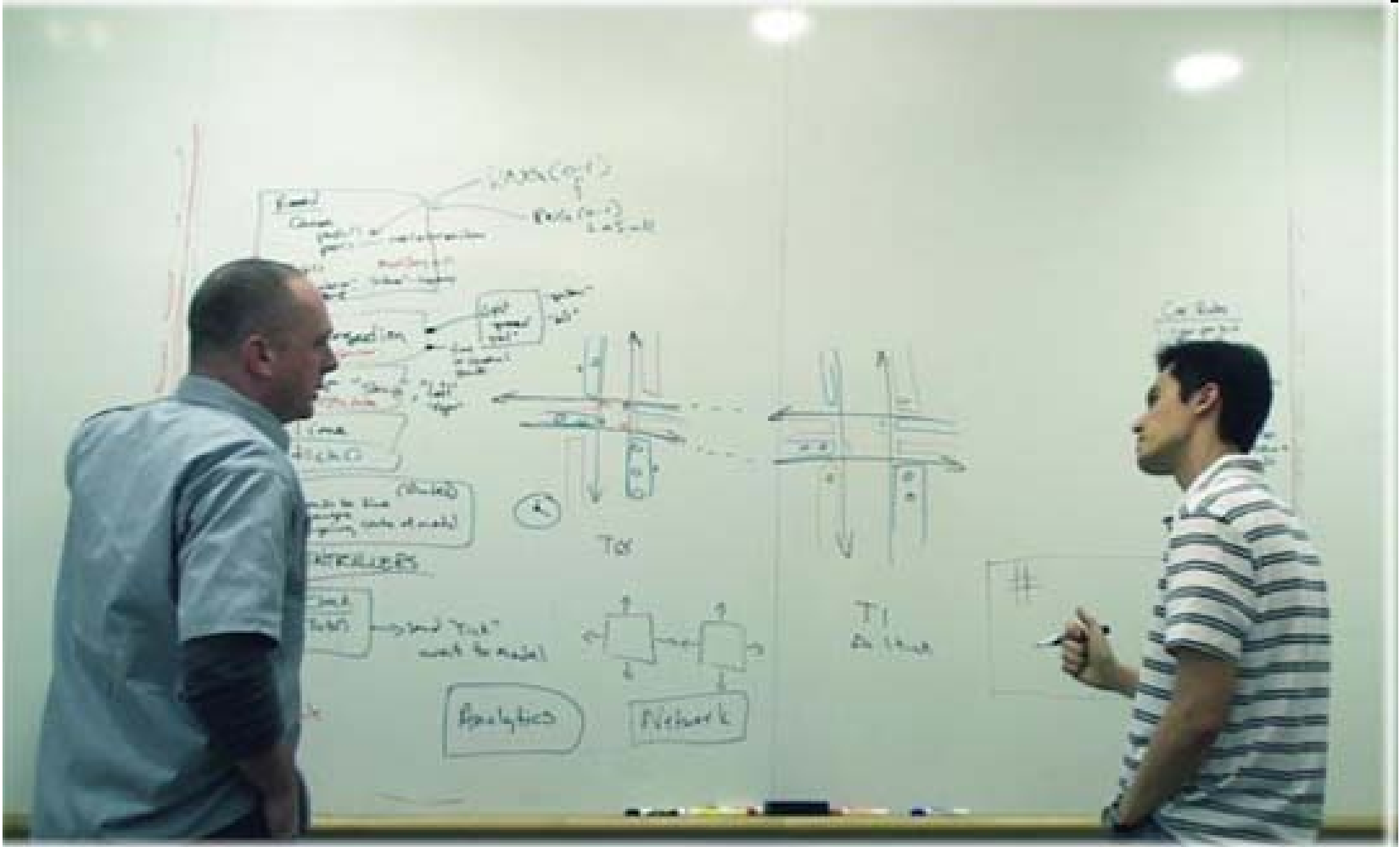


Hugh Robinson



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Studying Professional Software Design workshop





Max Patte – Reflection – Te Papa



- exploration
- consideration of alternatives
- domain : software
- representation
- human reasoning



something about...

- 1.what I've seen
- 2.what's in designers' minds?
- 3.representations of design?
- 4.reasoning about hard problems?
- 5.expert design behaviour?



2010

– Flexible modelling tools

– How experts reason about software: design and problem solving strategies

2005

– Representations for early capture of design ideas

– Disciplines of innovation; mechanisms of inspiration

2000

– Communication and coordination of design ideas within teams

– Software visualisation and mental imagery

1995

– Cognitive dimensions of notations

– Graphical and textual notations

1990

– Programming paradigms



Autodesk

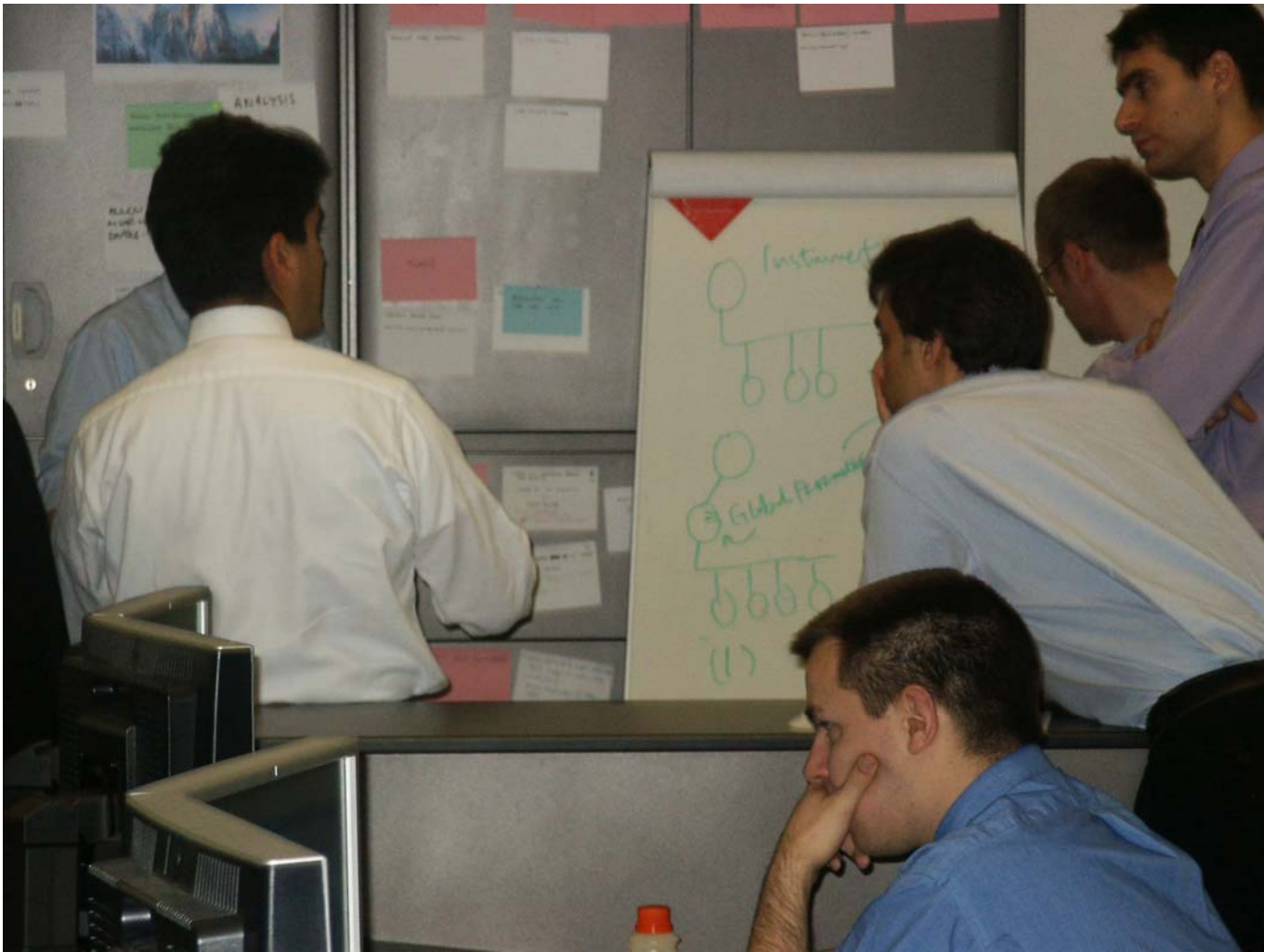


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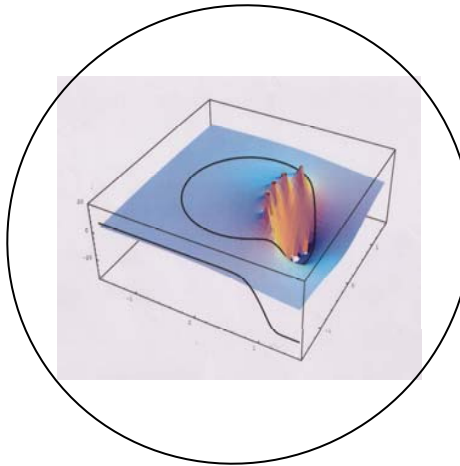




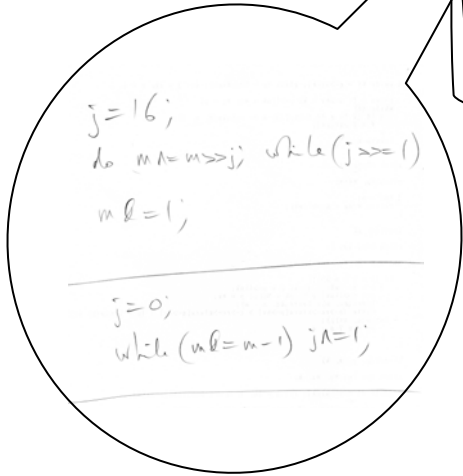


Helen Sharp

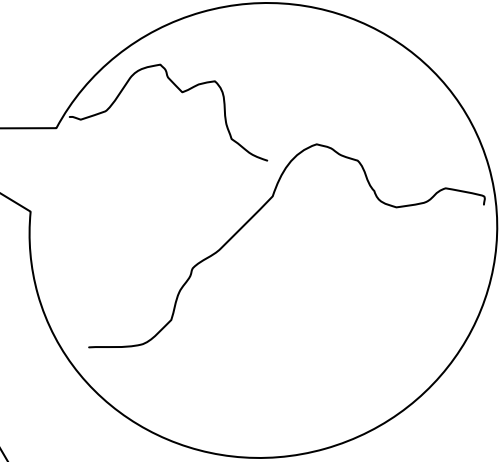




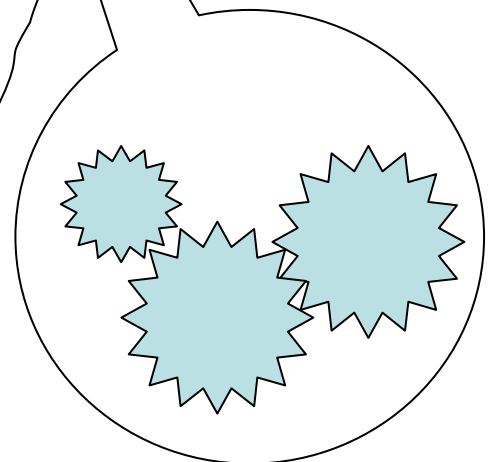
surfaces



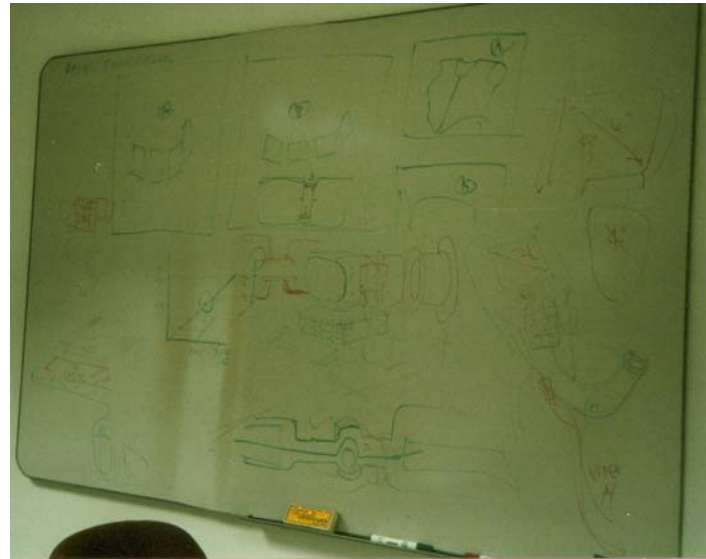
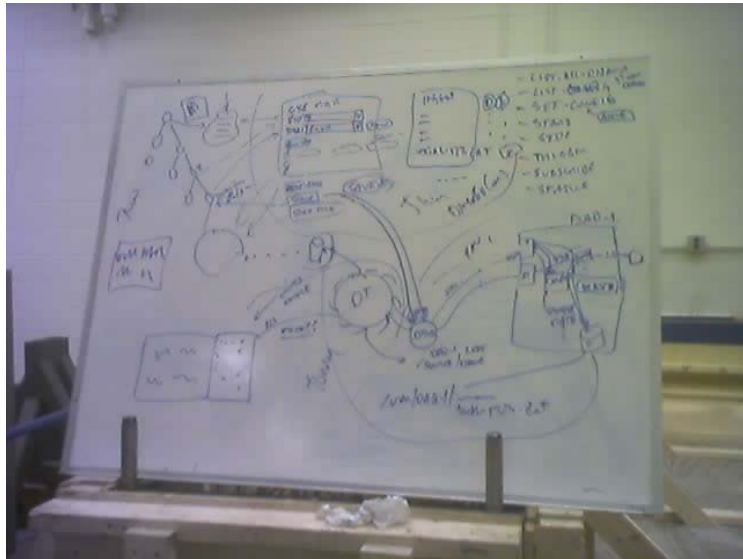
text with animation



landscapes



abstract machines



disciplines of innovation:

- ways to maintain the knowledge base
- ways to change perspective
- ways to expand the search space

Many of their strategies concern
expansion of the design space,
not just convergence to a solution.



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simplification (solving a simpler problem)

transformation (into another, easier to handle, form)

re-segmentation (dividing it up differently)

relaxing constraints (changing reality)

analogy (using differences to explore boundaries)

abstraction (solving the essence)

re-shaping the problem space (solving the problem
instead of the solution)

seeking insight (rather than solution *per se*)

nibbling (working at small bits that *can* be solved)



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Experts use systematic practices ...

- testing, debugging, code reviews
- daily discussions
- building tools to suit practice
- disciplines of innovation
- play, tinkering, bricolage

... that are socially embedded and reinforced

- pair debugging
- reliance on team to catch slips
→ freedom to experiment
- rewarding success
- roles related to skills





"heroic programming"
the guy w/ the award
who developed s/w that
worked for as long as he
stayed at the company and
stopped the day after

doing certain actions in the right order:

e.g.:

“Setting goals before taking action

Understand problems before generating solutions

Designing before writing design documents

Validating designs before investing in code

Steak before sizzle”

John Schrag, Autodesk

<http://dux.typepad.com/dux/2009/07/values-in-software-design-practice-.html>

exploration

- creativity
- provisionality
- design alternatives
- the role of error
- tinkering / bricolage / play





TDI Blog | Design: Metserve Ent.

cognitive issues

- **abstraction** is hard, and comes at a cognitive cost
- **bias** in perception, attention, cognition, judgment
- the need for **operational models**



experts can:

- identify what is relevant and important and to ignore the unimportant;
- match strategies to tasks;
- recognise resonances across domains;
- have and use strategies for dealing with intractable problems by recognising analogies or transforming them into simpler problems;
- understand the consequences of design decisions, to encompass both abstraction and detail;
- handle conflicts among constraints or principles.



reflective practice

- systematic efforts to alter perspective
- deliberate changes of representations, of paradigms
- cultivating an awareness of alternatives
- reviews of experience
- tolerance for error

“Sound methodology can empower and liberate the creative mind; it cannot inflame or inspire the drudge.”

(Brooks)



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