Empirical Modelling as *Construction*

An Experiential Framework for Learning (EFL)
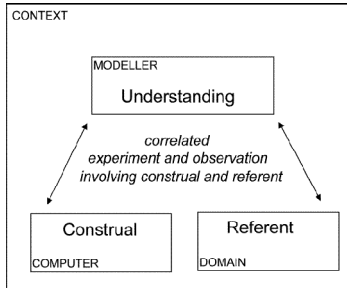
private experience / empirical / concrete

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

"Formal specification from an observation-oriented perspective"

```
first = 4; last = 7; next=0;

proc heapmake : next  {
        if (next && first>1 && is_heap) {
                first--;
                next=0;
        }
}

proc outsort : next  {
        if (first==1 && last>0 && next==1 && is_heap) {
                last--;
                exc(1, last+1);
                next=0;
        }
}
```

Automated version of heapsort: phases
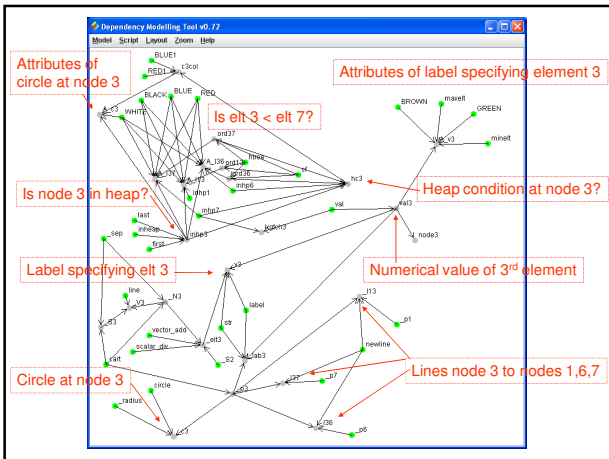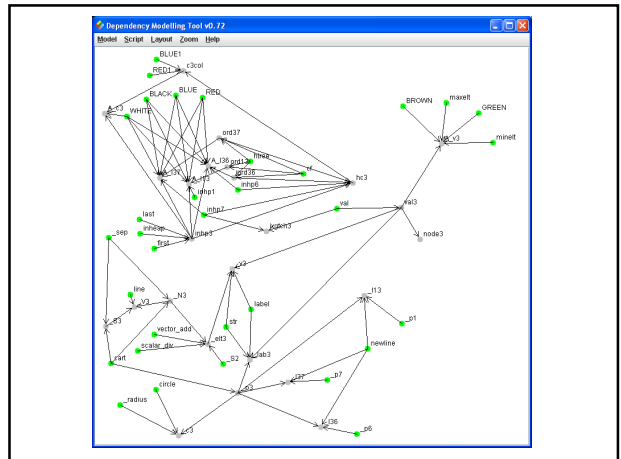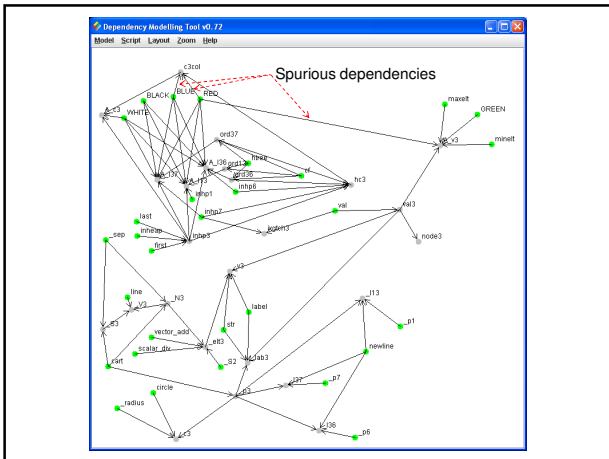

```
next = 0;

proc maintainheap1: hc1, next {
        if (!hc1 && next==1) {
        todo("exc(1, ixgtch1);");
        next =0;
        }
}

proc nextstep : heapwin_mouse {
        if (heapwin_mouse[2]==4 && next==0) next++;
}
```

Automated version of heapsort: agents

Spurious dependencies

Attributes of circle at node 3

Attributes of label specifying element 3

Is elt 3 < elt 7?

Is node 3 in heap?

Heap condition at node 3?

Label specifying elt 3

Numerical value of 3rd element

Circle at node 3

Lines node 3 to nodes 1,6,7

The experimental paradox

A key element in specialising from multi-agent Empirical Modelling to traditional programming is concerned with a reinterpretation of action associated with experiment:

… an action is at first carried out with uncertain expectations about the outcome …

… the very same action is subsequently carried out with absolute conviction that the outcome will be as expected